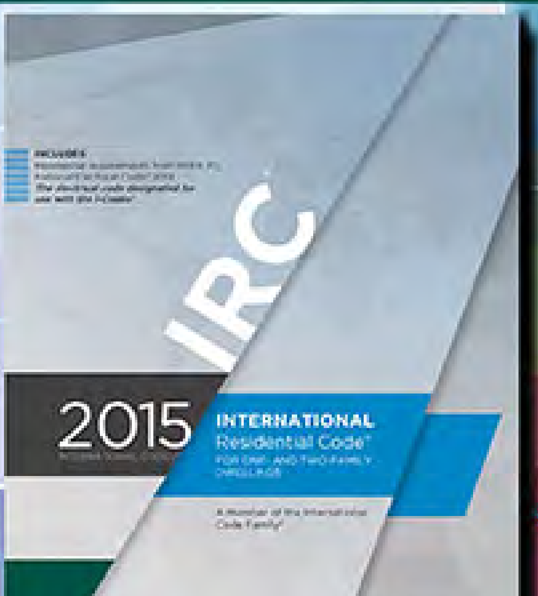
COMPLETE REVISION HISTORY TO THE 2015 I-CODES®

Successful Changes and Public Comments



ICC
INTERNATIONAL CODE COUNCIL®

Complete Revision History to the 2015 I-Codes: Successful Changes with Public Comments: 2015 IRC

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INTRODUCTION

Why did IRC/2015 section R602.10.5 change from the 2012 edition? This Complete Revision History to the 2015 I-Codes: Successful Changes with Public Comments: 2015 IRC has been compiled to provide the answers to such questions.

This Complete Revision History to the 2015 I-Codes: Successful Changes with Public Comments: 2015 IRC provides the published documentation for each successful code change in the IRC/2015 since the 2012 edition. Each changed code section is listed in the Table of Changes which contains three headings. The first heading is 2015 IRC" which lists the section number in the 2015 code. If (new) appears after the section number it indicates that the section is new in 2015. If (deleted) is indicated in 2015 it means that the section no longer exists and the second column 2012 IRC will show the section number that was deleted. Also, the second heading will indicate if a section number has changed from 2012 to 2015. If there is nothing indicated in the 2012 column, the section number remained the same. The third heading lists the code change number(s) which affected that particular section. The published material for each change is contained in the Documentation section.

HOW TO USE THE HANDBOOK

This Complete Revision History to the 2015 I-Codes: Successful Changes with Public Comments: 2015 IRC makes it possible for the reader to examine, in one location, all published information about a particular code change. For any given change, the text of the proposed change, committee actions and modifications, assembly actions, successful public comments, and final action can be found by using the following steps:

1. Locate the code section in the Table of Changes using the 2015 IRC section number.
2. Note the corresponding proposed code change number(s) from the list.
3. Locate the proposed code change number (listed in numerical order under the appropriate year and letter designation) in the Documentation section to read the complete chronological documentation of the proposed change.

SOURCE DOCUMENTS

The code development cycle (see page vii) involves the publication of four documents, the result of 1) public submittal of proposed changes, 2) Report of Committee Action, 3) submittal of public comments to the committee or assembly actions, and 4) final action results. Under each code change number in the Documentation section of this handbook, material corresponding to that individual proposed change has been drawn from each of the four publications. One code change cycle occurred between published editions of the 2012 and 2015 IRC; therefore, the Documentation section of this handbook contains material collected from the following published documents:

2013 Documentation

2013 Proposed Changes to the International Codes
2013 Report of the Committee Action on the International Codes
2013 Public Comment Agenda on the International Codes
Final Action on 2013 Proposed Changes to the International Codes

Unsuccessful proposed changes have not been included since they do not directly affect the final content of the code section.

Code Change No: RB79-13

Code change numbers are identified with a letter and a year designation. For instance, **RB79-12** is proposed change number **79** to the International Residential Code Building Committee and was submitted in the **13** (2013) code change cycle. (See Code Change Numbers on page v for a discussion of code committees)

Original Proposal

This is the proposal as published in the 2013 Proposed Changes to the International Codes. It includes the section number(s), proponent's name, who they are representing, the text of the proposed change and their reason for the change. This is a change to IRC Section R302.2.4.

Public Hearing Results

This is the result of the Code Development Hearing held to consider the change, as published in the 2013 Report of the Committee Action Hearing to the International Codes. It includes the committee's action (Approval as submitted) and reason for the action and also identifies if there was an assembly motion (none).

Public Comments

This is text of the submitted public comment, as published in the 2013 Public Comment Agenda to the International Codes. It includes the public commenter's name and affiliation, the requested action to be considered at the Public Comment Hearing (Approved as Modified) and the reason.

Final Hearing Results

This is the action taken by the eligible voting members of the ICC at the Final Action Hearing, as published in the Final Action on 2013 Proposed Changes to the International Codes. The Final Action was AMPC which means the eligible voting members of ICC overturned the committee=s action and approved the change based on the submitted public comment.

CODE CHANGE NUMBERS

The following is the legend for code change numbers, along with the applicable committee and the committee's primary area of responsibility relative to the IRC.

Prefix	Code Committee	Primary IRC Chapters Affected
RB	IRC Building/Energy Committee	Chapters 1-11
RM	IRC Mechanical Committee	Chapters 2, 12-23
FG	IFGC Committee	Chapter 24
RP	IRC Plumbing Committee	Chapters 2, 25-33
FS	IBC Fire Safety Committee	Chapter 3
G	IBC General Committee	Chapter 3
E	IBC Means of Egress Committee	Chapter 3
S	IBC Structural Committee	Chapters 3 - 10
RE	International Residential Energy Code Development Committee	Chapter 11
F	IFC Committee	Chapter 3
M	IMC Committee	Chapters 2, 12-23
P	IPC Committee	Chapters 2, 25-33

Although most changes to the IRC are found under proposed change numbers beginning with an RB, RM, RP, RE or FG, some changes to the IRC are published within a proposed change to the other *International Codes,* and therefore are found under a proposed code change number beginning with one of the other letters listed above. See page vii for discussion on the IRC fuel gas and electrical provisions.

CODE SECTION NUMBER DIFFERENCES

For editorial reasons, some code section numbers in the 2015 edition have changed from the 2012 edition. The numbering of code sections is an editorial task which takes place outside of the normal code development cycle, and is necessary to avoid duplicate or non-sequential section numbers.

The Table of Changes typically references the 2012 code section numbers that have been deleted. (See Introduction)

In most cases the section numbers have not changed from the 2012 to the 2015 edition. However, the reader should remember that it is always the 2012 code section numbers which appear in the material contained in the Documentation section. This is due to proposed changes which have as their basis, a section number in the 2012 edition. Since an attempt to correlate code sections by number may lead to confusion, the user is advised to rely on the section content rather than the numbers to locate and compare parallel sections in the two editions.

ABBREVIATIONS FOR ACTIONS

In the Documentation section, the following abbreviations are used to signify committee or final action:

Legend for 2013 Documentation:

AS	=	Approved as Submitted
D	=	Disapproved
AM	=	Approved as Modified by the Code Committee
AMPC	=	Approved as Modified by a Public Comment
WP	=	Withdrawn by Proponent

CODE CORRELATION COMMITTEE

During the course of the code development process, there are editorial issues, issues related to code correlation problems arising from code changes, and issues related to the appropriate committee that should consider certain topics. These issues are placed before the ICC Code Correlation Committee for resolution. During the development of the 2015 Code, from 2012 to 2014, the Code Correlation Committee met 2 times to discuss and resolve these issues. Code Correlation Committee actions are posted on the ICC website in the Code Development Section.

PART VI — FUEL GAS
CHAPTER 24
FUEL GAS

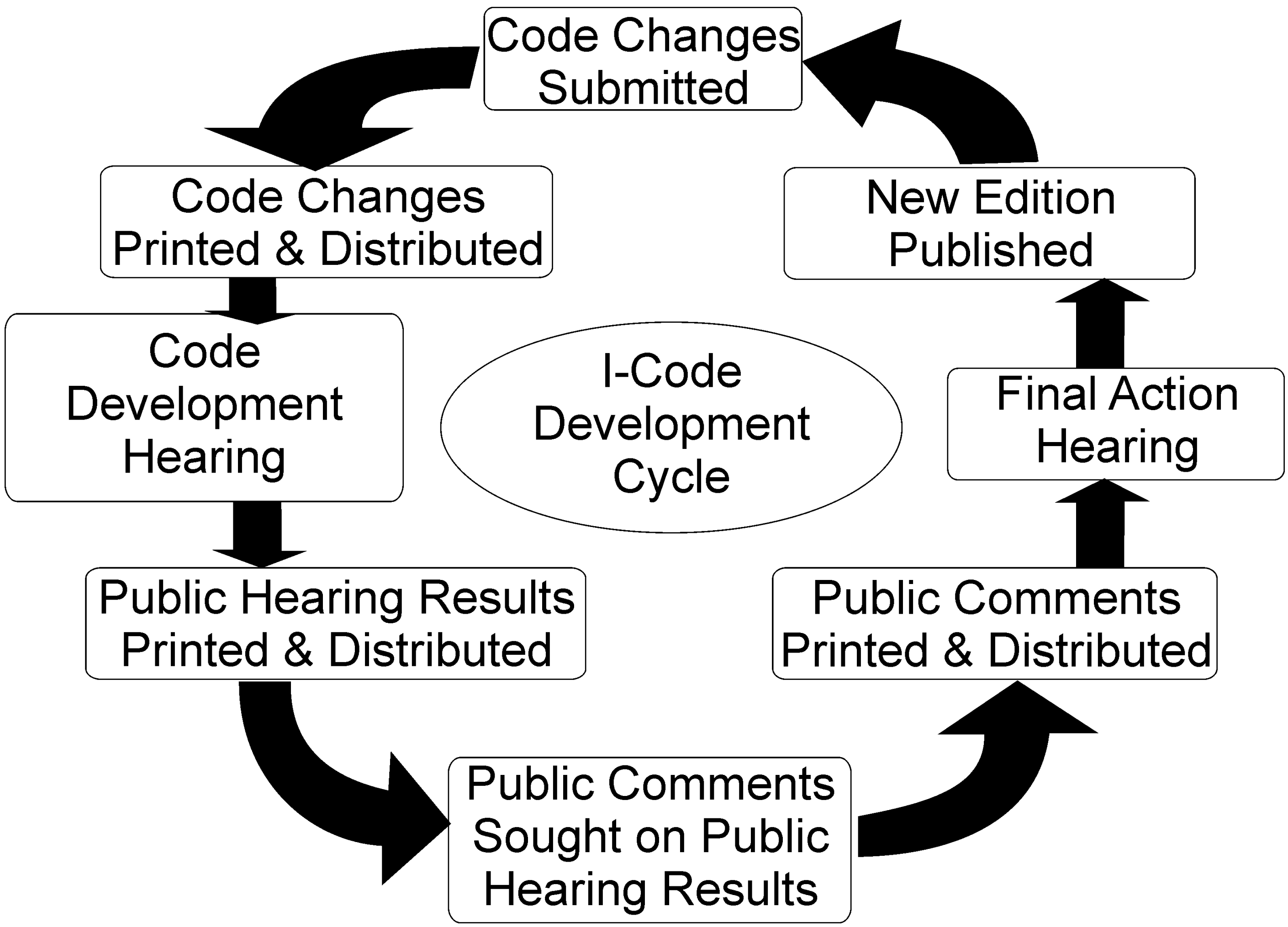
The provisions contained in Chapter 24 of the *International Residential Code* are reproduced from the *International Fuel Gas Code*. Because Chapter 24 is reproduced from the *International Fuel Gas Code*, Chapter 24 is not revised by code change proposals submitted for the *International Residential Code*. Instead, Chapter 24 is revised by the code change proposals that are submitted for the *International Fuel Gas Code* and the *National Fuel Gas Code* (ANSI Z223.1). For this reason, the code change proposals shown as affecting Chapter 24 are, in reality, the *International Fuel Gas Code* or the *National Fuel Gas Code* (ANSI Z223.1) proposals.
Changes made to sections designated by an asterisk in the Table of Changes (page xviii) are the result of the Standards Development Process that maintains the *National Fuel Gas Code* (ANSI Z223.1), for which the American Gas Association is the Administrative Secretariat. (See explanation under Maintenance on page IV of the preface of the *International Fuel Gas Code*)

PART VIII — ELECTRICAL
CHAPTER 34
GENERAL REQUIREMENTS

The electrical provisions found in Chapters 34 through 43 are based on NFPA 70-2014 and are maintained by the NFPA. All changes to the provisions in these chapters are the result of the Standards Development Process that maintains the *National Electrical Code*, (NFPA 70). All sections that have been revised are listed herein. (See explanation paragraphs at the beginning of Chapter 34 in the *International Residential Code*)

ICC CODE DEVELOPMENT PROCESS

The following depicts the key steps in ICC's Code Development Process:



The procedures governing ICC Code Development are entitled Code Development Process for the International Codes. These procedures are updated periodically and therefore not included here. To obtain the current version, visit ICC's website at www.iccsafe.org.

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R505.3.3.1		RB258-13
R505.3.4		RB258-13
Deleted	Table R505.3.4(1)	RB258-13
Deleted	Table R505.3.4(2)	RB258-13
Figure R505.3.4(2)		RB258-13
Deleted	Table R505.3.4(3)	RB258-13
Deleted	Table R505.3.4(4)	RB258-13
R506.2.2		RB259-13
R507		RB267-13
R507.1		RB264-13 AMPC2
R507.2		RB265-13 AMPC2
Table R507.2		RB265-13 AMPC1,2
R507.2.1 (New)		RB264-13 AMPC2
R507.2.2 (New)		RB265-13 AMPC2
R507.2.3 (New)		RB265-13 AMPC2
Figure R507.2.3(1)	Figure R507.2.3	RB262-13 AMPC2
Figure R507.2.3(2)	Figure R507.3(2)	RB262-13 AMPC2
Table R502.3.1(1)		RB248-13, RB250-13 AMPC
Table R502.3.1(2)		RB248-13, RB250-13 AMPC
Table R502.3.3(1)		RB247-13, RB249-13
Table R502.3.3(2)		RB247-13, RB249-13
R507.2.4	R507.2.3	RB260-13, RB262-13 AMPC2
Deleted	R507.3	RB267-13
R507.3 (New)		RB260-13, RB262-13 PC2
Deleted	R507.3.1	RB267-13
R507.3.1 (New)		RB267-13
R507.3.2 (New)		RB267-13
R507.3.3 (New)		RB267-13
R507.3.4 (New)		RB267-13
R507.3.5 (New)		RB267-13
R507.4 (New)		RB264-13 AMPC2
Table R507.4 (New)		RB264-13 AMPC2
R507.5 (New)		RB264-13 AMPC2
Figure R507.5 (New)		RB264-13 AMPC2
Table R507.5 (New)		RB264-13 AMPC2
R507.5.1 (New)		RB264-13 AMPC2
R507.6 (New)		RB264-13 AMPC2
Figure R507.6 (New)		RB264-13 AMPC2
Table R507.6 (New)		RB264-13 AMPC2
R507.7 (New)		RB264-13 AMPC2
R507.7.1		RB264-13 AMPC2
Figure R507.7.1 (New)		RB264-13 AMPC2
R507.8 (New)		RB264-13 AMPC2
R507.8.1 (New)		RB264-13 AMPC2
Figure R507.8.1(New)		RB264-13 AMPC2
Table R507.8 (New)		RB264-13 AMCP2

CHAPTER 6
WALL CONSTRUCTION

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
R602.1 (New)		RB269-13
R602.1.1	R602.1	RB269-13
R602.1.4	R602.1.3	RB242-13

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2015 IRC	2012 IRC	CODE CHANGE NUMBER(S
R602.1.6 (New)		RB243-13
R602.1.7 (New)		RB243-13
R602.1.8 (New)		RB269-13
R602.1.9 (New)		RB269-13
R602.1.10 (New)		RB269-13
R602.3		RB252-13, RB255-13, RB269-13
Table R602.3(1)		RB43-12 AMPC, RB271-13, RB272-13, RB273-13, RB274-13, RB275-13, RB276-13, RB278-13 AMPC2, RB279-13
Table R602.3(2)		RB43-13 AMPC, RB271-13, RB280-13
Table R602.3(3)		RB271-13
Table R602.3(5)		RB281-13 AMPC
R602.3.1		RB283-13 AMPC
Deleted	Table R602.3.1	RB283-13 AMPC
Table R602.3.1		RB43-13 AMPC, RB271-13 PC2,
R602.3.2		RB284-13
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R602.3.5		RB271-13
R602.7		RB252-13
Table R602.7(1)	Table R502.5(1)	RB252-13
Table R602.7(2)	Table R502.5(2)	RB252-13
R602.7.1		RB287-13 AMPC
Deleted	Table R602.7.1	RB252-13
Figure R602.7.1(1)		RB287-13 AMPC
Figure R602.7.1(2)		RB287-13 AMPC
R602.7.2 (New)		RB288-13 AMPC
Figure R602.7.2 (New)		RB288-13 AMPC
Figure R602.7.3	Figure R602.7.2	RB285-13
R602.7.4 (New)		RB286-13 AMPC
Table R602.7.4 (New)		RB286-13 AMPC
R602.7.5 (New)		RB286-13 AMPC
Table R602.10.1.3		RB271-13
R602.10.2.2.1		RB290-13, RB292-13
Table R602.10.3(1)		RB271-13, RB293-13, RB295-13
Table R602.10.3(2)		RB296-13
Table R602.10.3(3)		RB295-13, RB297-13
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R602.10.5		RB271-13, RB310-13
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Table R602.10.6.1		RB271-13
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Figure R602.10.6.3		RB312-13, RB313-13
Figure R602.10.6.4		RB312-13, RB313-13
Table R602.10.6.4		RB271-13
R602.10.6.5.1		RB271-13, RB315-13
R602.10.8.2		RB271-13, RB319-13
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R602.10.9.1		RB214-13
R602.10.11		RB321-13, RB322-13
R602.12		RB271-13, RB324-13 AMPC, RB325-13
Table R602.12.4		RB324-13 AMPC, RB325-13
R602.12.6.2		RB327-13
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R603.3.2		RB44-13, RB284-13 AMPC
R603		RB330-13
R603.1		RB330-13
R603.1.1		RB330-13
R603.2		RB330-13

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2015 IRC	2012 IRC	CODE CHANGE NUMBER(S
Deleted	Table R603.2(1)	RB330-13
Deleted	Table R603.2(2)	RB330-13
R603.2.1		RB330-13
R603.2.2	R603.2.3	RB330-13
R603.2.3 (New)		RB330-13
Table R603.2.3 (New)		RB330-13
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Figure R603.2.3(2)	Figure R603.2(2)	RB330-13
Deleted	Table R603.2.4	RB330-13
R603.2.5	R603.2.4	RB330-13
R603.2.6.1	R603.2.5	RB330-13
R603.2.6.2	R603.2.5.2	RB330-13
R603.2.6.3	R603.2.5.3	RB330-13
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Table R603.3.2(1)		RB330-13
Table R603.3.2(2)		RB330-13
Deleted	Table R603.3.2(3)	RB330-13
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Table R603.3.2(4)	Table R603.3.2(6)	RB330-13
Deleted	Table R603.3.2(5)	RB330-13
Deleted	Table R603.3.2(7)	RB330-13
Table R603.3.2(5)	Table R603.3.2(8)	RB330-13
Deleted	Table R603.3.2(9)	RB330-13
Table R603.3.2(6)	Table R603.3.2(10)	RB330-13
Table R603.3.2(7)	Table R603.3.2(12)	RB330-13
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Deleted	Table R603.3.2(15)	RB330-13
Table R603.3.2(9)	Table R603.3.2(16)	RB330-13
Deleted	Table R603.3.2(17)	RB330-13
Table R603.3.2(10)	Table R603.3.2(18)	RB330-13
Deleted	Table R603.3.2(19)	RB330-13
Table R603.3.2(11)	Table R603.3.2(20)	RB330-13
Deleted	Table R603.3.2(21)	RB330-13
Table R603.3.2(12)	Table R603.3.2(22)	RB330-13
Deleted	Table R603.3.2(23)	RB330-13
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Table R603.3.2(14)	Table R603.3.2(26)	RB330-13
Deleted	Table R603.3.2(27)	RB330-13
Table R603.3.2(15)	Table R603.3.2(28)	RB330-13
Deleted	Table R603.3.2(29)	RB330-13
Table R603.3.2(16)	Table R603.3.2(30)	RB330-13
Deleted	Table R603.3.2(31)	RB330-13
R603.3.2.1		RB330-13
Table R603.3.2.1(1)		RB330-13
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Table R603.3.2.1(2)	Table R603.3.2.1(3)	RB330-13
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Table R603.7(2)		RB330-13

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2015 IRC	2012 IRC	CODE CHANGE NUMBER(S
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R603.9.2		RB330-13
Table R603.9.2(1)		RB330-13
Deleted	R603.9.2.2	RB330-13
R603.9.2.2	R603.9.2.3	RB330-13
R603.9.4.1		RB330-13
R603.9.4.2		RB330-13
Figure R603.9.4.2	Figure R603.9.2	RB330-13
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Table R603.9.5(2) (New)		RB371-13
Table R603.9.5(3) (New)		RB371-13
Table R603.9.5(4) (New)		RB371-13
R603.9.5.2		RB371-13
R604.1		RB255-13
R604.3		RB331-13
R606.2 thru R606.2.7 (New)		RB332-13
R606.2.7.1	R607.1.1	RB332-13
R606.2.7.2	R607.1.2	RB332-13
R606.2.7.3	R607.1.2	RB332-13
Table R606.2.7	Table R607.1	RB332-13
R606.2.8 (New)		RB332-13
R606.2.9 (New)		RB332-13
R606.2.10 (New)		RB332-13
R606.2.11	R609.1.1	RB332-13
Table R606.2.11	Table R609.1.1	RB332-13
R606.2.12 (New)		RB332-13
R606.3		RB332-13
R606.3.1	R607.2.1	RB332-13
R606.3.2	R607.2.2	RB332-13
R606.3.2.1	R607.2.2.1	RB332-13
R606.3.2.2	R607.2.2.2	RB332-13
R606.3.3	R607.3	RB332-13
R606.3.4	R606.13	RB332-13
R606.3.4.1	R606.15.1	RB332-13
Table R606.3.4.1	Table R606.15.1	RB332-13
R606.3.5 (New)		RB332-13
R606.3.5.1		RB332-13
Table R606.3.5.1	R609.1.2	RB332-13
R606.3.5.2 (New)		RB332-13
R606.3.5.3 (New)		RB332-13
R606.4.3	R606.2.3	RB332-13
R606.6.2	R606.4.2	RB332-13
R606.6.3	R606.14	RB332-13
R606.6.3.1	R606.14.1	RB332-13
R606.7	R606.6	RB332-13
R606.8	R606.7	RB332-13
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R606.9	R606.5	RB332-13
R606.9.1	R606.5.1	RB332-13
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R606.12.3		RB332-13
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Deleted	R607	RB332-13
Deleted	R607.1	RB332-13
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2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
R606.14 thru R606.14.2 (New)		RB332-13
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R608 thru R608.10	R611 thru R611.10	RB332-13
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R610 thru R610.10	R613 thru R613.10	RB332-13
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R610.7	R613.7	RB345-13, RB346-13
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Table R613.5(2)		RB44-13, RB271-13

CHAPTER 7
WALL COVERING

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
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R702.3.3		RB349-13, RB350-13
R702.3.5		RB349-13, RB351-13
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R702.3.5.1	R702.3.6	RB349-13, RB351-13
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R703.1		RB359-13
R703.2		RB363-13, RB392-13
R703.3	R703.4	RB389-13, RB390-13, RB391-13, RB392-13 AMPC1,2,3,4
Table R703.3 (New)		RB368-13, RB374-13, RB383-13, RB385-13, RB387-13, RB389-13, RB392-13
Table R703.3(1) (New)		RB392-13 AMPC2
Table R703.3(2) (New)		RB392-13 AMPC1
R703.3.1 (New)		RB366-13, RB367-13, RB392-13 AMPC3
Table R703.3.1 (New)		RB392-13 AMPC3
R703.3.2 (New)		RB392-13 AMPC4
Table R703.3.2 (New)		RB392-13 AMPC4
R703.3.3 (New)		RB392-13 AMPC2
Deleted	Table R703.4	RB392-13
R703.4	R703.8	RB378-13, RB379-13 RB380-13, RB392-13
R703.5	R703.3	RB392-13
Table R703.5 (New)		RB367-13
R703.5.1		RB369-13 AMPC1
R703.5.1 (New)		RB392-13
Table R703.5.1(2) (New)		RB369-13 AMPC2
Table R703.5.1(3) (New)		RB369-13 AMPC2
R703.5.2	R703.3.1	RB392-13
Table R703.5.2		RB369-13
R703.5.3	R703.3.2	RB392-13
Deleted	R703.5.3.1	RB369-13
R703.6.2	R703.5.1	RB369-13 AMPC1,2,3,5
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2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
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R703.8.2.1	R703.7.2.1	RB478-13
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R703.9		RB381-13
R703.9.1		RB381-13
R703.9.2		RB381-13
R703.10.1		RB382-13 AMPC
R703.10.2		RB475-13
R703.11.1.1 (New)		RB383-13
R703.11.1.2 (New)		RB383-13
R703.11.1.3 (New)		RB383-13
R703.11.1.4	R703.11.1.1	RB383-13
R703.11.2		RB385-13
R703.11.2.1		RB349-13, RB366-13
R703.11.2.2		RB349-13, RB366-13
R703.12		RB392-13
R703.12.3 (New)		RB392-13
R703.13 (New)		RB386-13
R703.13.1 (New)		RB386-13
R703.14 thru R703.14.2 (New)		RB387-13
R703.15 thru R703.15.2 (New)		RB389-13
R703.16 thru R703.16.2 (New)		RB390-13
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CHAPTER 8
ROOF-CEILING CONSTRUCTION

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R802.1 (New)		RB393-13
R802.1.1	R802.1	RB393-13
R802.1.3 (New)		RB242-13, RB393-13
R802.1.6 (New)		RB243-13
R802.1.7 (New)		RB244-13
R802.3		RB394-13
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Table R802.5.1(1)		RB248-13, RB250-13
Table R802.5.1(2)		RB248-13, RB250-13
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Table R802.5.1(7)		RB248-13, RB250-13
Table R802.5.1(8)		RB248-13, RB250-13
R802.7.2		RB243-13
R802.10.2.1		RB43-13 AMPC, RB44-13, RB396-13
Table R802.11 (New)		RB396-13 AMPC
R802.11.1		RB396-13
R802.11.1.2		RB397-13 AMPC1,2
R803.2.1		RB255-13
R803.2.3		RB49-13
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R804.2 thru R804.2.1		RB400-13
R804.2.2		RB400-13
Deleted	Table R804.2(2)	RB400-13

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2015 IRC	2012 IRC	CODE CHANGE NUMBER(S
R804.2.3 (New)		RB400-13
Table R804.2.3	Table R804.2(1)	RB400-13
Deleted	Table R804.2.4	RB400-13
R804.2.5	R804.2.4	RB400-13
R804.3		RB400-13
Table R804.3		RB400-13
R804.3.1.1		RB400-13
Table R804.3.1.1(1)	Table R804.3.1.1(5)	RB400-13
Table R804.3.1.1(2)	Table R804.3.1.1(7)	RB400-13
Table R804.3.1.1(3)	Table R804.3.1.1(9)	RB400-13
Deleted	Table R804.3.1.1(2)	RB400-13
Deleted	Figure R804.3.1.1(2)	RB400-13
Deleted	Table R804.3.1.1(3)	RB400-13
Deleted	Table R804.3.1.1(4)	RB400-13
Deleted	Table R804.3.1.1(6)	RB400-13
Deleted	Table R804.3.1.1(8)	RB400-13
Deleted	R804.3.1.2	RB400-13
R804.3.2.1		RB400-13
Table R804.3.2.1(1)		RB400-13
Deleted	Table R804.3.2(2)	RB400-13
Table R804.3.2.1(2)	Table R804.3.2.1(3)	RB400-13
R804.3.2.4		RB400-13
Deleted	R804.3.3 thru R804.3.3.4	RB400-13
Deleted	Table R804.3.3.2	RB400-13
Deleted	Table R804.3.3.3	RB400-13
Deleted	Table R804.3.3.4(1)	RB400-13
Deleted	Figure R804.3.3.4(1)	RB400-13
Deleted	Table R804.3.3.4(2)	RB400-13
Deleted	Table R804.3.3.4(3)	RB400-13
Deleted	Figure R804.3.3.4(3)	RB400-13
Deleted	Figure R804.3.3.4(4)	RB400-13
Deleted	Figure R804.3.3.4(5)	RB400-13
R804.3.7.1	R804.3.8.1	RB400-13
Table R804.3.7.1	Table R804.3.8(1)	RB400-13
R804.3.8	R804.3.9	RB400-13
Deleted	Table R804.3.8(2)	RB400-13
Deleted	Table R804.3.8(3)	RB400-13
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Table R806.5		RB405-13
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CHAPTER 9
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2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
R902		RM98-13 Part II
R902.1		RB408-13, RM98-13 Part II
R902.3 (New)		RM98-13 Part II
R902.4 (New)		RM98-13 Part II
R904.3		RB412-13
R905.1.1 (New)		RB435-13
Table R905.1.1(1) (New)		RB418-13, RB435-13
Table R905.1.1(2) (New)		RB413-13, RB435-13
Table R905.1.1(3) (New)		RB418-13, RB429-13, RB430-13, RB435-13
R905.1.2 (New)		RB425-13, RB435-13
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2015 IRC	2012 IRC	CODE CHANGE NUMBER(S
Table R905.2.4.1 (New)		RB418-13
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R905.2.5		RB422-13
Deleted	R905.2.7	RB435-13
R905.2.7	R905.2.7.1	RB435-13
R905.2.7.1		RB425-13 AMPC
Deleted	R905.2.7.2	RB435-13
R905.2.8.5		RB439-13
R905.3.3		RB435-13
Deleted	R905.3.3.1 thru R905.3.3.3	RB435-13
R905.3.7		RB43-13 AMPC
R905.7.5		RB369-13 AMPC5
Table R905.7.5(2) (New)		RB369-13 AMPC3
R905.8.6		RB369-13 AMPC5
R905.16		RB446-13
R905.16.1 (New)		RB446-13
R905.16.2 (New)		RB446-13
R905.16.3 (New)		RB446-13
R905.16.4 (New)		RB446-13
R905.16.4.1 (New)		RB446-13
R905.16.4.2 (New)		RB446-13
R905.16.5	R905.16.1	RB446-13
R905.16.6	R905.16.2	RB446-13
R905.16.7	R905.16.3	RB446-13
R907 thru R907.5 (New)		RB447-13
Deleted	R907.3	RB453-13
R908	R907	RB451-13
R908.1	R907.1	RB451-13
R908.2	R907.2	RB451-13
R908.3 (New)		RB453-13
R908.3.1 (New)		RB453-13
R908.3.1.1 (New)		RB453-13
R909 thru R909.1.3 (New)		RM98-13 Part II

CHAPTER 10
CHIMNEYS AND FIREPLACES

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
R1001.4.1.1		RB479-13
R1001.11		RB352-13
R1002.2		RB455-13
R1002.5		RB455-13
R1003.4.1.1		RB479-13
R1003.18		RB458-13
R1004.5		RB459-13
R1006.2		RB461-13
R1006.5		RB461-13

Part IV — Energy Conservation

Note: *Sections N1101.2 through N1105 are extracted from the 2015 edition of the* International Energy Conservation Code—Residential Provisions *and have been editorially revised to conform to the scope and application of this code. The section numbers appearing in parenthesis after each section number are the section numbers of the corresponding text in the* International Energy Conservation Code—Residential Provisions.

CHAPTER 11 [RE]
ENERGY EFFICIENCY

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
Deleted	N1101.3	CE4-13 Part II AMPC2
N1101.5	N1101.8	RE3-13
N1101.5.1 (New)		CE37-13 Part II AMPC
ALTERATION (New)		ADM51-13 Part III
CIRCULATING HOT WATER SYSTEM (New)		CE49-13 Part III AMPC
CLIMATE ZONE (New)		CE50-13 Part II
CONDITIONED SPACE		CE51-13 Part II
CONTINUOUS INSULATION (New)		CE52-13 Part II
ERI REFERENCE DESIGN (New)		RE188-13
ROOF RECOVER (New)		CE15-13 Part II
ROOF REPAIR (New)		CE15-13 Part II
ROOF REPLACEMENT (New)		CE15-13 Part II
N1101.7	N1101.10	CE61-13 Part II, CE62-13 Part II
Figure N1101.7	Figure N1101.10	CE 62-13 Part II
Table N1107.7	Table N1101.10	CE61-13 Part II, CE62-13 Part II
Deleted	N1102.3.6	CE4-13 Part II AMPC2
N1101.8 (New)		CE66-13
N1101.10.1	N1101.12.1	CE63-13 Part II
N1101.10.3	N1101.12.3	CE65-13
N1101.10.4.1 (New)		CE67-13 Part II
N1101.13	N1101.15	RE188-13
N1101.13.1 (New)		CE66-13
N1101.14	N1101.16	RE14-13, RE16-13
N1102.1		CE23-13 Part II, RE18-13
N1102.1.1 (New)		RE18-13
Table N1102.1.2	Table N1102.1.1	RE63-13
Table N1102.1.4	Table N1102.1.3	RE50-13
N1102.2.1	N1102.2.2	RE53-13
N1102.2.7 (New)		RE63-13
N1102.2.8	N1102.2.7	RE60-13
N1102.3.5		RE68-13
Table N1102.4.1.1		RE60-13, RE83-13, RE84-13, RE85-13, RE86-13
N1102.4.1.2		RE91-13
N1103.1.1		RE103-13, RE105-13
N1103.2 (New)		CE362-13 Part II
N1103.3.1	N1103.2.1	RE107-13
N1103.3.2	N1103.2.2	RE109-13, RE111-13, RE117-13
N1103.3.3	N1103.2.2	RE109-13, RE118-13
N1103.3.4	N1103.2.2	RE109-13 RE118-13
N1103.5.1 thru N1103.5.1.2 (New)		RE125-13 Part I
N1103.5.2 (New)		RE136-13 Part I AMPC2

CHAPTER 11 [RE] - continued

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
N1103.5.4 (New)		CE283-13 Part II
N1103.7	N1103.6	RE142-13
N1103.10 (New)		SP19-13 Part III AMPC1
N1103.10.1	N1103.9	SP19-13 Part III AMPC1
N1103.10.2	N1103.9.1	SP19-13 Part III AMPC1
N1103.10.3	N1103.9.2	SP19-13 Part III AMPC1
N1103.10.4	N1103.9.3	SP19-13 Part III AMPC1
N1103.11 (New)		SP19-13 Part III AMPC1
N1103.12 (New)		SP19-13
N1105.4.2		RE163-13
N1105.4.2.1 (New)		RE163-13
N1105.4.2.2 (New)		RE163-13
N1106 thru N1106.7.3 (New)		RE188-13
N1107.1 thru N1110 (New)		CE4-13 Part II AMPC2

Part V — Mechanical

CHAPTER 13
GENERAL MECHANICAL SYSTEM REQUIREMENTS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
M1305.1		RM2-13 AMPC
M1305.1.3.1		RM3-13
M1305.1.4.3		RM4-13
M1306.2 thru M1306.2.2		RM5-13
M1307.2		RM6-13, RM7-13
M1308.1		RB258-13

CHAPTER 14
HEATING AND COOLING EQUIPMENT

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
M1401.3		RM89-13 AMPC1
M1403.1		RM11-12, RM12-13, RM13-13
Deleted	M1403.2	RM14-13
M1410.1		RM15-13
M1410.2		RM16-13
M1411.3.2		RM19-13, RM20-13
M1411.3.3 (New)		RM21-13
M1411.4 (New)		RM22-13
M1411.6 (New)		RM23-13
M1412.1		RM25-13
M1413.1		RM26-13

CHAPTER 15
EXHAUST SYSTEMS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
M1502.4.4 (New)		RM101-13
M1502.4.5	M1502.4.4	RM100-13, RM101-13
M1502.4.5.3 (New)		RM100-13
M1502.4.6	M1502.4.5	RM29-13, RM101-13
M1503.1		RM30-13
M1503.2		RM30-13

CHAPTER 15 - continued

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
M1503.4		RM34-13
M1503.4.1 (New)		RM27-13 AMPC
M1506.1		RM36-13
M1506.2 (New)		RM36-13
Table R1506.2 (New)		RM36-13
M1506.3	M1506.2	RM36-13

CHAPTER 16
DUCT SYSTEMS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
M1601.4.1		RM53-13
M1601.4.3		RM56-13 AMPC
M1804.4		RM59-13

CHAPTER 19
SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
Deleted	M1901.3	RM61-13

CHAPTER 20
BOILERS AND WATER HEATERS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
M2001.1		RM62-13 AMPC
M2002.5		RM63-13
M2002.6		RM63-13
M2005.1		RM64-13

CHAPTER 21
HYDRONIC PIPING

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
Table M2101.1		RM65-13, RM66-13, RM67-13, RM73-13
Table M2101.9		RM68-13, RM69-13
M2101.10		RM66-13
M2103.1		RM70-13, RM71-13
M2103.3		RM72-13, RM73-13, RM74-13
M2102.6		RB258-13
M2103.3		RM72-13 AMPC
M2104.2		RM75-13
Deleted	M2104.2.1	RM66-13, RM67-13
Deleted	M2104.2.1.1	RM66-13, RM67-13
Deleted	M2104.2.1.2	RM66-13, RM67-13
Deleted	M2104.2.1.3	RM66-13, RM67-13
M2104.3		RM75-13
M2104.3.3		RM75-13
M2105.1		RM66-13, RM67-13
M2105.2		RM66-13, RM67-13
M2105.3		RM66-13, RM67-13
M2105.4		RM66-13, RM67-13

CHAPTER 21 - continued

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
Table M2105.4		RM66-13
M2105.5		RM66-13, RM67-13
M2105.5		RM66-13
M2106 thru M2106.9		RM66-13, RM67-13
M2107 thru M2107.2		RM66-13, RM67-13
M2108 thru M2108.11		RM66-13, RM67-13
M2109 thru M2109.1		RM66-13, RM67-13
M2110 thru M2110.1		RM66-13
M2111 thru M2111.1		RM66-13

CHAPTER 22
SPECIAL PIPING AND STORAGE SYSTEMS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
M2201.6		RB193-13 AMPC
M2202.1		RM76-13

CHAPTER 23
THERMAL SOLAR ENERGY SYSTEMS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
M2301.2		RM7-13, RM79-13
M2301.2.3		RM82-13
M2301.2.5		RM84-13
M2301.2.7		RM86-13
M2301.2.8		RM84-13, RM85-13
M2301.2.10 (New)		RM88-13
M2301.2.11 (New)		RM88-13
M2301.2.11.1	M2301.2.8	RM84-13, RM88-13
M2301.2.11.2 (New)		RM88-13
M2301.2.12	M2301.2.9	RM84-13, RM88-13
M2301.2.13 (New)		RM7-13, RM84-13, M88-13
M2301.3.1		RM89-13
M2301.4		RM90-12, RM91-13
M2301.6 (New)		RM92-13 AMPC
M2301.6 (New)		RM93-13 AMPC2
M2301.6.1 (New)		RM93-13 AMPC2
M2301.6.2 (New)		RM93-13 AMPC2
Deleted	M2302.1	RM98-13 Part I
Deleted	M2302.2	RM98-13 Part I
Deleted	M2302.2.1	RM98-13 Part I
Deleted	M2302.2.2	RM98-13 Part I
Deleted	M2302.2.3	RM98-13 Part I
Deleted	M2302.3	RM98-13 Part I
Deleted	M2302.4	RM98-13 Part I

Part VI ─ Fuel Gas

CHAPTER 24
FUEL GAS

The provisions contained Chapter 24 of the *International Residential Code* are reproduced from the *International Fuel Gas Code.* Because Chapter 24 is reproduced from the *International Fuel Gas Code,* Chapter 24 is not revised by code change proposals that are submitted for the *International Fuel Gas Code* and the *National Fuel Gas Code* (ANSI Z223.1).

Part VII — Plumbing

CHAPTER 25
PLUMBING ADMINISTRATION

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
P2503.4		RP4-13 AMPC
P2503.5.1		RP8-13 AMPC

CHAPTER 26
GENERAL PLUMBING REQUIREMENTS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
P2601.2		RP11-13
P2602.1		RP12-13 AMPC
P2603.2		RB258-13
P2603.2.1		RP14-13
P2603.3		RP16-13
P2604.2		RP17-13
P2604.4		RP18-13
Deleted	Figure R2604.4	RP18-13
Table P2605.1		RP19-13 AMPC, RP20-13, RP21-13
P2607.1		RP23-13 AMPC
P2607.2 (New)		RP23-13 AMPC
P2609.1		RP24-13, RP25-13
P2609.4		RP27-13

CHAPTER 27
PLUMBING FIXTURES

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
P2701.1		RP28-13, RP36-13
Table P2701.1		RP30-13
P2702.1		RP32-13
P2702.2		RP33-13
P2705.1		RP34-13
P2706.1		RP32-13
P2706.1.1 (New)		RP32-13
P2706.1.2	P2706.2	RP32-13
P2706.1.2.1	P2706.2.1	RP32-13
P2707.1		RP29-13
P2708.2 (New)		RP154-13
P2710.1		RP39-13
P2712.1		RP40-13
P2716		RP29-13
P2716.1		RP29-13
P2716.2		RP29-13, RP42-13
P2717.1		RP43-13
P2717.3		RP29-13

CHAPTER 28
WATER HEATERS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
P2801.1		RP48-13
P2801.2 (New)		RP49-13
P2801.5		RP50-13, RP51-13
P2801.5.1		RP53-13

CHAPTER 28 - continued

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
P2802 (New)		RM87-13 AMPC
P2802.1 (New)		RM87-13 AMPC
P2802.2 (New)		RM87-13 AMPC
P2803.6.1		RP55-13, RP56-13

CHAPTER 29
WATER SUPPLY AND DISTRIBUTION

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
P2901.1		RP57-13
P2901.2 (New)		RP57-13
P2901.2.1 (New)		RP57-13
Figure P2901.2.1 (New)		RP57-13
P2901.2.2 (New)		RP57-13
P2901.2.2.1 (New)		RP57-13
P2901.2.2.2 (New)		RP57-13
Table P2901.2.2.2 (New)		RP57-13
P2901.2.2.3 (New)		RP57-13
P2902.1		RP58-13
Table P2902.3		RP71-13
P2902.3.1		RP61-13
P2902.3.2		RP62-13, RP63-13
P2902.3.3		RP65-13
P2902.3.4		RP67-13
P2902.3.6		RP70-13
P2902.3.7 (New)		RP103-13
P2902.4		RP72-13
P2902.4.1		RP73-13
P2902.4.3		RP74-13
P2902.5.1		RP75-13
P2902.5.2		RP76-13
P2902.5.5		RP77-13
P2902.5.5 (New)		RM93-13 AMPC2
P2902.5.5.1 (New)		RM93-12 AMPC2
P2902.5.5.2 (New)		RM93-13 AMPC2
P2902.5.5.3 (New)		RM93-13 AMPC2
Table P2903.1		RP79-13
P2903.3		RP82-13
Table P2903.6		RP29-13
P2903.8		RP85-13
Deleted	P2903.8.3	RP87-13
P2903.9.3		RP90-13
P2903.9.4		RP91-13, RP92-13
Table P2903.9.4		RP92-13
P2904.3		RP101-13
P2905.1 (New)		RE136-13, Part III
P2905.2		RP102-13
P2905.2.1 (New)		RP102-13
Table P2905.4		RP105-13, RP106-13, RP108-13
P2905.4.1		RP104-13
Table P2905.5		RP107-13, RP108-13
Table P2905.6		RP108-13, RP109-13, RP110-13, RP111-13
P2905.9.1.2		RP155-13
P2905.9.1.3		RP107-13
P2905.14		RP114-13
P2905.17.1		RP115-13
P2905.18		RP116-13
P2905.19.1		RP118-13

CHAPTER 29 - continued

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S
P2909 thru P2909.12 (New)		RP120-13
P2910 thru P2910.13.4 (New)		RP120-13
P2911 thru P2911.16.4 (New)		RP120-13
P1912 thru P2912.4.2 (New)		RP120-13

CHAPTER 30
SANITARY DRAINAGE

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
Table P3002.1(1)		RP122-13
P3002.2.1		RP123-13
Deleted	P3003.4 thru P3003.5.3	RP124-13
P3003.4.3	P3003.6.3	RP126-13
Deleted	P3003.8 thru P3003.9.2	RP127-13
P3003.6	P3003.10	RP124-13
P3003.6.1	P3003.10.1	RP124-13
P3003.6.3	P3003.10.3	RP124-13
Deleted	P3003.11 thru P3003.11.3	RP124-13
P3003.9.2	P3003.14.2	RP129-13
P3003.13.1	P3003.18.1	RP130-13
P3003.13.2	P3003.18.2	RP130-13
P3003.13.3	P3003.18.3	RP130-13
P3003.14	P3003.19	RP140-13
Table P3004.1		RP29-13
Deleted	P3005.1.5	RP132-13
Deleted	P3005.2 thru P3005.2.11	RP133-13
P3005.2 thru P3005.2.4 (New)		RP133-13
P3005.2.5 (New)		RP133-13
P3005.2.6 (New)		RP133-13, RP134-13
P3005.2.7 thru P3005.2.11 (New)		RP133-13
P3007.3.2		RP136-13
P3007.3.3.1		RP135-13
P3007.5		RP156-13
P3008.1		RP137-13
P3009.1 thru P3009.11.1		RP120-13
P3010 thru P3010.8 (New)		RP141-13

CHAPTER 31
VENTS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
P3101.2		RP142-13
P3103.1		RP143-13
P3103.2		RP144-13
P3111.1		RP29-13
P3111.2.2		RP145-13
P3112.1		RP29-13
P3114.5		RP146-13
P3114.8		RP147-13

CHAPTER 32
TRAPS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
P3201.1		RP148-13

CHAPTER 32 - continued

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S
P3201.2		RP150-13
P3201.2.1 thru P3201.2.4 (New)		RP150-13
P3201.7		RP152-13
Table P3201.7		RP29-13, RP152-13

CHAPTER 33
STORM DRAINAGE

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
Table P3302.1		RP105-13, RP153-13

Part VIII — Electrical

CHAPTER 34
GENERAL REQUIREMENTS

The electrical provisions found in Chapter 34 through 43 are based on NFPA 70-2002 and are maintained by the NFPA. All changes to the provisions in these chapters are the result of the Standards Development Process that maintains the NEC®, (NFPA 70). All sections that have been revised are listed herein. (See explanation paragraphs at the beginning of Chapter 34 in the *International Residential Code.*

Part IX — Referenced Standards

CHAPTER 44
REFERENCED STANDARDS

2015 IRC	2012 IRC	CODE CHANGE NUMBER(S)
CHAPTER 55	CHAPTER 55	ADM62-13
ANSI/AMCA		RM36-13
ASTM		RB386-13 AMPC
ISO		RB256-13, RB382-13 AMPC
SRCC		RM77-13

Code Change No: RB1-13

Original Proposal

Section(s): R101.2

Proponent: Steve Thomas, Colorado Code Consulting, LLC representing Colorado Chapter ICC (sthomas@coloradocode.net)

Revise as follows:

R101.2 Scope. The provisions of the International Residential Code for One- and Two-family Dwellings shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures.

Exceptions:

1. Live/work units located in townhouses and complying with the requirements of Section 419 of the International Building Code shall be permitted to be ~~built as one- and two-family dwellings or townhouses~~ constructed in accordance with the International Residential Code for One- and Two-Family Dwellings. Fire suppression required by Section 419.5 of the International Building Code when constructed under the International Residential Code for One- and Two-family Dwellings shall conform to Section P2904.
2. Owner-occupied lodging houses with five or fewer guestrooms shall be permitted to be constructed in accordance with the International Residential Code for One- and Two-family Dwellings when equipped with a fire sprinkler system in accordance with Section P2904.

Reason: Live/work units are regulated by Section 419 of the IBC. This exception has created enforcement problems for local jurisdictions as it applies to one- and two-family dwellings. The way the language is written, it creates serious enforcement problems for building departments. If a homeowner wants to open a home business in an existing home, this section would require them to sprinkler the home. The IRC only requires new homes to be provided with fire sprinklers. A contractor that uses their garage to store their tools or build cabinets would be classified as live-work units under this exception as well. Is that really what we want the code to say? This provision is over-restrictive and unenforceable for the building official. This proposal limits the use of the live-work provisions would only apply to townhouses.

Cost Impact: This will reduce the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that the proposal identifies live/work units as they are allowed in the International Residential Code and clarifies the intent of the exception.

Assembly Action: **None**

Final Hearing Results

RB1-13 **AS**

Code Change No: RB3-13

Original Proposal

Section(s): R102.7.1

Proponent: David Bonowitz, Chair, Existing Buildings Subcommittee, Code Advisory Committee, representing National Council of Structural Engineers Associations (dbonowitz@att.net)

Revise as follows:

R102.7.1 Additions, alterations ~~or~~, repairs, or relocations. Additions, alterations or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations ~~or~~, repairs, or relocations shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

Reason: This proposal adds relocations to the list of possible project types applicable to existing dwellings. The IBC and IEBC recognize five project types: Additions, alterations, repairs, relocations, and changes of occupancy. Change of occupancy need not be included here since it is already covered in IRC section R110.2, but relocations are common, and the IRC should consider them.

The proposal modifies the section title and the last sentence. The first sentence is not modified because that sentence refers to projects that affect only part of an existing structure, whereas relocations affect the entire structure.

The intent of this proposal is not to negate, reverse, or otherwise interfere with any other proposal for this section. Any other approved proposal should be made. Then, this proposal, if approved, would merely add relocations to the list of project types.

Per R201.4, it should not be necessary to add a definition of relocation to the IRC. That term is also used in the IBC and IEBC without definition.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB3-13	**AS**

Code Change No: RB4-13

Original Proposal

Section(s): R104.10.1, R105.3.1.1, R112.2.1, R112.2.2, R301.2.4, R322.1

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net)

Revise as follows:

R104.10.1 Flood hazard areas. The building official shall not grant modifications to any provisions related to flood hazard areas as established by Table R301.2(1) ~~without the granting of a variance to such provisions by the board of appeals~~ unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section R322 inappropriate.
2. A determination that failure to grant the modification would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a modification will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the modification is the minimum necessary to afford relief, considering the flood hazard.
5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.

R105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. For applications for reconstruction, rehabilitation, alteration, repair, addition or other improvement of existing buildings or structures located in a flood hazard area as established by Table R301.2(1), the building official shall examine or cause to be examined the construction documents and shall make a determination ~~prepare a finding~~ with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamage condition. If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, ~~the finding shall be provided to the board of appeals for a determination of substantial improvement or substantial damage. Applications determined by the board of appeals to constitute substantial improvement or substantial damage~~ the proposed work is a substantial improvement or restoration of substantial damage and the building official shall require all existing portions of the entire building or structure to meet the requirements of R322.

For the purpose of this determination, a substantial improvement means any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or repair is started. If the building or structure has sustained substantial damage, all repairs necessary to restore the building or structure to its pre-damaged condition are considered substantial improvement regardless of the actual repair work performed. The term does not include:

1. Improvements of a building or structure required to correct existing health, sanitary or safety code

violations identified by the building official and which are the minimum necessary to assure safe living conditions; or

2. Any alteration of a historic building or structure, provided that the alteration will not preclude the continued designation as a historic building or structure. For the purposes of this exclusion, a historic building is:
    2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; or
    2.2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or
    2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

~~**R112.2.1 Determination of substantial improvement in flood hazard areas.** When the building official provides a finding required in Section R105.3.1.1, the board of appeals shall determine whether the value of the proposed work constitutes a substantial improvement. A substantial improvement means any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or repair is started. If the building or structure has sustained substantial damage, all repairs are considered substantial improvement regardless of the actual repair work performed. The term does not include:~~

1. ~~Improvements of a building or structure required to correct existing health, sanitary or safety code violations identified by the building official and which are the minimum necessary to assure safe living conditions; or~~
2. ~~Any alteration of a historic building or structure, provided that the alteration will not preclude the continued designation as a historic building or structure. For the purposes of this exclusion, a historic building is:~~
    ~~2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; or~~
    ~~2.2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or~~
    ~~2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.~~

~~**R112.2.2 Criteria for issuance of a variance for flood hazard areas.** A variance shall only be issued upon:~~

1. ~~A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 322 inappropriate.~~
2. ~~A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.~~
3. ~~A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.~~
4. ~~A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.~~
5. ~~Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.~~

R301.2.4 Floodplain construction. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1), and substantial improvement and restoration of substantial damage of buildings and structures in flood hazard areas, shall be designed and constructed in accordance with the provisions of Section R322. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

R322.1 General. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1), and substantial improvement and restoration of substantial damage of buildings and structures in flood hazard areas, shall be designed and constructed in accordance with the provisions contained in this section. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

Reason: This proposal does three things related to existing dwellings in flood hazard areas:

1. Moves language from R112.2.2 to R104.10. The effect is to parallel both the IBC and IEBC which charge the building official with making certain determinations before granting modifications, rather than have the Board of Appeals make such determinations.
2. Moves language from R112.2.1 to R105.3.1.1. The effect is to more closely align the IRC with the IBC and IEBC, which rely on the building official to determine whether work on existing buildings in flood hazard areas meets the definitions "substantial improvement" and "substantial damage," rather than have the building official make a finding and have the Board of Appeals make such determinations
3. Clearly identify in R301.2.4 and R322.1, that the flood provisions apply to substantial improvement and substantial damage; R102.7.1 already makes clear that the IRC applies to additions, alterations, or repairs.

The IRC currently requires the Board of Appeals to do two things that are done by the building official under both the IBC and the IEBC – (1) determine whether requests for modifications to the flood provisions meet certain criteria and (2) determine whether work on existing dwellings constitutes substantial improvement or substantial damage (SI/SD). As stated in R112.1, the purpose of a Board of Appeals is to hear appeals of decisions, orders, and determinations of the building official. If the Board is charged with making decisions, such as the granting of a modification (variance) and the determination of SI/SD, then permit applicants and permittees have no recourse to appearl those decisions, except perhaps the courts. If building officials are capable of making these determinations under IBC and IEBC, then they should be permitted to do the same under the IRC.

The proposed changes to R301.2.4 and R322.1, which have the same phrasing, is to make clear that, as stated in R102.7.1, because the IRC applies to work on existing dwellings, the flood provisions apply to substantial improvement and substantial damage of existing dwellings. The added phrase is the same as used in IBC 1612.1.

Cost Impact: Costs will be reduced for permit applicants and permittees who challenge SI/SD determinations and decisions on requests for modifications (variances) because they can appeal the building official's decisions to the Board of Appeals instead of the courts. There is no change in the cost of compliance because the IRC already applies to existing dwellings and communities that participate in the NFIP have long required existing buildings that are SI/SD to be brought into compliance with the requirements for new construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because they felt that it substantially changes the description of a historic building in a manner that puts it in the hands of the federal government, which is the wrong direction.

Assembly Action: **None**

Public Comments

Public Comment 1:

Gregory Wilson (FEMA) and Rebecca Quinn (RCQuinn Consulting), representing US Dept of Homeland Security, Federal Emergency Management Agency and RCQuinn Consulting, Inc. representing FEMA, requests Approval as Modified by this Public Comment,

Replace the proposal with the following:

Revise as follows:

R105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. For applications for reconstruction, rehabilitation, alteration, repair, addition or other improvement of existing buildings or structures located in a flood hazard area as established by Table R301.2(1), the building official shall examine or cause to be examined the construction documents and shall make a determination with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamage condition. If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the proposed work is a substantial improvement or restoration of substantial damage and the building official shall require all existing portions of the entire building or structure to meet the requirements of R322.

For the purpose of this determination, a substantial improvement shall mean any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or repair is started. If the building or structure has sustained substantial damage, all repairs necessary to restore the building or structure to its pre-damaged condition are considered substantial improvement regardless of the actual repair work performed. The term shall not include:

1. Improvements of a building or structure required to correct existing health, sanitary or safety code violations identified by the building official and which are the minimum necessary to assure safe living conditions; or
2. Any alteration of a historic building or structure, provided that the alteration will not preclude the continued designation as a historic building or structure. For the purposes of this exclusion, a historic building is:
   2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; or
   2.2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or
   2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

~~**R112.2.1 Determination of substantial improvement in flood hazard areas.** When the building official provides a finding required in Section R105.3.1.1, the board of appeals shall determine whether the value of the proposed work constitutes a substantial improvement. A substantial improvement means any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or repair is started. If the building or structure has sustained substantial damage, all repairs are considered substantial improvement regardless of the actual repair work performed. The term does not include:~~

1. ~~Improvements of a building or structure required to correct existing health, sanitary or safety code violations identified by the building official and which are the minimum necessary to assure safe living conditions; or~~
2. ~~Any alteration of a historic building or structure, provided that the alteration will not preclude the continued designation as a historic building or structure. For the purposes of this exclusion, a historic building is:~~
   ~~2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; or~~
   ~~2.2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or~~
   ~~2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.~~

~~**R112.2.2 Criteria for issuance of a variance for flood hazard areas.** A variance shall only be issued upon:~~

1. ~~A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 322 inappropriate.~~
2. ~~A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.~~
3. ~~A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.~~
4. ~~A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.~~
5. ~~Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.~~

Commenter's Reason: The committee action on this code change proposal was Disapproval, explained only by a concern with the description of historic building. The proposal does not, as perceived by the committee, "substantially change the description of a historic building…." The text proposed for R105.3.1.1 is simply being moved from the existing Section R112.2.1. The same language qualifying the I-Codes definition for "historic building" is in the IBC Chapter 34 Section 3409.2 and in the IEBC 1101.4.

This public comment replaces the original proposal with ONLY the portions of that proposal that affect Chapter 1, with no change to any of the originally proposed language.

The primary objective is to move certain determinations from R112 Board of Appeals into R104 Duties and Powers of the Building Official and R105 Permits. The result is to be consistent with the administrative provisions of the IBC and the IEBC. If the building official is authorized and capable of making these determinations under the IBC and the IEBC, then the building official is also capable and should be authorized to the same under the IRC. Importantly, having the building official make these determinations rather than the board of appeals increases an applicant's ability to appeal those decisions at the local level.

Public Comment 2:

Gregory Wilson (FEMA) and Rebecca Quinn (RCQuinn Consulting), representing US Dept of Homeland Security, Federal Emergency Management Agency and RCQuinn Consulting, Inc. representing FEMA, requests Approval as Modified by this Public Comment,

Replace the proposal with the following:

Revise as follows:

R301.2.4 Floodplain construction. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1)<u>, and substantial improvement and restoration of substantial damage of buildings and structures in flood hazard areas,</u> shall be designed and constructed in accordance with the provisions of Section R322. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

R322.1 General. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1)<u>, and substantial improvement and restoration of substantial damage of buildings and structures in flood hazard areas,</u> shall be designed and constructed in accordance with the provisions contained in this section. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

Commenter's Reason: The committee action on this code change proposal was Disapproval, explained only by a concern with the description of historic buildings.

This public comment replaces the original proposal with ONLY the portions of that proposal that affect Chapter 3, with no change to any of the originally proposed language.

It is clear in IRC Section 102.7.1 that the IRC applies to existing buildings when those buildings have additions, alterations, or repairs. The phrase proposed to be added to R301.2.4 and R322.1 is the same wording used in the IBC 1612.1. This will make it clearer that when the code applies to existing dwellings in flood hazard areas, a determination must be made as to whether the proposed work constitutes Substantial Improvement or repair of Substantial Damage (see current provisions in R105.3.1.1 and R112.2.1, which call for the building official to make a finding and for the Board of Appeals to make determinations of substantial improvement and substantial damage).

Final Hearing Results

RB4-13	**AMPC1, 2**

Code Change No: RB7-13

Original Proposal

Section(s): R106.1.1, R106.1.3 (New)

Proponent: Michael D. Fischer, Kellen Company, representing the American Institute of Building Design (mfischer@kellencompany.com)

Revise as follows:

R106.1.1 Information on construction documents. *Construction documents* shall be drawn upon suitable material. Electronic media documents are permitted to be submitted when *approved* by the *building official*. *Construction documents* shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the *building official.* ~~Where required by the *building official*, all braced wall lines, shall be identified on the *construction documents* and all pertinent information including, but not limited to, bracing methods, location and length of braced wall panels, foundation requirements of braced wall panels at top and bottom shall be provided.~~

R106.1.2 Manufacturer's installation instructions. Manufacturer's installation instructions, as required by this code, shall be available on the job site at the time of inspection.

R106.1.3 Information on braced wall design. For buildings and structures utilizing braced wall design, and where required by the *building official*, all braced wall lines shall be identified on the *construction documents*. All pertinent information including, but not limited to, bracing methods, location and length of braced wall panels, foundation requirements of braced wall panels at top and bottom shall be provided.

Reason: The code contains confusing language regarding braced wall design, and suggests the building official is the one who "requires" braced wall design. It seems to us the intent of the code provision is to specify the necessary detail for those projects where the building official requires they be included in the construction documents. This proposal seeks to satisfy that intent and clear up the confusion. Additionally, R106.1.1 contains general information regarding the media used; this technical detail rightfully belongs in its own section.

Cost Impact: None.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it makes it very clear that, when a braced wall is used, certain information is required.

Assembly Action: **None**

Final Hearing Results

RB7-13 **AS**

Code Change No: RB10-13

Original Proposal

Section(s): R202

Proponent: Tim Pate, City and County of Broomfield, CO, representing Colorado Chapter Code Change Committee

Revise as follows:

R202
DEFINITIONS

Accessory Structure. A structure ~~not greater than 3,000 square feet (279 m2) in floor area, and~~ not more than two stories in height, the use of which is customarily accessory to and incidental to that of dwelling (s) and which is located on the same lot.

Reason: This code change proposal will delete the limitation of an accessory structure being 3,000 square feet or less. It does not make sense to limit accessory structures to only 3,000 square feet when there is no restriction to a size of a single family dwelling. These types of structures are typically used for vehicle and farm equipment storage, shops, etc. and are still only accessory and incidental to that of a dwelling. Houses in rural areas routinely need much larger accessory structures to store farm equipment.

Cost Impact: Will not increase cost

Analysis: This term is also defined in the *International Wildland-Urban Interface Code*. The definitions were not identical and this proposal does not make them identical.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it was appropriate to allow the authority having jurisdiction to make their own determination as to what an accessory structure is.

Assembly Action: **None**

Final Hearing Results

RB10-13 **AS**

Code Change No: RB12-13

Original Proposal

Section(s): **R202**

Proponent: Rick Davidson, City of Maple Grove, Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

SECTION R202
DEFINITIONS

ATTIC. The unfinished space between the ceiling assembly ~~of the top *story*~~ and the roof assembly.

Reason: The current definition of "attic" is insufficient in that it excludes spaces that clearly should be regulated. Attics exist at locations other than the top story. It encourages a lack of uniformity in enforcement and confusion from all users of the code.

Examples of areas where the current definition becomes problematic include rules regarding attics with limited storage, exposed foam plastics, insulation requirements, fire separations, draft stops, structural requirements, access, and ventilation. These rules are intended to apply to all attics, not just those defined as being above the top story.

Cost Impact: None

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because they felt that the term "top story" needs to be maintained for clarity purposes.

Assembly Action: **None**

Public Comment

Public Comment:

Rick Davidson, City of Maple Grove, representing Association of Minnesota Building Officials, requests Approval as Submitted.

Commenter's Reason: This proposal deletes the reference to "top story" from the definition of attic. This proposal was disapproved by the IRC Committee because the reason statement says the term "top story" is needed for "clarity purposes". At the beginning of the IRC is a section titled "Effective Use of the International Residential Code". In that section is an explanation of terms defined in the IRC. It states that when a term is italicized it means that the definition is uniquely used in the IRC and in those cases the published definition applies.

What follows are a number of sections from the IRC where the italicized word "*attic"* is used and therefore the definition in the IRC is clearly intended to apply.

I ask that you read through some of these code sections and apply the IRC definition of the word "attic". Every place you see "attic", think only of the top story. Does the defined term add clarity as was stated by the IRC Committee? Or, are commonly used applications of the code null and void because the definition does not include attics that may not be in the top story of a building but where applications of the code would normally occur?

As a permit holder, I would be willing to push the envelope if I didn't feel a particular code section was necessary and the definition suited my needs. Prosecutions of such "violations" would never get past the city attorney's desk. You need to be able to prosecute violations, not just write correction orders.

For example, suppose I construct a 2 story dwelling with an attached one story garage. I place a lid on the garage ceiling. I don't provide an access. I don't install collar ties in my hand framed garage roof. And, I don't ventilate the space. Can you prosecute any of these items as a code violation even though they would clearly be required in the attic of the top story of the dwelling? Not given the current text in the code and knowledge by the persons involved of the definitions.

Those who enforce the code need to be able to explain the requirements to the public. When you have differing rules that apply to very similar conditions in the same structure, that task becomes difficult and suggests to the public that the rules makers don't know what they are doing and that in turn impacts credibility. The proposed code change needs to be approved to achieve clarity and consistency.

Effective Use of the International Residential Code
Where understanding a term's definition is key to or necessary for understanding a particular code provision, the term is shown in italics where it appears in the code. This is true only for those terms that have a meaning that is unique to the code. In other words, the generally understood meaning of a term or phrase might not be sufficient or consistent with the meaning prescribed by the code; therefore, it is essential that the code-defined meaning be known.

ATTIC. The unfinished space between the ceiling assembly of the top *story* and the roof assembly.

DRAFT STOP. A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor-ceiling assemblies, roof-ceiling assemblies and *attics*.

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other by wall and/or floor assemblies having not less than a 1-hour fire-resistance rating when tested in accordance with ASTM E 119 or UL 263. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the *exterior wall*, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.
2. Wall assemblies need not extend through *attic* spaces when the ceiling is protected by not less than 5/8-inch (15.9 mm) Type X gypsum board and an *attic* draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings*. The structural framing supporting the ceiling shall also be protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

R302.10.1 Insulation. Insulation materials, including facings, such as vapor retarders and vapor-permeable membranes installed within floor/ceiling assemblies, roof/ ceiling assemblies, wall assemblies, crawl spaces and *attics* shall have a flame spread index not to exceed 25 with an accompanying smoke-developed index not to exceed 450 when tested in accordance with ASTM E 84 or UL 723.

R302.10.4 Exposed attic insulation. All exposed insulation materials installed on *attic* floors shall have a critical radiant flux not less than 0.12 watt per square centimeter.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional *story* of the *dwelling*, including *basements* and habitable attics but not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

R314.4 Power source. Smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:

1. Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power.
2. Hard wiring of smoke alarms in existing areas shall not be required where the *alterations* or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an *attic*, crawl space or *basement* available which could provide access for hard wiring without the removal of interior finishes.

R316.5.3 Attics. The thermal barrier specified in Section R316.4 is not required where all of the following apply:

1. *Attic* access is required by Section R807.1.

R316.5.12 Sheathing. Foam plastic insulation used as sheathing shall comply with Section R316.3 and Section R316.4. Where the foam plastic sheathing is exposed to the *attic* space at a gable or kneewall, the provisions of Section R316.5.3 shall apply.

R501.1 Application. The provisions of this chapter shall control the design and construction of the floors for all buildings including the floors of *attic* spaces used to house mechanical or plumbing fixtures and *equipment*.

R502.3.1 Sleeping areas and attic joists. Table R502.3.1(1) shall be used to determine the maximum allowable span of floor joists that support sleeping areas and *attics* that are accessed by means of a fixed stairway in accordance with Section R311.7 provided that the design live load does not exceed 30 pounds per square foot (1.44 kPa) and the design dead load does not exceed 20 pounds per square foot (0.96 kPa). The allowable span of ceiling joists that support *attics* used for limited storage or no storage shall be determined in accordance with Section R802.4.

R502.3.2 Other floor joists. Table R502.3.1(2) shall be used to determine the maximum allowable span of floor joists that support all other areas of the building, other than sleeping rooms and *attics*, provided that the design live load does not exceed 40 pounds per square foot (1.92 kPa) and the design dead load does not exceed 20 pounds per square foot (0.96 kPa).

R603.3.2 Minimum stud sizes. Cold-formed steel walls shall be constructed in accordance with Figure R603.3.1(1), R603.3.1(2) or R603.3.1(3), as applicable. Exterior wall stud size and thickness shall be determined in accordance with the limits set forth in Tables R603.3.2(2) through R603.3.2(31). Interior load-bearing wall stud size and thickness shall be determined in accordance with the limits set forth in Tables R603.3.2(2) through R603.3.2(31) based upon an 85 miles per hour (38 m/s) Exposure A/B wind value and the building width, stud spacing and snow load, as appropriate. Fastening requirements shall be in accordance with Section R603.2.4 and Table R603.3.2(1). Top and bottom tracks shall have the same minimum thickness as the wall studs. Exterior wall studs shall be permitted to be reduced to the next thinner size, as shown in Tables R603.3.2(2) through R603.3.2(31), but not less than 33 mils (0.84 mm), where both of the following conditions exist:

1. Minimum of 1/2 inch (12.7 mm) gypsum board is installed and fastened in accordance with Section R702 on the interior surface.
2. Wood structural sheathing panels of minimum 7/16-inch-thick (11 mm) oriented strand board or 15/32-inch-thick (12 mm) plywood is installed and fastened in accordance with Section R603.9.1 and Table R603.3.2(1) on the outside surface.

Interior load-bearing walls shall be permitted to be reduced to the next thinner size, as shown in Tables R603.3.2(2) through R603.3.2(31), but not less than 33 mils (0.84 mm), where a minimum of 1/2-inch (12.7 mm) gypsum board is installed and fastened in accordance with Section R702 on both sides of the wall. The tabulated stud thickness for load- bearing walls shall be used when the *attic* load is 10 pounds per square feet (480 Pa) or less. A limited *attic* storage load of 20 pounds per square feet (960 Pa) shall be permitted provided that the next higher snow load column is used to select the stud size from Tables R603.3.2(2) through R603.3.2(31).

R611.2 Applicability limits. The provisions of this section shall apply to the construction of exterior concrete walls for buildings not greater than 60 feet (18 288 mm) in plan dimensions, floors with clear spans not greater than 32 feet (9754 mm) and roofs with clear spans not greater than 40 feet (12 192 mm). Buildings shall not exceed 35 feet (10 668 mm) in mean roof height or two stories in height above-grade. Floor/ceiling dead loads shall not exceed 10 pounds per square foot (479 Pa), roof/ceiling dead loads shall not exceed 15 pounds per square foot (718 Pa) and *attic* live loads shall not exceed 20 pounds per square foot (958 Pa).

R802.3.1 Ceiling joist and rafter connections. Ceiling joists and rafters shall be nailed to each other in accordance with Table R802.5.1(9), and the rafter shall be nailed to the top wall plate in accordance with Table R602.3(1). Ceiling joists shall be continuous or securely joined in accordance with Table R802.5.1(9) where they meet over interior partitions and are nailed to adjacent rafters to provide a continuous tie across the building when such joists are parallel to the rafters. Where ceiling joists are not connected to the rafters at the top wall plate, joists connected higher in the *attic* shall be installed as rafter ties, or rafter ties shall be installed to provide a continuous tie…

Collar ties or ridge straps to resist wind uplift shall be connected in the upper third of the *attic* space in accordance with Table R602.3(1).

R804.3.1.1 Minimum ceiling joist size. Ceiling joist size and thickness shall be determined in accordance with the limits set forth in Tables R804.3.1.1(1) through R804.3.1.1(8). When determining the size of ceiling joists, the lateral support of the top flange shall be classified as unbraced, braced at mid-span or braced at third points in accordance with Section R804.3.1.4. Where sheathing material is attached to the top flange of ceiling joists or where the bracing is spaced closer than third point of the joists, the "third point" values from Tables R804.3.1.1(1) through R804.3.1.1(8) shall be used. Ceiling joists shall have a bearing support length of not less than 11/2 inches (38 mm) and shall be connected to roof rafters (heel joint) with No. 10 screws in accordance with Figures R804.3.1.1(1) and R804.3.1.1(2) and Table 804.3.1.1(9). When continuous joists are framed across interior bearing supports, the interior bearing supports shall be located within 24 inches (610 mm) of midspan of the ceiling joist, and the individual spans shall not exceed the applicable spans in Tables R804.3.1.1(2), R804.3.1.1(4), R804.3.1.1(6) and R804.3.1.1(8). When the *attic* is to be used as an *occupied space,* the ceiling joists shall be designed in accordance with Section R505.

R806.1 Ventilation required. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow.

R806.5 Unvented attic and unvented enclosed rafter assemblies. Unvented *attic* assemblies (spaces between the ceiling joists of the top *story* and the roof rafters) and unvented enclosed rafter assemblies (spaces between ceilings that are applied directly to the underside of roof framing members/rafters and the structural roof sheathing at the top of the roof framing members/rafters) shall be permitted if all the following conditions are met:
1. The unvented *attic* space is completely contained within the *building thermal envelope.*

R807.1 Attic access. Buildings with combustible ceiling or roof construction shall have an *attic* access opening to *attic* areas that exceed 30 square feet (2.8 m2) and have a vertical height of 30 inches (762 mm) or greater. The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members. The rough-framed opening shall not be less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other readily accessible location. When located in a wall, the opening shall be a minimum of 22 inches wide by 30 inches high (559 mm wide by 762 mm high). When the access is located in a ceiling, minimum unobstructed headroom in the *attic* space shall be 30 inches (762 mm) at some point above the access measured vertically from the bottom of ceiling framing members. See Section M1305.1.3 for access requirements where mechanical *equipment* is located in *attics.*

R1006.2 Exterior air intake. The exterior air intake shall be capable of supplying all *combustion air* from the exterior of the *dwelling* or from spaces within the *dwelling* ventilated with outside air such as nonmechanically ventilated crawl or *attic* spaces. The exterior air intake shall not be located within the garage or *basement* of the *dwelling* nor shall the air intake be located at an elevation higher than the firebox. The exterior air intake shall be covered with a corrosion-resistant screen of 1/4-inch (6 mm) mesh.

M1305.1.3 Appliances in attics. *Attics* containing *appliances* shall be provided with an opening and a clear and unobstructed passageway large enough to allow removal of the largest *appliance*, but not less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) long measured along the centerline of the passageway from the opening to the *appliance*. The passageway shall have continuous solid flooring in accordance with Chapter 5 not less than 24 inches (610 mm) wide. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present along all sides of the *appliance* where access is required. The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 762 mm), and large enough to allow removal of the largest appliance.

Final Hearing Results

RB12-13	**AS**

Code Change No: RB13-13

Original Proposal

Section(s): R202

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

SECTION R202
DEFINITIONS

BACKFLOW PREVENTER. A backflow prevention assembly, a backflow prevention device or other means or method to prevent backflow into the potable water supply.

Reason: The proposed language was approved for the 2015 IPC. This definition is used throughout the code. However, it does not define to the user of the code, how to specifically identify or apply proper "protection" to a use or connection. Industry standards differentiate between backflow prevention devices and backflow prevention assemblies. A backflow prevention assembly is a specific type of mechanical backflow prevention protection which is field testable and repairable in-line, with shutoff valves and test cock fittings.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X1 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal makes the definition more clear.

Assembly Action: **None**

Final Hearing Results

RB13-13 **AS**

Code Change No: RB14-13

Original Proposal

Section(s): R202

Proponent: Michael S. Moss, American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

R202
DEFINITIONS

BACKFLOW PREVENTER. A backflow prevention assembly, a backflow prevention device or other means or methods to prevent backflow into the potable water supply.

Reason: This definition is used throughout the code. However, it does not define to the user of the code, how to specifically identify or apply proper "protection" to a use or connection. Industry standards differentiate between backflow prevention devices and backflow prevention assemblies. A backflow prevention assembly is a specific type of mechanical backflow prevention protection which is field testable and repairable in-line, with shutoff valves and test cock fittings.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal is the same as RB13 so the reason or approval is the same.

Assembly Action: **None**

Final Hearing Results

RB14-13	**AS**

Code Change No: RB16-13

Original Proposal

Section(s): R202

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Revise definition as follows:

R202
DEFINITIONS

CONDITIONED SPACE. For energy purposes, space within a building that is provided with heating and/or cooling *equipment* or systems capable of maintaining, through design or heat loss/gain, 50°F (10°C) during the heating season and 85°F (29°C) during the cooling season, or communicates directly with a *conditioned space*. For mechanical purposes, an area, room or space that is ~~being heated or cooled by any *equipment* or *appliance*.~~ enclosed within the building thermal envelope and that is directly heated or cooled or that is indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate thru openings with conditioned spaces, where they are separated from conditioned spaces by un-insulated walls, floors or ceilings or where they contain un-insulated ducts, piping or other sources of heating or cooling.

Reason: This revised language was approved for the 2015 IMC. Confusion exists between the two different definitions in the IRC and IECC. The IECC attempts to define how a space is indirectly conditioned; however, further clarification is needed. This proposed change is similar to the definition in ASHRAE 90.1 – 2010.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R202
DEFINITIONS

CONDITIONED SPACE. ~~For energy purposes, space within a building that is provided with heating and/or cooling *equipment* or systems capable of maintaining, through design or heat loss/gain, 50°F (10°C) during the heating season and 85°F (29°C) during the cooling season, or communicates directly with a *conditioned space*. For mechanical purposes,~~ An area, room or space that is enclosed within the building thermal envelope and that is directly heated or cooled or that is indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate thru openings with conditioned spaces, where they are separated from conditioned spaces by un-insulated walls, floors or ceilings or where they contain un-insulated ducts, piping or other sources of heating or cooling.

Committee Reason: Approval was based upon the proponent's published reason. The modification will align the definition with the 2015 IMC and proposals submitted for the IRC and IECC.

Assembly Action: **None**

Final Hearing Results

RB16-13 **AM**

Code Change No: RB17-13

Original Proposal

Section(s): R202

Proponent: Michael S. Moss, American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

R202
DEFINITIONS

BACKFLOW PREVENTER. A backflow prevention assembly, a backflow prevention device or other means or methods to prevent backflow into the potable water supply.

Reason: This definition is used throughout the code. However, it does not define to the user of the code, how to specifically identify or apply proper “protection” to a use or connection. Industry standards differentiate between backflow prevention devices and backflow prevention assemblies. A backflow prevention assembly is a specific type of mechanical backflow prevention protection which is field testable and repairable in-line, with shutoff valves and test cock fittings.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The following is errata that was not posted to the ICC website.

Replace proposal as follows:

RB17 – 13
R202

Proponent: Michael S. Moss, American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

R202
DEFINITIONS

CONTAMINATION. A~~n~~ high hazard or health hazard impairment of the quality of the potable water that creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids or waste.

Reason: The code does not define “high hazard” or health hazard, however, the term is used as a footnote for Table 608.1. This terminology is required to more correctly determine the type of backflow prevention assembly, backflow prevention device, means or method which is required for the protection of the water system to ensure protection of public health.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal adds needed clarity to the code.

Assembly Action: **None**

Final Hearing Results

RB17-13	**AS**

Code Change No: RB18-13

Original Proposal

Section(s): R202

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new definition as follows:

R202
DEFINITIONS

<u>FACTORY MADE AIR DUCT.</u> <u>A listed and labeled duct manufactured in a factory and assembled in the field in accordance with the manufacturer's installation instructions and conditions of the listing.</u>

Reason: The term is used in Sections M1601.1.1 and M1601.2 but is not defined. It is unclear if the term includes both factory-built fibrous glass ducts and flexible ducts and also any other duct material made in a factory. The IMC does not use this term which is unique to the IRC. Section M1601.2 requires that factory made ducts be listed to UL 181 and that standard does not limit the material.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB18-13	**AS**

Code Change No: RB19-13

Original Proposal

Section(s): **R202**

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, Products in Fibre-reinforced Cement and self

Revise as follows:

R202
DEFINITIONS

FIBER-CEMENT (BACKER BOARD, SIDING, SOFFIT, TRIM, AND UNDERLAYMENT) PRODUCTS. ~~A~~ M~~m~~anufactured thin section composites of hydraulic cementitious matrices and discrete non-asbestos fibers., ~~fiber-reinforced products made with an inorganic hydraulic or calcium silicate binder formed by chemical reaction and reinforced with discrete organic or inorganic nonasbestos fibers, or both. Additives that enhance manufacturing or product performance are permitted.~~

Reason: The current definition is limited to fiber-cement siding products. The proposal corrects the definition to that published in ASTM C1154-06, *Standard Terminology for Non-Asbestos Fiber-reinforced Cement Products* (see attached copy of ASTM C1154-06), for "fiber-cement products". Additional text describes types of fiber-cement products to include also fiber-cement backer board, soffit, trim and underlayment products currently recognized in the Code (IRC Sections R703.10, R703.10.1, R703.10.2, Table R503.2.1.1(2), and R702.4.2) The proposed code change eliminates a barrier to trade by including other fiber-cement products currently permitted by the Code.

IBC Section 202 has, as a result of the Group A IBC Code Hearings, already been revised to this definition (see attached "Final Action Hearing" results). This proposed revision would bring the two code definitions of "Fiber-cement Products" into alignment.

Cost Impact: The code change proposal will not increase the cost of construction because the change simply corrects the current definition to be consistent with the National Standard and provides examples of the types of products covered by the definition.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change brings the definition into alignment with ASTM C1154-06 and the IBC committee action of Group A.

Assembly Action: **None**

Final Hearing Results

RB19-13	**AS**

Code Change No: RB20-13

Original Proposal

Section(s): **R202**

Proponent: Bob Eugene, representing UL LLC (Robert.Eugene@ul.com)

Revise as follows:

R202
DEFINITIONS

FIREPLACE. An assembly consisting of a hearth and fire chamber of noncombustible material and provided with a chimney, for use with solid fuels.

Factory-built fireplace. A *listed* and *labeled* fireplace and chimney system composed of factory-made components, and assembled in the field in accordance with manufacturer's instructions and the conditions of the listing.

~~**Masonry chimney.** A field-constructed chimney composed of solid masonry units, bricks, stones or concrete.~~

Masonry fireplace. A field-constructed fireplace composed of solid masonry units, bricks, stones or concrete.

Reason: Eliminates duplication of definition of masonry chimney which is defined with the letter "M" definitions.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB20-13	**AS**

Code Change No: RB21-13

Original Proposal

Section(s): R202

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new definition as follows:

R202
DEFINITIONS

FLEXIBLE AIR CONNECTOR. A conduit for transferring air between an air duct or plenum and an air terminal unit, an air inlet or an air outlet. Such conduit is limited in its use, length and location.

Reason: The code does not define "flexible air connector." As seen in the field, flexible air connectors are often indistinguishable from flexible ducts and the only way to tell them apart is to look at their labels. It is the product listing and label that dictates whether the product is an air connector or an air duct. This definition was approved for the 2015 IMC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB21-13	**AS**

Code Change No: RB22-13

Original Proposal

Section(s): **R202 (New)**

Proponent: Michael Gardner, representing Gypsum Association (mgardner@gypsum.org)

Add new definition as follows:

R202
DEFINITIONS

GYPSUM BOARD. The generic name for a family of sheet products consisting of a noncombustible core primarily of gypsum with paper surfacing. Gypsum wallboard, gypsum sheathing, gypsum base for gypsum veneer plaster, exterior gypsum soffit board, predecorated gypsum board and water-resistant gypsum backing board complying with the standards listed in Section R702.3 and Part IX of this code are types of gypsum board.

Reason: The IRC has incorporated the term gypsum board since the creation of the first edition of the code; however, the code does not define the term. To correct this oversight, this proposal adds a definition for gypsum board.

The definition of gypsum board in the IBC was modified during the Group 'A' hearings in 2012. The proposed definition in this proposal is identical to the definition that will appear in the 2015 IBC. It is also the definition contained in the ASTM standards referenced in Section R702.3.

A separate proposal submitted by the Gypsum Association proposes to add language to Chapters 2 and 7 to define and incorporate gypsum panel products. Adding the panel product definition to the code creates the need to add a definition for gypsum board. Gypsum boards are paper-faced gypsum sheet materials. Gypsum panel products are gypsum sheet materials with facings other than paper.

Cost Impact: None.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This provides the definition consistent with the committee's action on RB352-13.

Assembly Action: **None**

Final Hearing Results

RB22-13	**AS**

Code Change No: RB24-13

Original Proposal

Section(s): R202

Proponent: Jason Thompson, National Concrete Masonry Association representing Masonry Alliance for Codes and Standards

Revise as follows:

R202
DEFINITIONS

MASONRY UNIT. Brick, tile, stone, architectural cast stone, glass block or concrete block conforming to the requirements specified in Section 2103 of the *International Building Code*.

Reason: In the last cycle a reference to ASTM C1364 for architectural cast stone was added to Section 2103 of the IBC. This modification clarifies that architectural cast stone materials cited within the IRC must also comply with the material requirements for these products as required by the IBC.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change expands the definition to include architectural cast stone.

Assembly Action: **None**

Final Hearing Results

RB24-13	**AS**

Code Change No: RB25-13

Original Proposal

Section(s): R202 (New)

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new definition as follows:

R202
DEFINITIONS

MECHANICAL JOINT.

1. A connection between pipes, fittings, or pipes and fittings that is not welded, brazed, caulked, soldered, solvent cemented or heat-fused.
2. A general form of gas or liquid-tight connections obtained by the joining of parts through a positive holding mechanical construction such as, but not limited to, flanged, screwed, clamped or flared connections.

Reason: This language will be the 2015 IMC. Heat fusion is now a defined type of joint for plastic piping, and is considered to be separate from welding because there is no additional filler material used in forming the joint. However, heat-fusion joints are not mechanical joints and as such should be excluded from the definition of mechanical joints.

Cost Impact: This proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal is consistent with the IMC.

Assembly Action: **None**

Final Hearing Results

RB25-13	**AS**

Code Change No: RB26-13

Original Proposal

Section(s): R202 (New)

Proponent: Mark S. Graham, representing National Roofing Contractors Association (mgraham@nrca.net)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new definitions as follows:

R202
DEFINITIONS

<u>**PHOTOVOLTAIC MODULE.** A complete, environmentally-protected unit consisting of solar cells, optics and other components, exclusive of a tracker, designed to generate DC power when exposed to sunlight.</u>

<u>**PHOTVOLTAIC PANEL.** A collection of modules mechanically fastened together, wired and designed to provide a field-installable unit.</u>

Reason: This code change proposal is intended to clarify the code by providing specific terms and definitions for photovoltaic devices already addressed in the Code.

These definitions for the terms “photovoltaic module” and photovoltaic panel” are taken from NFPA 70, “National electrical Code, 2011 Edition.”

This same code change proposal was submitted for consideration as a portion of S3-12 for Group A of the International Building Code and was Approved as Modified; the modification was to a portion of the code change proposal separate from the definitions.

Cost Impact: This code change proposal will not increase the cost of construction

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent’s published reason.

Assembly Action: **None**

Final Hearing Results

RB26-13 **AS**

Code Change No: RB27-13

Original Proposal

Section(s): R202

Proponent: Mark S. Graham, representing National Roofing Contractors Association (mgraham@nrca.net)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new definitions as follows:

R202
DEFINITONS

PHOTOVOLTAIC ~~MODULES/~~SHINGLES. A roof covering ~~composed of flat-plate photovoltaic modules fabricated into~~ that resembles shingles and incorporates photovoltaic modules.

Reason: This code change proposal is intended to clarify the term and definition for "photovoltaic modules/shingles" in Chapter 2-Definitons and make it consist with that of the next edition of the International Building Code.

This same code change proposal was submitted for consideration as a portion of S2-12 for Group A of the International Building Code and was Approved as Modified; the modification was to a portion of the code change proposal separate from the definition.

Cost Impact: This code change proposal will not increase the cost of construction

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB27-13 **AS**

Code Change No: RB28-13

Original Proposal

Section(s): R202

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

R202
DEFINITIONS

PLUMBING SYSTEMS. ~~Includes the water supply and distribution pipes, plumbing fixtures, supports and appurtenances; soil, waste and vent pipes; sanitary drains and *building sewers* to an *approved* point of disposal.~~ Includes the water distribution pipes; plumbing fixtures and traps; water-treating or water-using equipment; soil, waste and vent pipes; and building drains; in addition to their respective connections, devices and appurtenances within a structure or premises; and the water service, building sewer and building storm sewer serving such structure or premises.

Reason: The proposed language was approved for the 2015 IPC. There is no technical reason for the IRC and the IPC to be different for this definition.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X3 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved because this same revised language was approved for the 2015 IPC. This definition between the IRC and IPC should be consistent.

Assembly Action: **None**

Final Hearing Results

RB28-13	AS

Code Change No: RB29-13

Original Proposal

Section(s): R202

Proponent: Michael S. Moss, American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

R202
DEFINITIONS

POLLUTION. ~~An~~ A low hazard or non-health hazard impairment of the quality of the potable water to a degree that does not create a hazard to the public health, but that does adversely and unreasonably affect the aesthetic qualities of such potable water supply for domestic use.

Reason: The code does not define "low hazard" or non-health, however, the term is used in Table 608.1 as a footnote. This terminology is required to more correctly determine the type of backflow prevention assembly, backflow prevention device, means or method which is required for the protection of the water system to ensure protection of public health.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This definition along with the contamination definition of RB28 is needed for proper selection of backflow preventers.

Assembly Action: **None**

Final Hearing Results

RB29-13 **AS**

Code Change No: RB30-13

Original Proposal

Section(s): R202 (New)

Proponent: Gary J. Ehrlich, P.E., representing National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Add new text as follows:

R202
DEFINITIONS

SHINGLE FASHION. A method of installing roof or wall coverings, water-resistive barriers, flashing, or other building components such that upper layers of material are placed overlapping lower layers of material to provide for drainage via gravity and moisture control.

Reason: The purpose of this code change is to introduce to the IRC a definition for "shingle fashion". This term is used in the IBC and IRC to describe the required method of applying moisture control layers such as roof underlayment and water-resistive barriers to the building. The intent is to direct the builder, contractor or installer to place upper layers of material lapping over lower layers of material, in the fashion of placing roof shingles, so moisture is provided with a clear path to drain down and away from the building. In field investigations of buildings with mold and moisture issues, it is frequently discovered that flashing, WRBs or underlayment have been placed in ***reverse*** shingle fashion, with the upper layer tucked behind the lower layer. This permits moisture to drain behind or below the intended protective layer or material where it can be trapped and lead to mold and decay of building components. The above definition was approved earlier this cycle (G21-12) for inclusion in the 2015 IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

SHINGLE FASHION. A method of installing roof or wall coverings, water-resistive barriers, flashing, or other building components such that upper layers of material are placed overlapping lower layers of material to provide ~~for~~ drainage and protect against water intrusion at unsealed penetrations and joints or in combination with sealed joints ~~via gravity and moisture control~~.

Committee Reason: This adds a needed and important definition. This is consistent with the action for the IBC in Group A. The modification clarifies what the method is protecting against.

Assembly Action: **None**

Final Hearing Results

RB30-13	**AM**

Code Change No: RB31-13

Original Proposal

Section(s): R202 (New)

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association (sma@stairways.org)

Add new definition as follows:

SECTION R202
DEFINITIONS

STAIRWAY, SPIRAL. A stairway with a plan view of closed circular form and uniform section-shaped treads radiating from a minimum-diameter circle.

Reason: The IRC does not define spiral stairway however the term is defined in the IBC and consequently R201.3 states this definition would apply to spiral stairs in the IRC. The IBC definition of spiral stairway is:

> **STAIRWAY, SPIRAL.** A stairway having a closed circular form in its plan view with uniform section-shaped treads attached to and radiating from a minimum-diameter supporting column.

This definition is flawed. The requirement of a supporting column is superfluous and restricts many safe designs that conform to the spiral stairway geometry but provide a supporting stringer and a guard with additional handrail instead of a column. These space saving stairs function as spiral stairways with the preferred walking path at the outside perimeter and enhance their safe use with handrails on both sides without intruding into the required width as when wrapping a support column with a handrail. This change would not restrict the continued use of a column or require an additional handrail.

This change is part of several related changes being proposed to clarify the regulations related to spiral stairways. In particular please see our change to R311.7.10.1 limiting the minimum diameter and defining the point at which curved stair requirements would apply.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it is a good definition that does not require a center column and, thereby, also allows design flexibility.

Assembly Action: **None**

Final Hearing Results

RB31-13 **AS**

Code Change No: RB32-13

Original Proposal

Section(s): R202 (New)

Proponent: Richard Grace/Fairfax County/Virginia Plumbing and Mechanical Inspectors Association and Virginia Building and Code Officials Association (Richard.Grace@fairfaxcounty.gov)

Add new definition as follows:

R202
DEFINITIONS

WASTE RECEPTOR. A floor sink, standpipe, hub drain or a floor drain that receives the discharge of one or more indirect waste pipes.

Reason: A definition for "waste receptor" is needed. The term is found several times in the code with no exact description. Also, see coordinated proposed change in Chapter 27 based on this definition.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Because the term is used many times throughout the code, this definition is needed.

Assembly Action: **None**

Final Hearing Results

RB32-13 **AS**

Code Change No: RB33-13

Original Proposal

Section(s): R202

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Add new definition as follows:

R202
DEFINITIONS

WASTE RECEPTOR. A floor sink, standpipe, hub drain or a floor drain that receives the discharge of one or more indirect waste pipes.

Reason: The proposed language was approved for the 2015 IPC. A definition for "waste receptor" is needed. The term is found in the code over 10 times with no exact description.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X4 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal is the same as RB32 so the same reason for this one.

Assembly Action: **None**

Final Hearing Results

RB33-13 **AS**

Code Change No: RB38-13

Original Proposal

Section(s): Table R301.2(1)

Proponent: Matthew L. Mlakar, Barrish Pelham & Associates, Inc., representing Structural Engineers Association of California

Revise as follows:

TABLE R301.2(1)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD	WIND DESIGN				SEISMIC DESIGN CATEGORY[f]
	Speed[d] (mph)	Topographic effects[k]	Special wind region[l]	Wind-borne debris zone[m]	

(Portions of table not shown to remain unchanged.)

a through k *(No changes to text)*
l. In accordance with Table R301.2(4)B, where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with "YES" and identify any specific requirements. Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
m. In accordance with Table R301.2(4)C, the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

Reason: Currently, the special wind regions in Table R301.2(4)B and the wind-borne debris regions in Table R301.2(4)C are shown on a single map for the entire continental United States. Attempting to interpret the map in areas where the contour lines occur can be difficult and may lead to mis-application of the tables especially since the contour lines do not follow county lines or readily identifiable borders. The identification of the transitions should be provided by the local *jurisdiction* to ensure that the proper coefficients are used.

Cost Impact: The proposed change will not impact the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because of potential conflicts if proposal RB39 does not pass at the Public Comment Hearings.

Assembly Action: **None**

Public Comments

Public Comment:

Matthew L. Mlakar, Barrish Pelham & Associates, representing Structural Engineers Association of California, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE R301.2(1)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD	WIND DESIGN				SEISMIC DESIGN CATEGORY[f]
	Speed[d] (mph)	Topographic effects[k]	Special wind region[l]	Wind-borne debris zone[m]	

(Portions of table and footnote not shown remain unchanged)

l. In accordance with ~~TableR301.2(4)B~~ FigureR301.2(4)A, where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with "YES" and identify any specific requirements. Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

m. In accordance with ~~TableR301.2(4)C~~ SectionR301.2.1.2.1, the jurisdiction shall indicate the wind- borne debris wind zone(s). Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

Commenter's Reason: The Committee's reasoning for disapproval during the hearing was that this code change proposal could cause potential conflicts if RB39 does not pass at the Public Comment Hearings. With the passage of the RB39 by the Committee and certain passage during the Public Comment Hearings, the inclusion of this proposal as amended by the Public Comment will provide clarity and needed direction to the user of the International Residential Code. The proposal requires the Authority Having Jurisdiction to include Special Wind Region Requirements and Wind-borne debris zone information into the Design Criteria table.

While these design requirements do not apply to most of the United States, when they are applicable they can have a major impact on the design and construction of the residential structure. With the passage of RB39 (and also in the current wind maps), the special wind regions in Figures R301.2(4)A and B are shown on a single map for the entire continental United States. Attempting to interpret the map in areas where the contour lines occur can be difficult and may lead to mis-application of the tables especially since the contour lines do not follow county lines or readily identifiable borders. The identification of the transitions should be provided by the local jurisdiction to ensure that the proper coefficients are used. It is important that these requirements be properly identified so as to be included in the construction requirements where applicable.

If there are uncertainties in the border location, then the Special Wind Requirements may be applied to locations where the requirements are not warranted. This can potentially drive up the cost of construction for sites adjacent to the Special Wind Regions.

Final Hearing Results

RB38-13 **AMPC**

Code Change No: RB39-13

Original Proposal

Section(s): R202, R301.2.1, R301.2.1.1, R301.2.1.2, R301.2.1.2.1 (New), R301.2.1.3, R301.2.1.4, Table R301.2(2), Table R301.2(4)A, Table R301.2(4)B, Table R301.2(4)C, Table R301.2.1.2, Table R301.2.1.3, Table R301.2.1.5.1, Table R301.2(2), Table 301.7, Figure R301.2(4)A (New), Figure R301.2(4)B, Figure R301.2(4)C, Figure R301.2(7)

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB);

Revise definitions as follows:

SECTION R202
DEFINITIONS

HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes, defined as the U.S. Atlantic Ocean and Gulf of Mexico coasts where the, ultimate design wind speed, *V_{ult}*~~, basic wind speed~~ is greater than 115 ~~90~~ miles per hour (51~~40~~ m/s), and Hawaii, Puerto Rico, Guam, Virgin Islands, and America Samoa.

WIND-BORNE DEBRIS REGION. Areas within *hurricane-prone regions* located ~~as designated in accordance with Figure R302.1(4)C.~~ :

1. Within 1 mile (1.61 km) of the coastal mean high water line where the ultimate design wind speed, V_{ult} is 130 mph (58 m/s) or greater; or
2. In areas where the ultimate design wind speed, V_{ult} is 140 mph (63.6 m/s) or greater; or Hawaii.

Revise as follows:

R301.2.1 Wind design criteria. Buildings and portions thereof shall be constructed in accordance with the wind provisions of this code using the ultimate design ~~basic~~ wind speed in Table R301.2(1) as determined from Figure R301.2(4)A. The structural provisions of this code for wind loads are not permitted where wind design is required as specified in Section R301.2.1.1. Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where not otherwise specified, the wind loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.4. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.

R301.2.1.1 Wind limitations and wind design required. The wind provisions of this code shall not apply to the design of buildings where wind design is required in accordance with Figure R301.2(4)B ~~or where the basic wind speed from Figure R301.2(4)A equals or exceeds 110 miles per hour (49 m/s)~~.

Exceptions:

1. For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R611.
2. For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R613.

In regions where wind design is required in accordance with Figure R301.2(4)B~~ or where the basic wind speed shown on Figure R301.2(4)A equals or exceeds 110 miles per hour (49 m/s)~~, the design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AF&PA *Wood Frame Construction Manual* (WFCM); or
2. ICC *Standard for Residential Construction in High-Wind Regions* (ICC 600); or
3. ASCE *Minimum Design Loads for Buildings and Other Structures* (ASCE 7); or
4. AISI *Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings* (AISI S230); or
5. *International Building Code*.

The elements of design not addressed by the methods in Items 1 through 5 shall be in accordance with the provisions of this code. When ASCE 7 or the *International Building Code* is used for the design of the building, the wind speed map and exposure category requirements as specified in ASCE 7 and the *International Building Code* shall be used.

~~TABLE R301.2(2)~~
~~COMPONENT AND CLADDING LOADS FOR A BUILDING WITH A MEAN ROOF HEIGHT OF 30 FEET LOCATED IN EXPOSURE B (psf)~~

~~FIGURE R301.2(4)A~~
~~BASIC WIND SPEEDS~~

~~FIGURE R301.2(4)B~~
~~REGIONS WHERE WIND DESIGN IS REQUIRED~~

~~FIGURE R301.2(4)C~~
~~WIND-BORNE DEBRIS REGIONS~~

R301.2.1.2 Protection of openings. Exterior glazing in buildings located in windborne debris regions shall be protected from windborne debris. Glazed opening protection for windborne debris shall meet the requirements of the Large Missile Test of ASTM E 1996 and ASTM E 1886 as modified in Section R301.2.1.2.1 ~~referenced therein~~. ~~The applicable wind zones for establishing missile types in ASTM E 1996 are shown on Figure R301.2(4)C.~~ Garage door glazed opening protection for windborne debris shall meet the requirements of an *approved* impact-resisting standard or ANSI/DASMA 115.

> **Exception:** Wood structural panels with a minimum thickness of 7/16 inch (11 mm) and a maximum span of 8 feet (2438 mm) shall be permitted for opening protection in one- and two-story buildings. Panels shall be precut and attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the component and cladding loads determined in accordance with either Table R301.2(2) or ASCE 7, with the permanent corrosion-resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table R301.2.1.2 is permitted for buildings with a mean roof height of 45 ~~33~~ feet (10 058 mm) or less where the ultimate design wind speed, V_{ult} is 180 mph or less. ~~located in Wind Zones 1 and 2 in accordance with Figure R301.2(4)C~~.

TABLE R301.2.1.2
WINDBORNE DEBRIS PROTECTION FASTENING SCHEDULE FOR WOOD STRUCTURAL PANELS[a,b,c,d]

a. This table is based on ~~130~~ 180 mph ultimate design wind speeds, V_{ult} and a 45 ~~33~~-foot mean roof height.

(Table and footnotes not shown to remain unchanged.)

R301.2.1.2.1. Application of ASTM E 1996. The text of Section 2.2 of ASTM E 1996 shall be substituted as follows:

2.2 *ASCE Standard:*
ASCE 7-10 American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures
The text of Section 6.2.2 of ASTM E 1996 shall be substituted as follows:

6.2.2 Unless otherwise specified, select the wind zone based on the strength design wind speed, V_{ult}, as follows:

6.2.2.1 *Wind Zone 1*—130 mph ≤ ultimate design wind speed, V_{ult} < 140 mph.

6.2.2.2 *Wind Zone 2*—140 mph ≤ ultimate design wind speed, V_{ult} < 150 mph at greater than one mile (1.6 km) from the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.3 *Wind Zone 3*—150 mph (58 m/s) ≤ ultimate design wind speed, V_{ult} ≤ 160 mph (63 m/s), or 140 mph (54 m/s) ≤ ultimate design wind speed, V_{ult} ≤ 160 mph (63 m/s) and within one mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.4 *Wind Zone 4*— ultimate design wind speed, V_{ult} >160 mph (63 m/s).

R301.2.1.3 Wind speed conversion. When referenced documents are based on nominal design ~~fastest mile~~ wind speeds, the ultimate design ~~three-second gust basic~~ wind speeds, V_{ult} ~~V_{3s}~~, of Figure R301.2(4)A shall be converted to nominal design ~~fastest mile~~ wind speeds, V_{asd} ~~V_{fm}~~, using Table R301.2.1.3.

~~**TABLE R301.2.1.3**~~
~~**EQUIVALENT BASIC WIND SPEEDS**~~

TABLE R301.2.1.3
WIND SPEED CONVERSIONS[a]

V_{ult}	110	115	120	130	140	150	160	170	180	190	200
V_{asd}	85	89	93	101	108	116	124	132	139	147	155

a. Linear interpolation is permitted

R301.2.1.4 Exposure category. For each wind direction considered, an exposure category that adequately reflects the characteristics of ground surface irregularities shall be determined for the site at which the building or structure is to be constructed. For a site located in the transition zone between categories, the category resulting in the largest wind forces shall apply. Account shall be taken of variations in ground surface roughness that arise from natural topography and vegetation as well as from constructed features. For a site where multiple detached one- and two-family dwellings, townhouses or other structures are to be constructed as part of a subdivision, master-planned community, or otherwise designated as a developed area by the authority having jurisdiction, the exposure category for an individual structure shall be based upon the site conditions that will exist at the time when all adjacent structures on the site have been constructed, provided their construction is expected to begin within one year of the start of construction for the structure for which the exposure category is determined. For any given wind direction, the exposure in which a specific building or other structure is sited shall be assessed as being one of the following categories:

~~1. Exposure A. Large city centers with at least 50 percent of the buildings having a height in excess of 70 feet (21 336 mm). Use of this exposure category shall be limited to those areas for which terrain representative of Exposure A prevails in the upwind direction for a distance of at least 0.5 mile (0.8 km) or 10 times the height of the building or other structure, whichever is greater. Possible channeling effects or increased velocity pressures due to the building or structure being located in the wake of adjacent buildings shall be taken into account.~~

1~~2~~. Exposure B. Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B shall be assumed unless the site meets the definition of another type exposure.

2~~3~~. Exposure C. Open terrain with scattered obstructions, including surface undulations or other irregularities, having heights generally less than 30 feet (9144 mm) extending more than 1,500 feet (457 m) from the building site in any quadrant. This exposure shall also apply to any building located within Exposure B type terrain where the building is directly adjacent to open areas of Exposure C type terrain in any quadrant for a distance of more than 600 feet (183 m). This category includes flat, open country and grasslands.

3~~4~~. Exposure D. Flat, unobstructed areas exposed to wind flowing over open water for a distance of at least 5000 feet (1,524 m) ~~1 mile (1.61 km). Shorelines in Exposure D include inland waterways, the Great Lakes, and coastal areas of California, Oregon, Washington and Alaska~~. This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the water. Exposure D extends inland from the shoreline a distance of 600 feet (183 m) ~~1500 feet (457 m)~~ or 20 ~~10~~ times the height of the building or structure, whichever is greater. This category includes smooth mud flats, salt flats and unbroken ice.

~~TABLE R301.2.1.5.1~~
~~BASIC WIND MODIFICATION FOR TOPOGRAPHIC WIND EFFECT~~

TABLE R301.2.1.5.1
BASIC WIND MODIFICATION FOR TOPOGRAPHIC WIND EFFECT[a]

BASIC WIND SPEED FROM FIGURE R301.2(4)	AVERAGE SLOPE OF THE TOP HALF OF HILL, RIDGE OR ESCARPMENT (percent)						
	0.10	0.125	0.15	0.175	0.20	0.23	0.25
	Required Basic Wind Speed, Modified for Topographic Wind Speed-Up (rounded)						
110	132	137	142	147	152	158	162
115	138	143	148	154	159	165	169
120	144	149	155	160	166	172	176
130	156	162	168	174	179	N/A	N/A
140	168	174	181	N/A	N/A	N/A	N/A
150	180	N/A	N/A	N/A	N/A	N/A	N/A

a. Table applies to a feature height of 500 feet or less and dwellings sited a distance equal or greater than half the feature height.

TABLE R301.2(2)
COMPONENT AND CLADDING LOADS FOR A BUILDING WITH A MEAN ROOF HEIGHT OF 30 FEET LOCATED IN EXPOSURE B (ASD)(psf)[a, b, c, d, e]

	ZONE	EFFECTIVE WIND AREA (feet2)	ULTIMATE DESIGN WIND SPEED, V_{ULT} (mph)																	
			110		115		120		130		140		150		160		170		180	
Roof 0 to 7 degrees	1	10	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.9	-	11.2	-	12.6	-	14.2	-35.0
	1	20	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.2	-	10.6	-	11.9	-	13.3	34.1
	1	50	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	8.5	-	10.0	-	10.8	-	12.2	-32.9
	1	100	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	7.8	-	10.0	-	10.0	-	11.3	-32.0
	2	10	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.9	-	11.2	-	12.6	-	14.2	-58.7
	2	20	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.2	-	10.6	-	11.9	-	13.3	-52.4
	2	50	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	8.5	-	10.0	-	10.8	-	12.2	-44.1
	2	100	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	7.8	-	10.0	-	10.0	-	11.3	-37.9

	ZONE	EFFECTIVE WIND AREA (feet2)	ULTIMATE DESIGN WIND SPEED, V_{ULT} (mph)																	
			110		115		120		130		140		150		160		170		180	
	3	10	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.9	-	11.2	-	12.6	-	14.2	-88.3
	3	20	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.2	-	10.6	-	11.9	-	13.3	-73.1
	3	50	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	8.5	-	10.0	-	10.8	-	12.2	-53.1
	3	100	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	7.8	-	10.0	-	10.0	-	11.3	-37.9
Roof > 7 to 27 degrees	1	10	10.0	-	10.0	-	10.0	-	10.5	-	12.2	-	14.0	-	15.9	-	17.9	-	20.2	-32.0
	1	20	10.0	-	10.0	-	10.0	-	10.0	-	11.1	-	12.8	-	14.5	-	16.4	-	18.4	-31.1
	1	50	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	11.1	-	12.7	-	14.3	-	16.0	-29.9
	1	100	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.9	-	11.2	-	12.6	-	14.2	-29.0
	2	10	10.0	-	10.0	-	10.0	-	10.5	-	12.2	-	14.0	-	15.9	-	17.9	-	20.2	-55.8
	2	20	10.0	-	10.0	-	10.0	-	10.0	-	11.1	-	12.8	-	14.5	-	16.4	-	18.4	-51.2
	2	50	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	11.1	-	12.7	-	14.3	-	16.0	-45.4
	2	100	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.9	-	11.2	-	12.6	-	14.2	-40.9
	3	10	10.0	-	10.0	-	10.0	-	10.5	-	12.2	-	14.0	-	15.9	-	17.9	-	20.2	-82.4
	3	20	10.0	-	10.0	-	10.0	-	10.0	-	11.1	-	12.8	-	14.5	-	16.4	-	18.4	-77.0
	3	50	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	11.1	-	12.7	-	14.3	-	16.0	-69.9
	3	100	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	9.9	-	11.2	-	12.6	-	14.2	-64.6
Roof > 27 to 45 degrees	1	10	11.9	-	13.1	-	14.2	-	16.7	-	19.4	-	22.2	-	25.3	-	28.5	-	32.0	-35.0
	1	20	11.6	-	12.7	-	13.8	-	16.2	-	18.8	-	21.6	-	24.6	-	27.7	-	31.1	-33.2
	1	50	11.2	-	12.2	-	13.3	-	15.6	-	18.1	-	20.8	-	23.6	-	26.7	-	29.9	-30.8
	1	100	10.9	-	11.9	-	12.9	-	15.1	-	17.6	-	20.2	-	22.9	-	25.9	-	29.0	-29.0
	2	10	11.9	-	13.1	-	14.2	-	16.7	-	19.4	-	22.2	-	25.3	-	28.5	-	32.0	-40.9
	2	20	11.6	-	12.7	-	13.8	-	16.2	-	18.8	-	21.6	-	24.6	-	27.7	-	31.1	-39.1
	2	50	11.2	-	12.2	-	13.3	-	15.6	-	18.1	-	20.8	-	23.6	-	26.7	-	29.9	-36.8
	2	100	10.9	-	11.9	-	12.9	-	15.1	-	17.6	-	20.2	-	22.9	-	25.9	-	29.0	-35.0
	3	10	11.9	-	13.1	-	14.2	-	16.7	-	19.4	-	22.2	-	25.3	-	28.5	-	32.0	-40.9
	3	20	11.6	-	12.7	-	13.8	-	16.2	-	18.8	-	21.6	-	24.6	-	27.7	-	31.1	-39.1
	3	50	11.2	-	12.2	-	13.3	-	15.6	-	18.1	-	20.8	-	23.6	-	26.7	-	29.9	-36.8
	3	100	10.9	-	11.9	-	12.9	-	15.1	-	17.6	-	20.2	-	22.9	-	25.9	-	29.0	-35.0
Wall	4	10	13.1	-	14.3	-	15.5	-	18.2	-	21.2	-	24.3	-	27.7	-	31.2	-	35.0	-37.9
	4	20	12.5	-	13.6	-	14.8	-	17.4	-	20.2	-	23.2	-	26.4	-	29.7	-	33.4	-36.4
	4	50	11.7	-	12.8	-	13.9	-	16.3	-	19.0	-	21.7	-	24.7	-	27.9	-	31.3	-34.3
	4	100	11.1	-	12.1	-	13.2	-	15.5	-	18.0	-	20.6	-	23.5	-	26.5	-	29.8	-32.7
	4	500	10.0	-	10.6	-	11.6	-	13.6	-	15.8	-	18.1	-	20.6	-	23.2	-	26.1	-29.0
	5	10	13.1	-	14.3	-	15.5	-	18.2	-	21.2	-	24.3	-	27.7	-	31.2	-	35.0	-46.8
	5	20	12.5	-	13.6	-	14.8	-	17.4	-	20.2	-	23.2	-	26.4	-	29.7	-	33.4	-43.7
	5	50	11.7	-	12.8	-	13.9	-	16.3	-	19.0	-	21.7	-	24.7	-	27.9	-	31.3	-39.5
	5	100	11.1	-	12.1	-	13.2	-	15.5	-	18.0	-	20.6	-	23.5	-	26.5	-	29.8	-36.4
	5	500	10.0	-	10.6	-	11.6	-	13.6	-	15.8	-	18.1	-	20.6	-	23.2	-	26.1	-29.0

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

Notes:

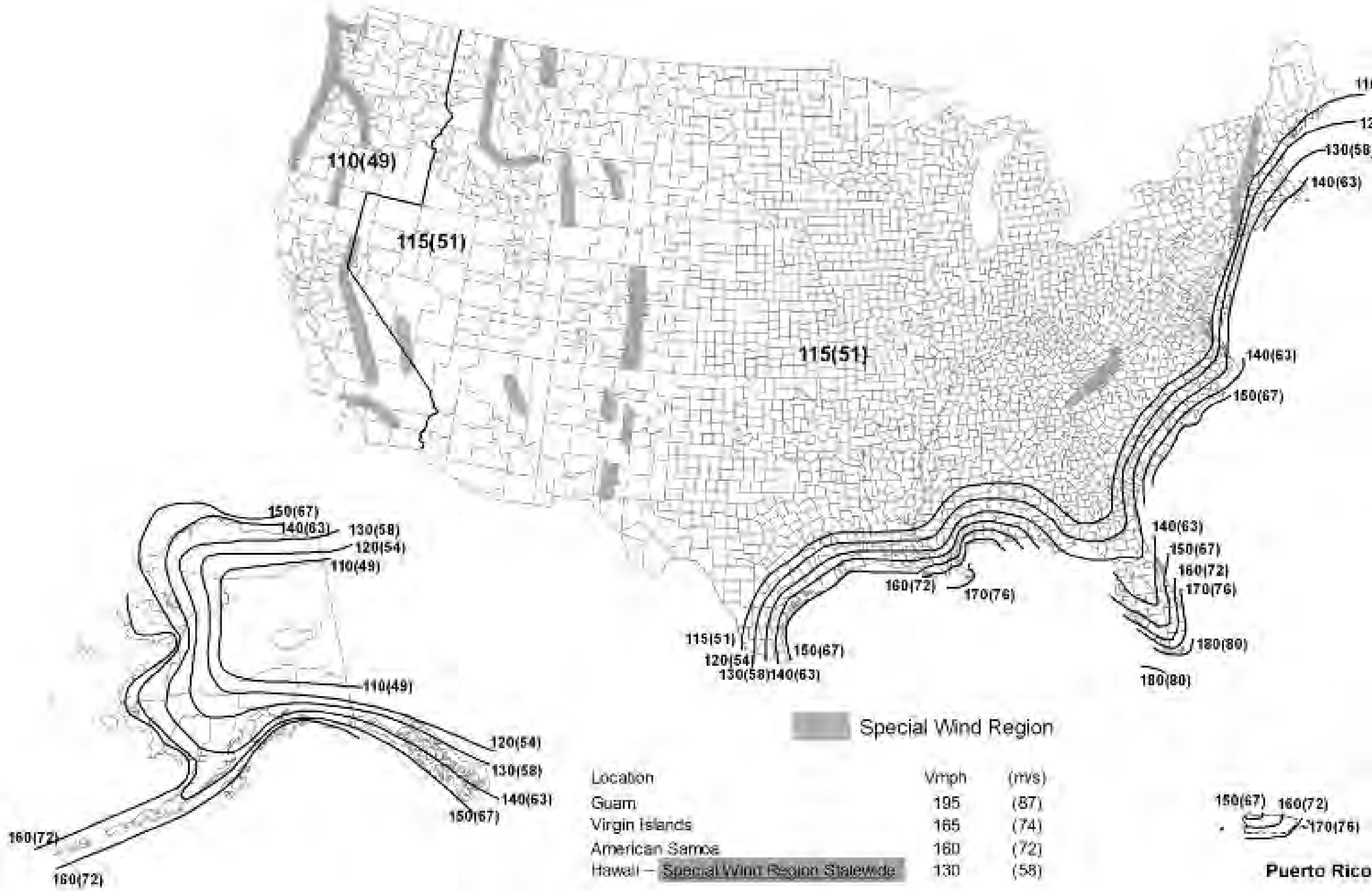
a. The effective wind area shall be equal to the span length multiplied by an effective width. This width shall be permitted to be not be less than one-third the span length. For cladding fasteners, the effective wind area shall not be greater than the area that is tributary to an individual fastener.

b. For effective areas between those given above, the load may be interpolated; otherwise, use the load associated with the lower effective area.

c. Table values shall be adjusted for height and exposure by multiplying by the adjustment coefficient in Table R301.2(3).

d. See Figure R301.2(7) for location of zones.

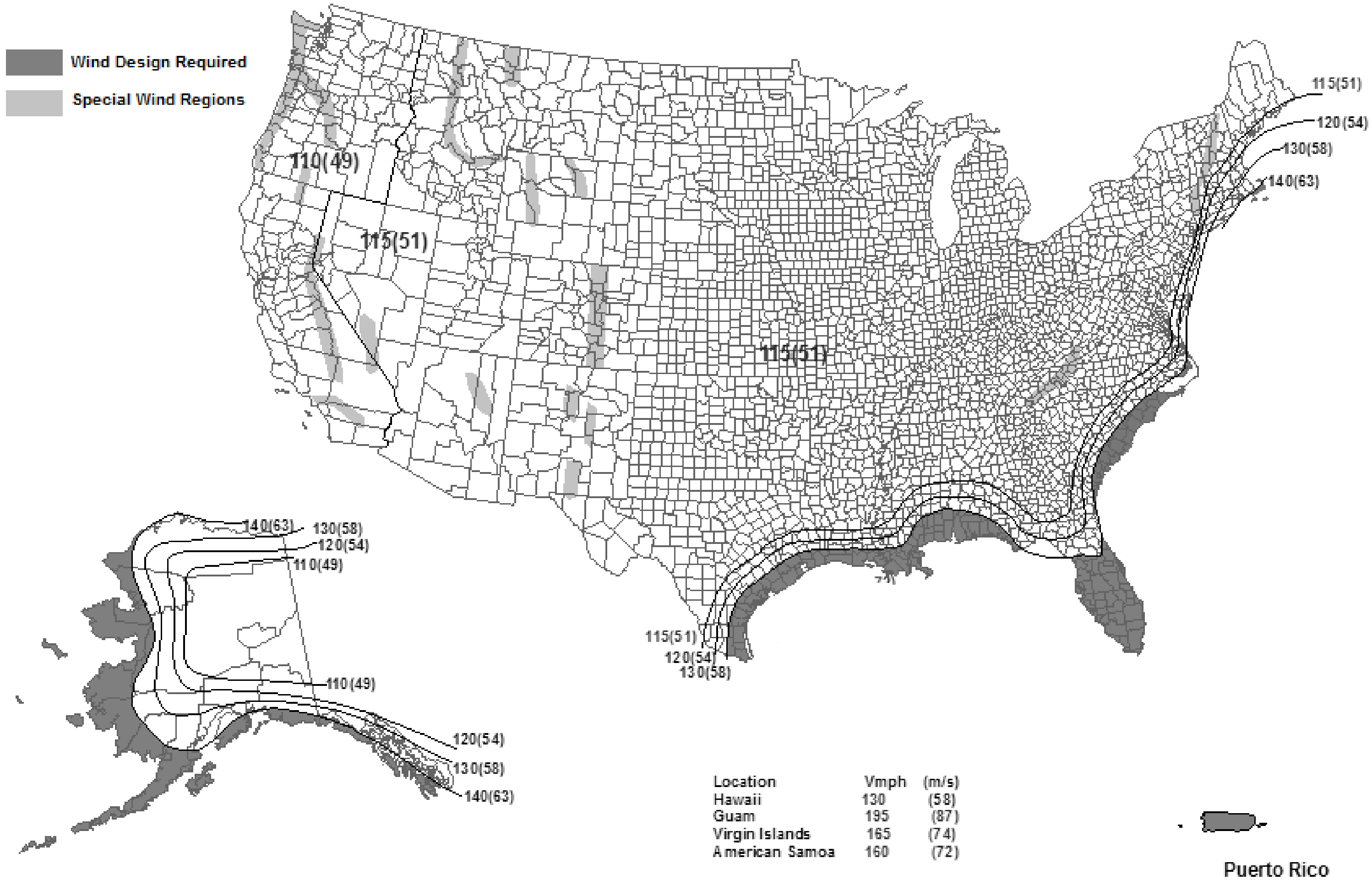
e. Plus and minus signs signify pressures acting toward and away from the building surfaces.



Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.
2. Linear interpolation between contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.
5. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).

FIGURE R301.2(4)A
ULTIMATE DESIGN WIND SPEEDS



Location	Vmph	(m/s)
Hawaii	130	(58)
Guam	195	(87)
Virgin Islands	165	(74)
American Samoa	160	(72)

Notes:
1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.
2. Linear interpolation between contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.
5. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years.

FIGURE R301.2(4)B
REGIONS WHERE WIND DESIGN IS REQUIRED

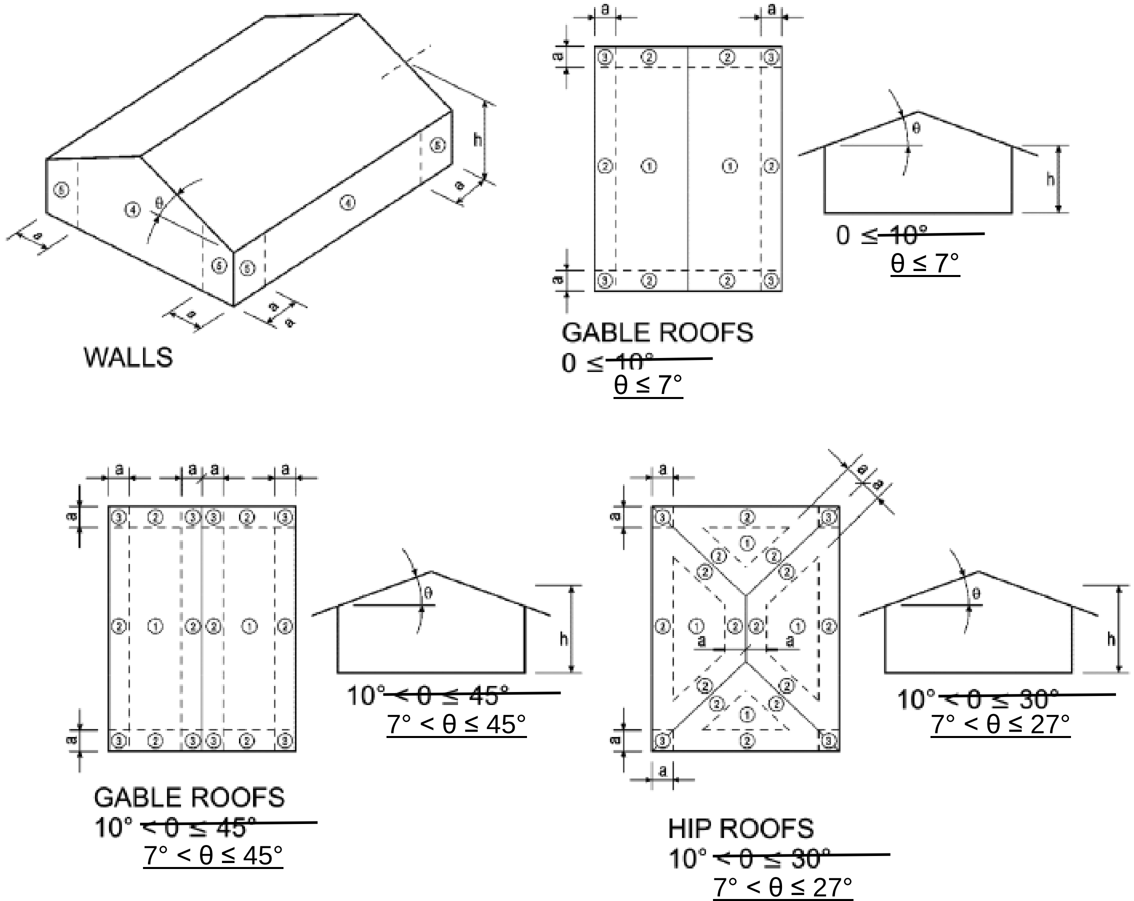


FIGURE R301.2(7)
COMPONENT AND CLADDING PRESSURE ZONES

TABLE R301.7
ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[a, b, c, d, e]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Exterior walls[a] ~~— wind loads[a]~~ with plaster or stucco finish	H/360
Exterior walls[a] with other brittle finishes	H/240
Exterior walls[a] with flexible finishes	H/120[d]
Lintels supporting masonry veneer walls [e]	L/600

Note: L = span length, H = span height.

a. The wind load shall be permitted to be taken as 0.7 times the Component and Cladding (ASD) loads obtained from Table R301.2(2) for the purpose of determining deflection limits herein.

(Footnotes not shown to remain unchanged.)

Reason: The purpose of this code change is to bring the wind provisions of the IRC in line with the 2012 IBC and ASCE 7-10. As a result of the schedule changes implemented during the 2009-2010 ICC code development cycle changes, there was not sufficient time to revise the IRC to fully implement the new ultimate wind speed basis of ASCE 7-10 and the 2012 IBC, due to the extent of prescriptive IRC provisions and tables which are directly related to basic wind speed.. New maps based on the ASCE 7-10 ultimate wind speed data but converted back down to nominal (ASD) basis were provided in the IRC. This has led to a fair amount of confusion among those stakeholders who work with both codes.

A working group of stakeholders including NAHB, the major material associations, ASCE, and the Insurance Institute for Business and Home Safety developed a series of IRC proposals to implement the new ultimate wind speed basis. This proposal updates the Chapter 3 design criteria, including definitions, a new ultimate wind speed map, a new map of the regions where special high-wind design is required, a conversion table to the nominal (ASD) wind speed basis for use with those standards which have not updated their provisions, and a revised table of component and cladding pressures.

It is noted the component and cladding pressure table is set up using the ultimate design wind speed, but reports pressures at an ASD level. That is, the listed pressures incorporate the 0.6 multiplier on wind loads per the allowable stress design load combinations shown in Section 1605.3 of the *International Building Code* and Section 2.3.2 of ASCE 7-10. This is done here and throughout this series of proposals to allow for easy adaptation of existing stock designs, construction documents and guidelines to the 2015 IRC, as the loads and pressures will be comparable to previous editions of the IRC for most sites.

The region in revised Figure R301.2(4)B where the use of alternate prescriptive high-wind standards or engineered design is required is defined using the 130mph contour along the Gulf Coast and along the southern portions of the Atlantic coast from Florida up to North Carolina. The 140mph contour is used for the northern portions of the Atlantic coast from Virginia up to Maine, and for Alaska. A 130mph trigger is also used for the assorted Caribbean and Pacific islands that are also considered part of the "hurricane-prone" region. This creates a region that approximately equals the region defined by the 110mph contour under the wind map used in the 2000 through 2009 IRC, maintains areas of Florida and the Gulf Coast traditionally outside of the prescriptive limits of the IRC, and maintains areas of New England traditionally included within the prescriptive limits of the IRC.

Code users desiring a more accurate determination in areas near or along a particular contour (or in general) can make use of the Applied Technology Council's Windspeed by Location web site (http://www.atcouncil.org/windspeed/) to obtain site-specific wind speeds using latitude/longitude or site address. This site was developed by ATC using the same data used to develop the wind maps for ASCE 7, the IBC and the IRC. As the site is not a reference standard or maintained by a government agency, we could not make a direct reference in the code figures. However, we include mention of the Windspeed by Location web site here to draw code users' attention to its existence and in hopes that mention of the web site could become part of the IRC Commentary.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The code change is contained in the <u>Updates to the 2013 Proposed Changes</u> posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: Approved as Submitted

Committee Reason: The committee approved this proposed code change because they felt that it creates consistency between the International Codes and ASCE 7.

Assembly Action: None

Public Comments

Public Comment 1:

Gary J Ehrlich, P.E., representing National Association of Home Builders (NAHB); Joseph D. Belcher, JDB Code Services Inc., representing the International Hurricane Protection Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R301.2.1.2.1 Application of ASTM E 1996. The text of Section 2.2 of ASTM E 1996 shall be substituted as follows:

2.2 *ASCE Standard:*
ASCE 7-10 American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures

The text of Section 6.2.2 of ASTM E 1996 shall be substituted as follows:

6.2.2 Unless otherwise specified, select the wind zone based on the <u>ultimate</u> ~~strength~~ design wind speed, V_{ult}, as follows:

6.2.2.1 *Wind Zone 1*—130 mph ≤ ultimate design wind speed, V_{ult} < 140 mph.

6.2.2.2 *Wind Zone 2*—140 mph ≤ ultimate design wind speed, V_{ult} < 150 mph at greater than one mile (1.6 km) from the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.3 *Wind Zone 3*—150 mph (58 m/s) ≤ ultimate design wind speed, V_{ult} ≤ 170 ~~160~~ mph (76~~63~~ m/s), or 140 mph (54 m/s) ≤ ultimate design wind speed, V_{ult} ≤ 170 ~~160~~ mph (76~~63~~ m/s) and within one mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.4 *Wind Zone 4*— ultimate design wind speed, V_{ult} > 170 ~~160~~ mph (63 m/s).

(Portions of proposal not shown to remain unchanged)

Commenter's Reason: The purpose of this public comment is to amend the definition for Wind Zone 4 in ASTM E1996. The original intent of Wind Zone 4 was to address higher requirements for impact-resistant glazing and impact-resistive systems in Miami-Dade County only. When similar language was added to the IBC last cycle to amend ASTM E1996 to work with ultimate design wind speeds, a direct conversion of the previous trigger was made. It was not realized until Florida was in the process of adopting the 2012 IBC that this had the effect of extending Wind Zone 4 north into Broward, Palm Beach, Martin and St. Lucie counties where it had not previously applied and was not intended to apply. The result is a potential increase of $2424 to $4248 for wind-borne debris protection of residential buildings in those counties.

The Florida Building Code was amended to correct the inadvertent extension of Wind Zone 4. The IHPA attempted a floor modification at the Committee Action Hearing which NAHB was prepared to support, but was ruled out of order by the moderator. This public comment advances the proposed modification and fixes the unintended consequences of the original ASTM E1996 amendment.

One editorial change is also made to correct "strength design wind speed" to "ultimate design wind speed" to correlate with the remainder of the IRC wind update proposals.

Public Comment 3:

Gary J Ehrlich, P.E., representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE R301.2.1.5.1
~~BASIC~~ ULTIMATE DESIGN WIND SPEED MODIFICATION FOR TOPOGRAPHIC WIND EFFECT[a]

~~BASIC~~ ULTIMATE DESIGN WIND SPEED FROM FIGURE R301.2(4)	AVERAGE SLOPE OF THE TOP HALF OF HILL, RIDGE OR ESCARPMENT (percent)						
	0.10	0.125	0.15	0.175	0.20	0.23	0.25
	Required Ultimate Design ~~Basic~~ Wind Speed, Modified for Topographic Wind Speed-Up (rounded)						
110	132	137	142	147	152	158	162
115	138	143	148	154	159	165	169
120	144	149	155	160	166	172	176
130	156	162	168	174	179	N/A	N/A
140	168	174	181	N/A	N/A	N/A	N/A
150	180	N/A	N/A	N/A	N/A	N/A	N/A

a. Table applies to a feature height of 500 feet or less and dwellings sited a distance equal or greater than half the feature height.
b. Where the ultimate design wind speed as modified by Table R301.2.1.5.1 equals or exceeds 140mph, the building shall be considered as "wind design required" in accordance with Section R301.2.1.1

TABLE R301.7
ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[a, b, c, d, e]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Exterior walls - wind loads[a] with plaster or stucco finish	H/360
Exterior walls - wind loads[a] with other brittle finishes	H/240
Exterior walls - wind loads[a] with flexible finishes	H/120[d]
Lintels supporting masonry veneer walls [e]	L/600

Note: L = span length, H = span height.

a The wind load shall be permitted to be taken as 0.7 times the Component and Cladding (ASD) loads obtained from Table R301.2(2) for the purpose of determining deflection limits herein.
b. (No changes)
c. (No changes)
d. (No changes)
e. (No changes)

(Portions of proposal not shown to remain unchanged)

Commenter's Reason: The purpose of this public comment is to insure the comprehensive Chapter 3 wind update is internally consistent with terminology and to correlate RB39 with other proposals.

In developing RB39, the wind speeds in Table R301.2.1.5.1, which provides simplified adjustments to wind speed for topographic effects, were updated to the new ultimate design wind speed basis. However, the term "basic wind speed" in the table was not changed to "ultimate design wind speed" as is done throughout the rest of the wind update (and in the 2012 IBC). This public comment picks up the change in terminology. A new footnote is also provided to clarify when the topographic wind effects make the site a "wind design required" region where use of the alternate standards (ICC-600, WFCM, AISI 230, etc.) are required.

The change to table R301.7 correlates RB39 with RB62, both of which were approved by the IRC Building Committee. As it stands, the committee actions would result in "wind loads" being deleted from the first exterior wall condition (plaster or stucco finish) but added to the other two conditions (brittle finishes and flexible finishes). This change will correlate the two proposals by insuring the "wind loads" language appears for all three conditions

Public Comment 4:

Bonnie Manley, American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R301.2.1.3 Wind speed conversion. When referenced documents are based on nominal design wind speeds<u> and do not provide the means for conversion between the ultimate design wind speeds and the nominal design wind speeds</u>, the ultimate design wind speeds, V_{ult}, of Figure R301.2(4)A shall be converted to nominal design wind speeds, V_{asd} using Table R301.2.1.3.

(Portions of proposal not shown to remain unchanged)

Commenter's Reason: The purpose of this comment is to ensure that the conversion table, Table R301.2.1.3, does not override Table A1-3 of AISI S230-07 w/S3-12, as follows:

Table A1-3
Conversion of ASCE 7 Basic Wind Speeds to AISI S230 Basic Wind Speeds (mph) [1]

ASCE 7 Basic Wind Speed	110	115	126	139	152	164	177	190
AISI S230 Basic Wind Speed	85	90	100	110	120	130	140	150

[1] ASCE 7 permits linear interpolation between the contours of the basic wind speed maps.

This table is based upon ASCE 7-10 Table C26.5-6 and provides a direct conversion between the wind speeds, where V_{ult} is effectively listed as the row titled "ASCE 7 Basic Wind Speed" and V_{asd} is effectively listed as the row titled "AISI S230 Basic Wind Speed." This differs slightly from the conversion incorporated into Proposal RB39. However, for the purposes of cold-formed steel framing, it is important that the conversion process remains consistent between the IRC and AISI S230. Therefore, it is necessary to introduce a qualifier to the charging language in section R301.2.1.3 that recognizes that reference documents may include conversion tables of their own.

Public Comment 5:

Bonnie Manley, American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R301.2.1.1 Wind limitations and wind design required. The wind provisions of this code shall not apply to the design of buildings where wind design is required in accordance with Figure R301.2(4)B.

Exceptions:

1. For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R611.
2. For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R613.
3. <u>For cold-formed steel light frame construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R505, R603 and R804.</u>

In regions where wind design is required in accordance with Figure R301.2(4)B, the design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AF&PA *Wood Frame Construction Manual (WFCM)*; or
2. ICC *Standard for Residential Construction in High-Wind Regions* (ICC 600); or
3. ASCE *Minimum Design Loads for Buildings and Other Structures* (ASCE 7); or
4. AISI *Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings* (AISI S230); or
5. *International Building Code*.

The elements of design not addressed by the methods in Items 1 through 5 shall be in accordance with the provisions of this code. When ASCE 7 or the International Building Code is used for the design of the building, the wind speed map and exposure category requirements as specified in ASCE 7 and the *International Building Code* shall be used.

(Portions of proposal not shown to remain unchanged)

Commenter's Reason: The purpose of this comment is to ensure that the IRC wind design applicability limits for cold-formed steel light frame construction remain consistent with AISI S230-07 w/S3-12. AISI developed AISI S230-07 w/S3-12 to allow the 2007 edition of AISI S230 to be used in conjunction with the 2010 edition of ASCE 7. AISI S230-07 w/S3-13 incorporates the following conversion table:

Table A1-3
Conversion of ASCE 7 Basic Wind Speeds to AISI S230 Basic Wind Speeds (mph) [1]

ASCE 7 Basic Wind Speed	110	115	126	139	152	164	177	190
AISI S230 Basic Wind Speed	85	90	100	110	120	130	140	150

[1] ASCE 7 permits linear interpolation between the contours of the basic wind speed maps.

This table is based upon ASCE 7-10 Table C26.5-6 and provides a direct conversion between the wind speeds, which differs slightly from the conversion incorporated into Proposal RB39. Specifically, AISI has chosen to convert the ASCE 7-05 design wind speed ("AISI S230 Basic Wind Speed" in Table A1-3) of 110 mph to 139 mph instead of 140 mph. Since this particular wind speed is often a trigger for additional requirements, it is important that it remains consistent throughout the IRC – in Sections R301, R505, R603 and R804 – and AISI S230. Therefore, it is necessary to introduce an exception to Section R301.2.1.1 for cold-formed steel light frame construction similar to the ones in place for concrete and structural insulated panels.

Final Hearing Results

RB39-13 **AMPC1, 3, 4, 5**

Code Change No: RB40-13

Original Proposal

Section(s): R301.2.1.1.1 (New), Chapter 44

Proponent: Julie Ruth, P.E., JRuth Code Consulting, representing the American Architectural Manufacturers Association (julruth@aol.com); Daniel J. Walker, P.E., Thomas Associates, representing the National Sunroom Association

Add new text as follows:

R301.2.1.1.1 Sunrooms. Sunrooms shall comply with the wind loads, structural requirements and testing provisions of Section 5.2.1 of AAMA/NPEA/NSA 2100, with the following modifications:

1. Basic wind speed in miles per hour (mph) shall be determined in accordance with Section R301.2.1 of this code; and
2. Sunrooms including exposed structure, components, cladding, and roof covering shall be designed to resist the wind loads as established in Section R301.2.1 of this code.

For the purpose of applying the criteria of AAMA/NPEA/NSA-2100 based on the intended use, sunrooms shall be identified as one of the following categories by the permit applicant, design professional or the property owner in the *construction documents*. Component and Cladding pressures shall be used for the design of elements that do not qualify as main wind force resisting systems. Main wind force resisting systems pressures shall be used for the design of elements assigned to provide support and stability for the overall *sunroom*.

Category I: A *Thermally Isolated Sunroom* with walls that are open or enclosed with insect screening or 0.5 mm (20 mil) maximum thickness plastic film. The space is nonhabitable and unconditioned.

Category II: A *Thermally Isolated Sunroom* with enclosed walls. The openings are enclosed with translucent or transparent plastic or glass. The space is nonhabitable and unconditioned.

Category III: A *Thermally Isolated Sunroom* with enclosed walls. The openings are enclosed with translucent or transparent plastic or glass. The sunroom fenestration complies with additional requirements for air infiltration resistance and water-penetration resistance. The space is nonhabitable and unconditioned.

Category IV: A *Thermally Isolated Sunroom* with enclosed walls. The sunroom is designed to be heated or cooled by a separate temperature control or system and is thermally isolated from the primary structure. The sunroom fenestration complies with additional requirements for water penetration resistance, air infiltration resistance, and thermal performance. The space is nonhabitable and *conditioned*.

Category V: A *Sunroom* with enclosed walls. The sunroom is designed to be heated or cooled and is open to the main structure. The sunroom fenestration complies with additional requirements for water-penetration resistance, air infiltration resistance, and thermal performance. The space is *habitable* and *conditioned*.

Add standards to Chapter 44 as follows:

AAMA American Architectural Manufacturers Association

1827 Walden Office Square, Suite 550
Schaumburg, IL 60173

AAMA/NSA/NPEA 2100-12 Specifications for Sunrooms

NSA National Sunroom Association
1300 Sumner Ave.
Cleveland, OH 44115-2851

AAMA/NSA/NPEA 2100-12 Specifications for Sunrooms

NPEA National Sunroom Association
1300 Sumner Ave.
Cleveland, OH 44115-2851

AAMA/NSA/NPEA 2100-12 Specifications for Sunrooms

Reason: The 2012 *International Residential Code* defines a sunroom as "A one-story structure attached to a *dwelling* with a *glazing area* in excess of 40 percent of the gross area of the structure's *exterior walls* and roof." These structures are typically constructed in one of two manners: 1) using typical wood framing techniques, or 2) using a stick system that consists of prefabricated framing of aluminum, fiberglass, wood or other materials, with glass or opaque wall or roof panels, and steel or aluminum connections.

The first technique can be done in accordance with the current provisions of the IRC for wood framed construction. There are no provisions in the IRC for the second method of constructing a sunroom other than by engineering analysis or demonstrating equivalence to the current provisions of the *International Residential Code* by some other means.

This proposal seeks to clarify the requirements for sunrooms under the IRC by adding reference to the provisions of AAMA/NPEA/NSA 2100 - 12 *Specifications for Sunrooms* to the available options for approval of sunroom construction in the IRC. Sunrooms designed and constructed in accordance with AAMA/NPEA/NSA 2100 are required within the standard to meet the structural provisions of the IRC or the IBC. Therefore, the appropriate engineering analysis has already been conducted for these structures. In addition, the standard establishes the specific requirements for these unique structures based upon their designated Category.

In 2002 the American Architectural Manufacturers Association (AAMA), the National Sunroom Association (NSA) and the National Patio Enclosure Association (NPEA) published the first U.S. standard for the design and specification of sunrooms – AAMA/NPEA/NSA 2100 – 02. The standard established five categories of sunrooms based upon the intended use of the space, and established specific design and performance criteria for them based on the end use.

As the document began to be used and referenced in various local codes (such as the Florida Building Code) the members of the AAMA Sunroom Council and NSA became aware that improvements and updates were needed. These improvements included revisions that would bring the document in line with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440 for the design, testing and labeling of windows, glass doors and skylights, and revisions that would bring the foundation requirements more closely in line with the requirements of the *International Residential Code*. The most recent edition of the standard is AAMA/NPEA/NSA 2100-12. The table below provides an overview of the requirements of AAMA/NPEA/NSA 2100-12, as they apply to the various categories of sunrooms.

Minimum Requirements	**Cat. I**	**Cat. II**	**Cat. III**	**Cat. IV**	**Cat. V**
Structural Design in accordance with IRC or IBC.	x	x	x	x	x
Fenestration products comply with AAMA/WDMA/CSA 101/I.S.2/A440 (includes resistance to air leakage, water penetration, forced entry, etc. as well as structural design pressure rating).		x	x	x	x
Comply with IECC or IRC Chapter 11.				x	x
Comply with the Foundation/footings, site location, and emergency escape and rescue openings requirements of the IRC or local code.	x	x	x	x	x
Emergency escape and rescue openings are permitted to open onto sunroom.	x				
Comply with the natural lighting requirements of the IRC or local code.	x	x	x	x	x
Openings for natural lighting are permitted to open onto sunroom.	x				
Comply with the requirements of the IRC or local code for stairway and egress illumination.	x	x	x	x	x

Minimum Requirements	Cat. I	Cat. II	Cat. III	Cat. IV	Cat. V
Required to have exit lighting.		x	x	x	x
Receptacle outlets as required by NFPA 70, Article 314.				x	x

The 2002 edition of AAMA/NPEA/NSA 2100 has been used successfully in previous editions of the Florida Building Code. Reference to the 2012 edition in the 2015 IRC to facilitate its use on a nationwide basis is appropriate at this time.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [AAMA/NSA/NPEA 2100-12] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

For staff analysis of the content of AAMA/NSA/NPEA 2100 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because there was no provision in the proposal for non-prefabricated sun rooms.

Assembly Action: **None**

Public Comments

Public Comment:

Julie Ruth, JRuth Code Consulting, representing American Architectural Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R301.2.1.1.1 Sunrooms. Sunrooms shall comply with ~~the wind loads, structural requirements and testing provisions of Section 5.2.1 of~~ AAMA/NPEA/NSA 2100. ~~with the following modifications:~~

1. ~~Basic wind speed in miles per hour (mph) shall be determined in accordance with Section R301.2.1 of this code; and~~
2. ~~Sunrooms including exposed structure, components, cladding, and roof covering shall be designed to resist the wind loads as established in Section R301.2.1 of this code.~~

(Portions of code change not shown remain unchanged).

Commenter's Reason: The committee disapproved the proposed reference at the Code Development Hearings in Dallas, at least in part, due to confusion regarding the scope of the document. Concern was expressed that it only applies to prefabricated sunrooms. The standard, however, is not limited to prefabricated sunrooms and the opponents who spoke against it have not identified a single reference in the standard that would limit its application. Questions regarding matters such as egress, natural lighting and ventilation, resistance to air leakage and water penetration, etc. are pertinent to both site built and prefabricated sunrooms. Addressing them does not limit the application of the standard in any way.

The design wind load requirements of the IRC were converted from allowable stress design to strength design through the approval of RB39-13 and related proposals.

The original proposal provided specific cross references to determine the appropriate design wind pressures for the sunroom. There is now confusion with regards to these cross references, due to the changes in wind speed model on Section R301.

This Public Comment removes the potential cause for concern, and simply references AAMA/NPEA/NSA 2100 for sunrooms. This is consistent with language that has been included in the Florida Building Code – Residential since the 2004 edition.

AAMA/NPEA/NSA 2100, and the 5 categories of sunrooms it established, clarifies the criteria for these types of spaces with regards to egress, natural ventilation, resistance of the exterior envelop to air leakage and water penetration, etc.

Final Hearing Results

RB40-13 **AMPC**

Code Change No: RB41-13

Original Proposal

Section(s): **R301.2.1.2**

Proponent: Edward L. Keith, APA, representing The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R301.2.1.2 Protection of openings. ~~Exterior openings in buildings located in windborne debris regions shall be protected from windborne debris.~~ Windows in buildings located in windborne debris regions shall have glazed openings protected from windborne debris. Glazed opening protection for windborne debris shall meet the requirements of the Large Missile Test of ASTM E 1996 and ASTM E 1886 referenced therein. ~~The applicable wind Zones for establishing missile types in ASTM E 1996 are shown on Figure R301.2(4)C.~~ Garage door glazed opening protection for windborne debris shall meet the requirements of an *approved* impact resisting standard or ANSI/DASMA 115.

> **Exception:** Wood structural panels with a minimum thickness of 7/16 inch (11 mm) and a maximum span of 8 feet (2438 mm) shall be permitted for opening protection in buildings with a mean roof height of 33 feet (10 058 mm) or less. ~~one- and two-story buildings~~. Panels shall be precut and attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the component and cladding loads determined in accordance with either Table R301.2(2) or ASCE 7, with the permanent corrosion resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table R301.2.1.2 is permitted for buildings with a mean roof height of 33 feet (10 058 mm) or less where wind speeds do not exceed 130 miles per hour (58 m/s) ~~located in Wind Zones 1 and 2 in accordance with Figure R301.2(4)C~~.

Reason: This is a companion item to S99-12/13 adopted in Portland in the October Final Action Hearing.

In the early development of the SBCCI Deemed to Comply document (The precursor to the SBCCI Standard for Hurricane Resistant Residential Construction (SSTD-10) and ultimately the ICC Standard for Residential Construction in High Wind Regions (ICC 600).) limits were developed to the geometry of the structures covered by the standard. These limits included a height limit of 33 feet mean roof height. The 33 feet was based on then-current height zoning regulations, the referenced wind speed height in the contemporary ASTM wind standard, as well as height of most anemometers (wind measuring devices). As the Deemed to Comply and later documents were limited for wood buildings to two stories in height, as the standards evolved the height limit was changed from 33 feet mean roof height to simply two stories. Note that the information in the code is based on a mean roof height of 33 feet and NOT two stories. APA developed this information and it is based on 33 feet mean roof height. (APA Form Number T450, free PDF download at www.apawood.org.)

From a wind perspective only the geometry of the structure matters. Its internal make-up of floors and walls affect the *resistance* of the structure to the wind but has no impact on the load on the structure. The reason for this change is that the “two story-only” requirement puts artificial limitations on the use of the shutter provisions. This requirement has been used to limit the use of the shutter provisions from 3-story residential structures built on sloped surfaces or with the first story partially embedded in the ground. In either of the cases the mean roof height may be 33 feet or less.

From the other perspective, the geometry of a two-story house could be such that the mean roof height exceeds 33 feet. This would make the analytical basis for the shutter design incorrect.

This proposal will also eliminate the confusion in the provision that first limits the exception to two-stories and then in the last sentence of the paragraph limits it to a 33 foot mean roof height.

The provisions in the code were originally based on a mean roof height of 33 feet; the shift to two-story was an unfortunate attempt at simplifying the provisions of the early high-wind prescriptive publications. Approval of this change will correct an unintended consequence of this attempt at simplification. Please vote for approval of this provision.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify by replacing the original proposal with the following:

R301.2.1.2 Protection of openings. Exterior openings in buildings located in windborne debris regions shall be protected from windborne debris. Glazed opening protection for windborne debris shall meet the requirements of the Large Missile Test of ASTM E 1996 and ASTM E 1886 referenced therein. Garage door glazed opening protection for windborne debris shall meet the requirements of an approved impact resisting standard or ANSI/DASMA 115.

> **Exception:** Wood structural panels with a minimum thickness of 7/16 inch (11 mm) and a maximum span of 8 feet (2438 mm) shall be permitted for opening protection ~~in one- and two-story buildings~~. Panels shall be precut and attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the component and cladding loads determined in accordance with either Table R301.2(2) or ASCE 7, with the permanent corrosion resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table R301.2.1.2 is permitted for buildings with a mean roof height of 33 feet (10 058 mm) or less located in Wind Zones 1 and 2 in accordance with Figure R301.2(4)C.

Committee Reason: The committee approved this code change proposal because it coordinates with previous action on RB39. The modification cleans up the proposal by removing unnecessary language.

Assembly Action: **None**

Final Hearing Results

RB41-13 **AM**

Code Change No: RB43-13

Original Proposal

Section(s): Tables R301.2.1.2, R602.3(2), R602.3.1, R602.3(3), R602.10.1.3, R602.10.3(1), R602.10.4, R602.10.5, R602.10.6.1, R603.3.1, R603.3.2(2), R603.3.2.1(1) through (4), R603.8, R611.6(1) through (4) and R613.5(1); and Sections R505.1.1, R602.10.6.5.1, R602.10.8.2, R603.1.1, R603.9.4.1, R611.2, R613.2, R802.10.2.1, R804.1.1, R804.3.2.1, R804.3.3 and R905.3.7

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

Revise as follows:

TABLE R301.2.1.2
WINDBORNE DEBRIS PROTECTION FASTENING SCHEDULE
FOR WOOD STRUCTURAL PANELS

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N,
1 mile per hour = 0.447 m/s.

a. This table is based on a 130mph basic wind speed~~s~~ and a 33-foot mean roof height.

b through d *(No change to current text)*

Revise as follows:

R505.1.1 Applicability limits. The provisions of this section shall control the construction of cold-formed steel floor framing for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist span, not greater than 40 feet (12 192 mm) in width parallel to the joist span, and less than or equal to three stories above *grade* plane. Cold-formed steel floor framing constructed in accordance with the provisions of this section shall be limited to sites ~~subjected to a maximum~~ where the basic ~~design~~ wind speed is not greater than ~~of~~ 110 miles per hour (49 m/s), the Exposure Category is B or C, and the ~~a maximum~~ ground snow load is not greater than ~~of~~ 70 pounds per square foot (3.35 kPa).

Revise as follows:

TABLE R602.3.1
MAXIMUM ALLOWABLE LENGTH OF WOOD WALL STUDS[b, c, d] ~~EXPOSED TO WIND SPEEDS OF 100 mph OR LESS IN SEISMIC DESIGN CATEGORIES A, B, C, D0, D1 and D2~~

(Portions of table not shown remain unchanged)

a. Design required.

b. Table is limited to buildings located where the basic wind speed is 100mph or less and for which the seismic design category is A, B, C, D0, D1, or D2

c~~b~~. Applicability of this table assumes the following: Snow load not exceeding 25 psf, *fb* not less than 1310 psi determined by multiplying the AF&PA NDS tabular base design value by the repetitive use factor, and by the size factor for all species except southern pine, E not less than 1.6 × 106 psi, tributary dimensions for floors and roofs not exceeding 6 feet, maximum span for floors and roof not exceeding 12 feet, eaves not over 2 feet in dimension and exterior sheathing. Where the conditions are not within these parameters, design is required.

d~~c~~. Utility, standard, stud and No. 3 grade lumber of any species are not permitted.

TABLE R602.3(2)
ALTERNATE ATTACHMENTS TO TABLE R602.3(1)

(Portions of table not shown remain unchanged)

a through f *(No change to current text)*

g. Specified alternate attachments for roof sheathing shall be permitted for basic wind speeds less than 100 mph. Fasteners attaching wood structural panel roof sheathing to gable end wall framing shall be installed using the spacing listed for panel edges.

TABLE R602.3(3) REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES [a, b, c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM BASIC WIND SPEED (mph)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind exposure category		
							B	C	D

(Portions of table not shown remain unchanged)

TABLE R602.10.1.3 BRACED WALL LINE SPACING

APPLICATION	CONDITION	BUILDING TYPE	BRACED WALL LINE SPACING CRITERIA	
			Maximum Spacing	Exception to Maximum Spacing
Wind bracing	Basic wind speed 85mph to 110 mph	Detached, Townhouse	60 feet	None

(Portions of table not shown remain unchanged)

TABLE R602.10.3(1) BRACING REQUIREMENTS BASED ON WIND SPEED

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 mile per hour = 0.447 m/s.

a through b *(No change to current text)*

c. Method CS-SFB does not apply where the basic wind speed is greater than 100 mph.

TABLE R602.10.4 BRACING METHODS

(Portions of table not shown remain unchanged)

a through c *(No change to current text)*

d. Method CS-SFB does not apply in Seismic Design Categories D0, D1 and D2 and in areas where the basic wind speed exceeds 100 mph.

e. *(No change to current text)*

TABLE R602.10.5 MINIMUM LENGTH OF BRACED WALL PANELS

METHOD (See Table R602.10.4)		MINIMUM LENGTH [a] (in)					CONTRIBUTING LENGTH (in)
		Wall Height					
		8 feet	9 feet	10 feet	11 feet	12 feet	
ABW	SDC A, B and C basic wind speed < 110 mph	28	32	34	38	42	48
	SDC D_o, D_1 and D_2, basic wind speed < 110 mph	32	32	34	NP	NP	

(Portions of table not shown remain unchanged.)

TABLE R602.10.6.1
MINIMUM HOLD-DOWN FORCES FOR METHOD ABW BRACED WALL PANELS

SEISMIC DESIGN CATEGORY AND WIND SPEED	SUPPORTING/STORY	HOLD DOWN FORCE (lb)				
		Height of Braced Wall Panel				
		8 ft	**9 ft**	**10 ft**	**11 ft**	**12 ft**
SDC A, B and C Basic w ~~W~~ind speed < 110 mph	One story	1800	1800	1800	2000	2200
	First of two story	3000	3000	3000	3300	3600
SDC D_0, D_1 and D_2 Basic w ~~W~~ind speed < 110 mph	One story	1800	1800	1800	NP [a]	NP [a]
	First of two story	3000	3000	3000	NP [a]	NP [a]

(Portions of table not shown remain unchanged.)

R602.10.6.5.1 Length of bracing. The length of bracing along each braced wall line shall be the greater of that required by the basic ~~design~~ wind speed and braced wall line spacing in accordance with Table R602.10.3(1) as adjusted by the factors in the Table R602.10.3(2) or the Seismic Design Category and braced wall line length in accordance with Table R602.10.6.5. Angled walls shall be permitted to be counted in accordance with Section R602.10.1.4, and braced wall panel location shall be in accordance with Section R602.10.2.2. The seismic adjustment factors in Table R602.10.3(4) shall not be applied to the length of bracing determined using Table R602.10.6.5. In no case shall the minimum total length of bracing in a braced wall line, after all adjustments have been taken, be less than 48 inches (1219 mm) total.

R602.10.8.2 Connections to roof framing. Top plates of exterior braced wall panels shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of braced wall panels and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the braced wall panels shall be permitted to replace the blocking required by this section. Blocking shall not be required over openings in continuously-sheathed braced wall lines. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with Section R806.1.

1. For Seismic Design Categories A, B and C and basic wind speeds less than 100 mph (45 m/s) where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is 91/4 inches (235 mm) or less, blocking between rafters or roof trusses shall not be required. Where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is between 91/4 inches (235 mm) and 151/4 inches (387 mm), blocking between rafters or roof trusses shall be provided above the braced wall panel in accordance with Figure R602.10.8.2(1).
2. For Seismic Design Categories D0, D1 and D2 or basic wind speeds of 100 mph (45 m/s) or greater, where the distance from the top of the braced wall panel to the top of the rafters or roof trusses is 151/4 inches (387 mm) or less, blocking between rafters or roof trusses shall be provided above the braced wall panel in accordance with Figure R602.10.8.2(1).
3. Where the distance from the top of the *braced wall panel* to the top of rafters or roof trusses exceeds $15^{1}/_{4}$ inches (387 mm), the top plates of the *braced wall panel* shall be connected to perpendicular rafters or roof trusses above in accordance with one or more of the following methods:
   - 3.1. Soffit blocking panels constructed in accordance with Figure R602.10.8.2(2);
   - 3.2. Vertical blocking panels constructed in accordance with Figure R602.10.8.2(3);
   - 3.3. Full-height engineered blocking panels designed in accordance with the AF&PA WFCM; or
   - 3.4. Blocking, blocking panels, or other methods of lateral load transfer designed in accordance with accepted engineering practice.

R603.1.1 Applicability limits. The provisions of this section shall control the construction of exterior cold-formed steel wall framing and interior load-bearing cold-formed steel wall framing for buildings not more than 60 feet (18 288 mm) long perpendicular to the joist or truss span, not more than 40 feet (12 192 mm) wide parallel to the joist or truss span, and less than or equal to three stories above *grade plane*. All exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Cold-formed steel walls constructed in accordance with the provisions of this section shall be limited to sites ~~subjected to a maximum~~ where the basic ~~design~~ wind speed is not greater than ~~of~~ 110 miles per hour (49 m/s), the Exposure Category is B or C, and the ~~a maximum~~ ground snow load is not greater than ~~of~~ 70 pounds per square foot (3.35 kPa).

TABLE R603.3.1
WALL TO FOUNDATION OR FLOOR CONNECTION REQUIREMENTS [a,b]

FRAMING CONDITION	BASIC WIND SPEED (mph) AND EXPOSURE					
	85 B	90 B	100 B 85 C	110 B 90C	100 C	< 110 C

(Portions of table not shown remain unchanged.)

TABLE R603.3.2(2)
24-FOOT-WIDE BUILDING SUPPORTING ROOF AND CEILING ONLY[a, b, c]
33 KSI STEEL

BASIC WIND SPEED		MEMBER SIZE	STUD SPACING (inches)	MINIMUM STUD THICKNESS (mils)		
				8-foot Studs	9-foot Studs	10-foot Studs
Exp. B	Exp. C			Ground Snow Load (psf)		

(Portions of table not shown remain unchanged.)

TABLE R603.3.2(31)
40-FOOT-WIDE BUILDING SUPPORTING TWO FLOORS, ROOF AND CEILING[a, b, c]
50 KSI STEEL

BASIC WIND SPEED		MEMBER SIZE	STUD SPACING (inches)	MINIMUM STUD THICKNESS (mils)		
				8-foot Studs	9-foot Studs	10-foot Studs
Exp. B	Exp. C			Ground Snow Load (psf)		

(Portions of table not shown remain unchanged.)

TABLE R603.3.2.1(1)
ALL BUILDING WIDTHS GABLE ENDWALLS 8, 9 OR 10 FEET IN HEIGHT[a, b, c]
33 KSI STEEL

BASIC WIND SPEED		MEMBER SIZE	STUD SPACING (inches)	MINIMUM STUD THICKNESS (Mils)		
Exp. B	Exp. C			8-foot Studs	9-foot Studs	10-foot Studs

(Portions of table not shown remain unchanged.)

(TABLE R603.3.2.1(2)
ALL BUILDING WIDTHS GABLE ENDWALLS 8, 9 OR 10 FEET IN HEIGHT[a, b, c]
50 KSI STEEL

BASIC WIND SPEED		MEMBER SIZE	STUD SPACING (inches)	MINIMUM STUD THICKNESS (Mils)		
Exp. B	Exp. C			8-foot Studs	9-foot Studs	10-foot Studs

(Portions of table not shown remain unchanged.)

TABLE R603.3.2.1(3)
ALL BUILDING WIDTHS GABLE ENDWALLS OVER 10 FEET IN HEIGHT[a, b, c]
33 KSI STEEL

BASIC WIND SPEED		MEMBER SIZE	STUD SPACING (inches)	MINIMUM STUD THICKNESS (mils)					
				Stud Height, *h* (feet)					
Exp. B	Exp. C			10 < *h* □ 12	12 < *h* □ 14	14 < *h* □ 16	16 < *h* □ 18	18 < *h* □ 20	20 < *h* □ 22

(Portions of table not shown remain unchanged.)

TABLE R603.3.2.1(4)
ALL BUILDING WIDTHS GABLE ENDWALLS OVER 10 FEET IN HEIGHT[a, b, c]
50 KSI STEEL

BASIC WIND SPEED		MEMBER SIZE	STUD SPACING (inches)	MINIMUM STUD THICKNESS (mils)					
				Stud Height, *h* (feet)					
Exp. B	Exp. C			10 < *h* □ 12	12 < *h* □ 14	14 < *h* □ 16	16 < *h* □ 18	18 < *h* □ 20	20 < *h* □ 22

(Portions of table not shown remain unchanged.)

TABLE R603.8
HEAD AND SILL TRACK SPAN

(Portions of table not shown remain unchanged.)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

a. Deflection limit: *L*/240.
b. Head and sill track spans are based on components and cladding wind pressures ~~speeds~~ and 48 inch tributary span.
c. For openings less than 4 feet in height that have both a head track and sill track, the above spans are permitted to be multiplied by 1.75. For openings less than or equal to 6 feet in height that have both a head track and a sill track, the above spans are permitted to be multiplied by a factor of 1.5.

R603.9.4.1 Wind speeds greater than 100 mph. Where the basic wind speed~~s are in excess of~~ exceeds 100 miles per hour (45 m/s) and~~,~~ Exposure C or D applies, walls shall be provided with ~~wind~~ direct uplift connections in accordance with AISI S230, Section E13.3, and AISI S230, Section F7.2, as required for 110 miles per hour (49 m/s), Exposure C.

R611.2 Applicability limits. The provisions of this section shall apply to the construction of exterior concrete walls for buildings not greater than 60 feet (18 288 mm) in plan dimensions, floors with clear spans not greater than 32 feet (9754 mm) and roofs with clear spans not greater than 40 feet (12 192 mm). Buildings shall not exceed 35 feet (10 668 mm) in mean roof height or two stories in height above-grade. Floor/ceiling dead loads shall not exceed 10 pounds per square foot (479 Pa), roof/ceiling dead loads shall not exceed 15 pounds per square foot (718 Pa) and *attic* live loads shall not exceed 20 pounds per square foot (958 Pa). Roof overhangs shall not exceed 2 feet (610 mm) of horizontal projection beyond the exterior wall and the dead load of the overhangs shall not exceed 8 pounds per square foot (383 Pa).

Walls constructed in accordance with the provisions of this section shall be limited to buildings ~~subjected to a maximum~~ where the basic ~~design~~ wind speed is not greater than ~~of~~ 130 miles per hour (58 m/s) Exposure B, 110 miles per hour (49 m/s) Exposure C and 100 miles per hour (45 m/s) Exposure D. Walls constructed in accordance with the provisions of this section shall be limited to detached one- and two-family *dwellings* and townhouses assigned to Seismic Design Category A or B, and detached one- and two-family *dwellings* assigned to Seismic Design Category C.

TABLE R611.6(1)
MINIMUM VERTICAL REINFORCEMENT FOR FLAT ABOVE-GRADE WALLS [a, b, c, d, e]

BASIC ~~MAXIMUM~~ WIND SPEED (mph)			MAXIMUM UNSUPPORTED WALL HEIGHT PER STORY (feet)	MINIMUM VERTICAL REINFORCEMENT—BAR SIZE AND SPACING (inches)[f, g]							
				Nominal[h] wall thickness (inches)							
Exposure Category				4		6		8		10	
B	C	D		Top[i]	Side[i]	Top[i]	Side[i]	Top[i]	Side[i]	Top[i]	Side[i]

(Portions of table not shown remain unchanged.)

TABLE R611.6(2)
MINIMUM VERTICAL REINFORCEMENT FOR WAFFLE-GRID ABOVE-GRADE WALLS[a, b, c, d, e]

BASIC ~~MAXIMUM~~ WIND SPEED (mph)			MAXIMUM UNSUPPORTED WALL HEIGHT PER STORY (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)[f, g]			
				Nominal[h] wall thickness (inches)			
Exposure Category				6		8	
B	C	D		Top[i]	Side[i]	Top[i]	Side[i]

(Portions of table not shown remain unchanged.)

TABLE R611.6(3)
MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH SCREEN-GRID ABOVE-GRADE WALLS[a, b, c, d, e]

BASIC ~~MAXIMUM~~ WIND SPEED (mph)			MAXIMUM UNSUPPORTED WALL HEIGHT PER STORY (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)[f, g]	
				Nominal[h] wall thickness (inches)	
Exposure Category				6	
B	C	D		Top[i]	Side[i]

(Portions of table not shown remain unchanged.)

TABLE R611.6(4)
MINIMUM VERTICAL REINFORCEMENT FOR FLAT, WAFFLE- AND SCREEN-GRID ABOVE-GRADE WALLS DESIGNED CONTINUOUS WITH FOUNDATION STEM WALLS[a, b, c, d, e, k, l]

BASIC ~~MAXIMUM~~ WIND SPEED (mph)			HEIGHT OF STEM WALL[h, i] (feet)	MAXIMUM DESIGN LATERAL SOIL LOAD (psf/ft)	MAXIMUM UNSUPPORTED HEIGHT OF ABOVE-GRADE WALL (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)[f, g]						
						Wall type and nominal thickness[j] (inches)						
Exposure Category						Flat				Waffle		Screen
B	C	D				4	6	8	10	6	8	6

(Portions of table not shown remain unchanged.)

R613.2 Applicability limits. The provisions of this section shall control the construction of exterior structural insulated panel walls and interior load-bearing structural insulated panel walls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist or truss span and not greater than two stories in height with each wall not greater than 10 feet (3048 mm) high. All exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Structural insulated panel walls constructed in accordance with the provisions of this section shall be limited to sites where the basic

~~subjected to a maximum design~~ wind speed is not greater than ~~of~~ 130 miles per hour (58 m/s), the Exposure Category is A, B or C, ~~and a maximum~~ the ground snow load is not greater than ~~of~~ 70 pounds per foot (3.35 kPa), and the Seismic Design Category is ~~Categories~~ A, B, or ~~and~~ C.

TABLE R613.5(1)
MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP LIGHT-FRAME ROOF ONLY (inches)

BASIC WIND SPEED ~~(3-second gust)~~ (mph)			MINIMUM STUD THICKNESS (mils)														
			24			28			32			36			40		
Exp. A/B	Exp. C	SNOW LOAD (psf)	Wall Height (ft)			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)		
			8	9	10	8	9	10	8	9	10	8	9	10	8	9	10

(Portions of table not shown remain unchanged.)

Revise as follows:

R802.10.2.1 Applicability limits. The provisions of this section shall control the design of truss roof framing when snow controls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist, rafter or truss span, not greater than 36 feet (10 973 mm) in width parallel to the joist, rafter or truss span, not greater than two stories in height with each *story* not greater than 10 feet (3048 mm) high, and roof slopes not smaller than 3:12 (25-percent slope) or greater than 12:12 (100-percent slope). Truss roof framing constructed in accordance with the provisions of this section shall be limited to sites ~~subjected to a maximum~~ where the basic ~~design~~ wind speed is not greater than ~~of~~ 110 miles per hour (49 m/s), the Exposure Category is A, B or C, and the ~~a maximum~~ ground snow load is not greater than ~~of~~ 70 pounds per square foot (3.35 kPa). For consistent loading of all truss types, roof snow load is to be computed as: 0.7 *p*g.

R804.1.1 Applicability limits. The provisions of this section shall control the construction of cold-formed steel roof framing for buildings not greater than 60 feet (18 288 mm) perpendicular to the joist, rafter or truss span, not greater than 40 feet (12 192 mm)in width parallel to the joist span or truss, less than or equal to three stories above *grade* plane and with roof slopes not less than 3:12 (25-percent slope) or greater than 12:12 (100 percent slope). Cold-formed steel roof framing constructed in accordance with the provisions of this section shall be limited to sites ~~subjected to a maximum~~ where the basic ~~design~~ wind speed is not greater than ~~of~~ 110 miles per hour (49 m/s), the Exposure Category is B or C, and the ~~a maximum~~ ground snow load is not greater than ~~of~~ 70 pounds per square foot (3.35 kPa).

R804.3.2.1 Minimum roof rafter sizes. Roof rafter size and thickness shall be determined in accordance with the limits set forth in Tables R804.3.2.1(1) and R804.3.2.1(2) based on the horizontal projection of the roof rafter span. For determination of roof rafter sizes, reduction of roof spans shall be permitted when a roof rafter support brace is installed in accordance with Section R804.3.2.2. The reduced roof rafter span shall be taken as the larger of the distance from the roof rafter support brace to the ridge or to the heel measured horizontally.

For the purpose of determining roof rafter sizes in Tables R804.3.2.1(1) and R804.3.2.1(2), basic wind speeds shall be converted to equivalent ground snow loads in accordance with Table R804.3.2.1(3). Roof rafter sizes shall be based on the higher of the ground snow load or the equivalent snow load converted from the basic wind speed.

R804.3.3 Hip framing. Hip framing shall consist of jack-rafters, hip members, hip support columns and connections in accordance with this section, or shall be in accordance with an *approved* design. The provisions of this section for hip members and hip support columns shall apply only where the jack rafter slope is greater than or equal to the roof slope. For the purposes of determining member sizes in this section, basic wind speeds shall be converted to equivalent ground snow load in accordance with Table R804.3.2.1(3).

Revise as follows:

R905.3.7 Application. Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, based on the following:

Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m2) require a minimum of one fastener per tile regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the basic wind speed exceeds 100 miles per hour (45 m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above *grade*. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The purpose of this proposal is to coordinate terminology in the code. Figure R301.2.4(A) supplies the "basic wind speed", defined as the "three-second gust speed at 33 feet (10 058 mm) above the ground in Exposure C (see Section R301.2.1). This wind speed, derived from ASCE 7, is a design wind speed based on an extensive modeling process using historical data, wind characteristics and computer simulations. It is not necessarily the "maximum" wind speed that can be experienced by a site, nor does it suggest the "maximum" wind speed an element is capable of resisting due to factors of safety in material standards and design procedures. This proposal corrects references throughout the IRC to properly refer to "basic wind speed."

Cost Impact: None

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because the proponent requested disapproval in order to clean it up and bring it back in the public comment period.

Assembly Action: **None**

Public Comments

Public Comment:

Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee requests Approval as Modified by this Public Comment.

Replace proposal with the following:

Revise Chapter 6 as follows:

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

(Portions of table and footnotes not shown remain unchanged)

f. Where the ultimate design ~~For regions having basic~~ wind speed is ~~of~~ ~~110~~140 mph or greater, 8d deformed (21/2" × 0.120) nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.

g. Where the ultimate design ~~For regions having basic~~ wind speed is ~~of~~ ~~100~~130 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. Where the ultimate design ~~When basic~~ wind speed is greater than ~~100~~130 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.

TABLE R602.3(2)
ALTERNATE ATTACHMENTS TO TABLE 602.3(1)

(Portions of table and footnotes not shown remain unchanged)

g. Specified alternate attachments for roof sheathing shall be permitted where the ultimate design wind speed is ~~for windspeeds~~ less than ~~100~~130 mph. Fasteners attaching wood structural panel roof sheathing to gable end wall framing shall be installed using the spacing listed for panel edges.

TABLE R602.3.1
MAXIMUM ALLOWABLE LENGTH OF WOOD WALL STUDS ~~EXPOSED TO WIND SPEEDS OF 100 mph OR LESS IN SEISMIC DESIGN CATEGORIES A, B, C, D0, D1 and D2~~

(Portions of table not shown remain unchanged)

a. Design required.
b. Table is limited to buildings located where the ultimate design wind speed is 130 mph or less and for which the seismic design category is A, B, C, D0, D1, or D2
c~~b~~. Applicability of this table assumes the following: Snow load not exceeding 25 psf, *fb* not less than 1310 psi determined by multiplying the AF&PA NDS tabular base design value by the repetitive use factor, and by the size factor for all species except southern pine, E not less than 1.6 × 106 psi, tributary dimensions for floors and roofs not exceeding 6 feet, maximum span for floors and roof not exceeding 12 feet, eaves not over 2 feet in dimension and exterior sheathing. Where the conditions are not within these parameters, design is required.
d~~c~~. Utility, standard, stud and No. 3 grade lumber of any species are not permitted.

R613.2 Applicability limits. The provisions of this section shall control the construction of exterior structural insulated panel walls and interior load-bearing structural insulated panel walls for buildings not greater than 60 feet (18 288mm) in length perpendicular to the joist or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist or truss span and not greater than two stories in height with each wall not greater than 10 feet (3048 mm) high. All exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Structural insulated panel walls constructed in accordance with the provisions of this section shall be limited to sites ~~subjected to a maximum~~ where the ultimate design wind speed (V_{ult}) is not greater than of ~~120~~ 155 miles per hour (~~54~~ 69 m/s), Exposure ~~A or~~ B or ~~110~~ 140 miles per hour (~~49~~ 63 m/s) Exposure C, the ~~and a maximum~~ ground snow load is not greater than ~~of~~ 70 pounds per foot (3.35 kPa), and the Seismic Design Category is ~~ies~~ A, B or ~~and~~ C.

Revise Chapter 8 as follows:

R802.10.2.1 Applicability limits. The provisions of this section shall control the design of truss roof framing when snow controls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist, rafter or truss span, not greater than 36 feet (10 973 mm) in width parallel to the joist, rafter or truss span, not greater than two stories in height with each *story* not greater than 10 feet (3048 mm) high, and roof slopes not smaller than 3:12 (25-percent slope) or greater than 12:12 (100-percent slope). Truss roof framing constructed in accordance with the provisions of this section shall be limited to sites ~~subjected to a maximum~~ where the ultimate design wind speed is not greater than ~~of~~ 140 ~~110~~ miles per hour (63~~49~~ m/s), the Exposure Category is ~~A,~~ B or C, and the ~~a maximum~~ ground snow load is not greater than ~~of~~ 70 pounds per square foot (3.35 kPa). For consistent loading of all truss types, roof snow load is to be computed as: 0.7 p_g.

Revise Chapter 9 as follows:

R905.2.4.1 Wind resistance of asphalt shingles. Asphalt shingles shall be tested in accordance with ASTM D 7158. Asphalt shingles shall meet the classification requirements of Table R905.2.4.1 for the appropriate maximum ultimate design ~~basic~~ wind speed. Asphalt shingle packaging shall bear a label to indicate compliance with ASTM D 7158 and the required classification in Table R905.2.4.1(1).

R905.3.7 Application. Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, based on the following:

1. Climatic conditions.
2. Roof slope.
3. Underlayment system.
4. Type of tile being installed.

Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m2) require a minimum of one fastener per tile regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the ultimate design wind speed exceeds 130 ~~100~~ miles per hour (58~~45~~ m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above *grade*. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.

Commenter's Reason: The Building Code Action Committee (BCAC) is submitting this public comment to coordinate terminology in the code. A comprehensive set of proposals was developed by a task group led by NAHB to update the IRC wind provisions to the ultimate wind speed basis of the 2012 IBC and ASCE 7-10. As part of that update, the term "basic wind speed" was changed to "ultimate design wind speed" to be consistent with the term used in the 2012 IBC (and also implemented in a similar update to ICC-600). RB43 as submitted would not have been consistent with those actions, and thus the BCAC requested disapproval during the Committee Action Hearings.

In correlating the actions taken on the comprehensive set of proposals to update the IRC wind provisions to the ultimate wind speed basis of the 2012 IBC and ASCE 7-10, several instances were found where the term "basic wind speed" was not changed to "ultimate design wind speed". This public comment has been developed to make the correlating change in one swoop, in lieu of submitting three separate public comments to RB271, RB396 and RB418. To avoid confusion, the corresponding changes to the wind speed contained in those proposals has been reflected here.

Final Hearing Results

RB43-13	**AMPC**

Code Change No: RB44-13

Original Proposal

Section(s): R301.2.1.4, R603.3.2, R613.2, Table R613.5(1), Table R613.5(2), R802.10.2.1

Proponent: Matthew L. Mlakar, Barrish Pelham and Associates, Inc., representing Structural Engineers Association of California

Revise as follows:

R301.2.1.4 Exposure category. For each wind direction considered, an exposure category that adequately reflects the characteristics of ground surface irregularities shall be determined for the site at which the building or structure is to be constructed. For a site located in the transition zone between categories, the category resulting in the largest wind forces shall apply. Account shall be taken of variations in ground surface roughness that arise from natural topography and vegetation as well as from constructed features. For a site where multiple detached one- and two-family dwellings, *townhouses* or other structures are to be constructed as part of a subdivision, master-planned community, or otherwise designated as a developed area by the authority having jurisdiction, the exposure category for an individual structure shall be based upon the site conditions that will exist at the time when all adjacent structures on the site have been constructed, provided their construction is expected to begin within one year of the start of construction for the structure for which the exposure category is determined. For any given wind direction, the exposure in which a specific building or other structure is sited shall be assessed as being one of the following categories:

~~1. Exposure A. Large city centers with at least 50 percent of the buildings having a height in excess of 70 feet (21 336 mm). Use of this exposure category shall be limited to those areas for which terrain representative of Exposure A prevails in the upwind direction for a distance of at least 0.5 mile (0.8 km) or 10 times the height of the building or other structure, whichever is greater. Possible channeling effects or increased velocity pressures due to the building or structure being located in the wake of adjacent buildings shall be taken into account.~~

1~~2~~. Exposure B. Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B shall be assumed unless the site meets the definition of another type exposure.

2~~3~~. Exposure C. Open terrain with scattered obstructions, including surface undulations or other irregularities, having heights generally less than 30 feet (9144 mm) extending more than 1,500 feet (457 m) from the building site in any quadrant. This exposure shall also apply to any building located within Exposure B type terrain where the building is directly adjacent to open areas of Exposure C type terrain in any quadrant for a distance of more than 600 feet (183 m). This category includes flat open country and grasslands.

3~~4~~. Exposure D. Flat, unobstructed areas exposed to wind flowing over open water for a distance of at least 1 mile (1.61 km). Shorelines in Exposure D include inland waterways, the Great Lakes, and coastal areas of California, Oregon, Washington and Alaska. This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the water. Exposure D extends inland from the shoreline a distance of 1500 feet (457 m) or 10 times the height of the building or structure, whichever is greater.

Revise as follows:

R603.3.2 Minimum stud sizes. Cold-formed steel walls shall be constructed in accordance with Figures R603.3.1(1), R603.3.1(2), or R603.3.1(3), as applicable. Exterior wall stud size and thickness shall be

determined in accordance with the limits set forth in Tables R603.3.2(2) through R603.3.2(31). Interior load-bearing wall stud size and thickness shall be determined in accordance with the limits set forth in Tables R603.3.2(2) through 603.3.2(31) based upon an 85 miles per hour (38 m/s) Exposure ~~A/~~B wind value and the building width, stud spacing and snow load, as appropriate. Fastening requirements shall be in accordance with Section R603.2.4 and Table R603.3.2(1). Top and bottom tracks shall have the same minimum thickness as the wall studs.
(*No change to remaining text)*

R613.2 Applicability limits. The provisions of this section shall control the construction of exterior structural insulated panel walls and interior load-bearing structural insulated panel walls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist or truss span and not greater than two stories in height with each wall not greater than 10 feet (3048 mm) high. All exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Structural insulated panel walls constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 120 miles per hour (54 m/s), Exposure ~~A or~~ B or, 110 miles per hour (49 m/s) Exposure C, and a maximum ground snow load of 70 pounds per foot (3.35 kPa), and Seismic Design Categories A, B, and C.

TABLE R613.5(1)
MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP LIGHT-FRAME ROOF ONLY (inches)[a]

Wind Speed (3-sec gust)		Snow Load (psf)	Building Width (ft)				
			24	28	32	36	40
Exp ~~A/~~B	Exp. C		Wall Height (feet)	Wall Height (feet)	Wall Height (feet)	Wall Height (feet)	Wall Height (feet)

(Portions of table not shown to remain unchanged.)

TABLE R613.5(2)
MINIMUM THICKNESS FOR SIP WALLS SUPPORTING SIP OR LIGHT-FRAME ONE STORY AND ROOF (inches)[a]

Wind Speed (3 –sec gust)		Snow Load (psf)	Building Width (ft)				
			24	28	32	36	40
Exp ~~A/~~B	Exp. C		Wall Height (feet)	Wall Height (feet)	Wall Height (feet)	Wall Height (feet)	Wall Height (feet)

(Portions of table not shown to remain unchanged.)

Revise as follows:

R802.10.2.1 Applicability limits. The provisions of this section shall control the design of truss roof framing when snow controls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist, rafter or truss span, not greater than 36 feet (10 973 mm) in width parallel to the joist, rafter or truss span, not more than three stories above *grade plane* in height, and roof slopes not smaller than 3:12 (25-percent slope) or greater than 12:12 (100-percent slope). Truss roof framing constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 110 miles per hour (49 m/s), Exposure ~~A,~~ B or C, and a maximum ground snow load of 70 psf (3352 Pa). For consistent loading of all truss types, roof snow load is to be computed as: 0.7 p_g.

Reason: Exposure category A is no longer listed as an exposure category under ASCE 7-10 section 26.7.3, nor is it used in the current edition of the IBC. Most of the references to Exposure A have been removed from the IRC, however, a few still remain. The four sections and two tables included in this proposal represent the remaining locations where Exposure A is referenced.
The removal of Exposure A will bring the IRC in line with the IBC and industry standards.

Cost Impact: The proposed code change will not change the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it makes the International Residential Code consistent with the International Building Code and ASCE 7.

Assembly Action: **None**

Final Hearing Results

RB44-13	**AS**

Code Change No: RB45-13

Original Proposal

Section(s): **R301.2.1.4**

Proponent: Matthew L. Mlakar, Barrish Pelham and Associates, Inc., representing Structural Engineers Association of California

Revise as follows:

R301.2.1.4 Exposure category. For each wind direction considered, an exposure category that adequately reflects the characteristics of ground surface irregularities shall be determined for the site at which the building or structure is to be constructed. For a site located in the transition zone between categories, the category resulting in the largest wind forces shall apply. Account shall be taken of variations in ground surface roughness that arise from natural topography and vegetation as well as from constructed features. For a site where multiple detached one- and two-family dwellings, *townhouses* or other structures are to be constructed as part of a subdivision, master-planned community, or otherwise designated as a developed area by the authority having jurisdiction, the exposure category for an individual structure shall be based upon the site conditions that will exist at the time when all adjacent structures on the site have been constructed, provided their construction is expected to begin within one year of the start of construction for the structure for which the exposure category is determined. For any given wind direction, the exposure in which a specific building or other structure is sited shall be assessed as being one of the following categories:

1. Exposure A. Large city centers with at least 50 percent of the buildings having a height in excess of 70 feet (21 336 mm). Use of this exposure category shall be limited to those areas for which terrain representative of Exposure A prevails in the upwind direction for a distance of at least 0.5 mile (0.8 km) or 10 times the height of the building or other structure, whichever is greater. Possible channeling effects or increased velocity pressures due to the building or structure being located in the wake of adjacent buildings shall be taken into account.
2. Exposure B. Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B shall be assumed unless the site meets the definition of another type exposure.
3. Exposure C. Open terrain with scattered obstructions, including surface undulations or other irregularities, having heights generally less than 30 feet (9144 mm) extending more than 1,500 feet (457 m) from the building site in any quadrant. This exposure shall also apply to any building located within Exposure B type terrain where the building is directly adjacent to open areas of Exposure C type terrain in any quadrant for a distance of more than 600 feet (183 m). This category includes flat open country and grasslands.
4. Exposure D. Flat, unobstructed areas exposed to wind flowing over open water<u>, smooth mud flats, salt flats and unbroken ice</u> for a distance of at least ~~1 mile (1.61 km)~~ <u>5000 feet (1,524m)</u>. ~~Shorelines in Exposure D include inland waterways, the Great Lakes, and coastal areas of California, Oregon, Washington and Alaska.~~ This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the ~~water~~ <u>unobstructed area</u>. Exposure D extends ~~inland~~ <u>downwind</u> from the ~~shoreline~~ <u>edge of the unobstructed area</u> a distance of ~~1500 feet (457 m)~~ 600 feet (183 m) or ~~10~~ <u>20</u> times the height of the building or structure, whichever is greater.

Reason: The 2012 IRC definition for wind exposure category D does not match the definition in either the 2012 IBC or ASCE 7-10. Under ICC CP#28 policy section 1.3.1 the provisions of all codes shall be consistent with one another so that conflicts between codes do not occur. The proposed change is to incorporate the language of ASCE 7-10 section 26.7.3 into the IRC. It should be noted that ASCE 7-10 now requires the use of exposure D along hurricane coastlines. ASCE 7-10 commentary section C26.7, cites recent research which provides data showing that the surface roughness over the ocean in a hurricane is consistent with that of exposure D rather than exposure C.

The change to the exposure categories will bring the IRC in line with the IBC and industry standards.

Cost Impact: The proposal is editorial and will not impact the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it created consistency with ASCE 7.

Assembly Action: **None**

Final Hearing Results

RB45-13	**AS**

Code Change No: RB47-13

Original Proposal

Section(s): R301.2.2.2.1, Table R301.2.2.2.1

Proponent: Edward L. Keith, APA, representing The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R301.2.2.2.1 Weights of materials. Average dead loads shall not exceed 15 pounds per square foot (720 Pa) for the combined roof and ceiling assemblies (on a horizontal projection) or 10 pounds per square foot (480 Pa) for floor assemblies, except as further limited by Section R301.2.2. Dead loads for walls above grade shall not exceed:

1. Fifteen pounds per square foot (720 Pa) for exterior light-frame wood walls.
2. Fourteen pounds per square foot (670 Pa)for exterior light-frame cold-formed steel walls.
3. Ten pounds per square foot (480 Pa) for interior light-frame wood walls.
4. Five pounds per square foot (240 Pa) for interior light-frame cold-formed steel walls.
5. Eighty pounds per square foot (3830 Pa) for 8-inch-thick (203 mm) masonry walls.
6. Eighty-five pounds per square foot (4070 Pa) for 6-inch-thick (152 mm) concrete walls.
7. Ten pounds per square foot (480 Pa) for SIP walls.

Exceptions:

~~1. Roof and ceiling dead loads not exceeding 25 pounds per square foot (1190 Pa) shall be permitted provided the wall bracing amounts in Chapter 6 are increased in accordance with Table R301.2.2.2.1.~~

1~~2~~. Light-frame walls with stone or masonry veneer shall be permitted in accordance with the provisions of Sections R702.1 and R703.

2~~3~~. Fireplaces and chimneys shall be permitted in accordance with Chapter 10.

~~**TABLE R301.2.2.2.1**~~
~~**WALL BRACING ADJUSTMENT FACTORS BY ROOF COVERING DEAD LOAD[a]**~~

~~WALL SUPPORTING~~	~~ROOF/CEILING DEAD LOAD~~	
	~~15 psf or less~~	~~25 psf~~
~~Roof only~~	~~1.0~~	~~1.2~~
~~Roof plus one or two stories~~	~~1.0~~	~~1.1~~

~~For SI: 1 pound per square foot = 0.0479kPa~~

~~a. Linear interpolation shall be permitted.~~

Reason: Exception 1 proposed for deletion in this proposal calls for the adjustment of the bracing amount in Chapter 6 to be increased by the Table R301.2.2.2.1 amounts. Currently the same adjustments are duplicated in Chapter 6 in Table R602.10.3(4) for the adjustment based on: "Roof/ceiling dead load for wall supporting". The way the exception is written could require the same adjustments be applied twice; once when determining Chapter 6 bracing, and once again it comply with Section R301.2.2.2.1. Deleting the requirement in Section R301.2.2.2.1 would eliminate the potential for "double dipping" and eliminate the resulting unnecessary construction costs.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify by replacing deleted Exception 1 to Section R301.2.2.1 in the original proposal with the following:

Exceptions:

1. Roof and ceiling dead loads not exceeding 25 pounds per square foot (1190 Pa) shall be permitted provided the wall bracing amounts in Chapter 6 Section R602.10.3 are increased in accordance with Table R602.10.3(4).

(Portions of proposal not shown to remain unchanged.)

Committee Reason: The committee approved this code change proposal because they felt that it is a good change that prevents the wall bracing adjustment factors from being applied twice. The modification adds a valid pointer**.**

Assembly Action: **None**

Final Hearing Results

RB47-13 **AM**

Code Change No: RB49-13

Original Proposal

Section(s): R301.2.2.2.5, R301.3, R803.2.3

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org)

Revise as follows:

R301.2.2.2.5 Irregular buildings. The seismic provisions of this code shall not be used for irregular structures located in Seismic Design Categories C, D0, D1 and D2. Irregular portions of structures shall be designed in accordance with accepted engineering practice to the extent the irregular features affect the performance of the remaining structural system. When the forces associated with the irregularity are resisted by a structural system designed in accordance with accepted engineering practice, design of the remainder of the building shall be permitted using the provisions of this code. A building or portion of a building shall be considered to be irregular when one or more of the following conditions occur:

1 through 6 *(No changes to current text)*

7. When stories above *grade* plane partially or completely braced by wood wall framing in accordance with Section R602 or <u>cold-formed</u> steel wall framing in accordance with Section R603 include masonry or concrete construction.

   Exception: Fireplaces, chimneys and masonry veneer as permitted by this code. When this irregularity applies, the entire *story* shall be designed in accordance with accepted engineering practice.

R301.3 Story height. The wind and seismic provisions of this code shall apply to buildings with story heights not exceeding the following:

1. *(No changes to current text)*
2. For <u>cold-formed</u> steel wall framing, a stud height of 10 feet (3048 mm), plus a height of floor framing not to exceed 16 inches (406 mm).

3 through 5 *(No changes to current text)*

Individual walls or walls studs shall be permitted to exceed these limits as permitted by Chapter 6 provisions, provided story heights are not exceeded. Floor framing height shall be permitted to exceed these limits provided the story height does not exceed 11 feet 7 inches (3531 mm). An engineered design shall be provided for the wall or wall framing members when they exceed the limits of Chapter 6. Where the story height limits of this section are exceeded, the design of the building, or the non-compliant portions thereof, to resist wind and seismic loads shall be in accordance with the International Building Code.

R803.2.3 Installation. Wood structural panel used as roof sheathing shall be installed with joints staggered or not staggered in accordance with Table R602.3(1), or APA E30 for wood roof framing or with Table R804.3 for <u>cold-formed</u> steel roof framing.

Reason: These editorial modifications correct the terminology to reflect what is adopted throughout the IRC and the IBC.

Cost Impact: No impact to the cost of construction is anticipated.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it creates consistency of terminology.

Assembly Action: **None**

Final Hearing Results

RB49-13	**AS**

Code Change No: RB52-13

Original Proposal

Section(s): R301.2.4.1, R322.1.1

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows

R301.2.4.1 Alternative provisions. As an alternative to the requirements in Section R322, ~~R322.3 for buildings and structures located in whole or in part in coastal high-hazard areas (V Zones) and Coastal A Zones, if delineated,~~ ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

R322.1.1 Alternative provisions. As an alternative to the requirements in Section R322, ~~R322.3 for buildings and structures located in whole or in part in coastal high-hazard areas (V Zones) and Coastal A Zones, if delineated,~~ ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

Reason: This code change provides an alternative for buildings and structures in any flood hazard areas to be designed and constructed according to the standard ASCE 24 *Flood Resistant Design and Construction*. There is no reason to limit use of ASCE 24 as an alternative. There are many flood hazard areas where the builder, designer or building official may deem it appropriate to not use prescriptive foundations, such as along riverine waterways and some coastal areas (inland of Zone V) where flood depths are significant and dwellings would need very tall foundations or in riverine floodplains where flood velocities are very fast which suggests it is appropriate to specifically consider hydrodynamic loads.

Another situation where use of ASCE 24 is appropriate is for dwellings in flood hazard areas on alluvial fans. The IBC, by reference to ASCE 24, has specific limitations for buildings on alluvial fans. The fact that the IRC does not have explicit provisions for alluvial fans does not mean code officials should ignore credible information on Flood Insurance Rate Maps or other sources that identifies flood hazard areas subject to high risk conditions, including alluvial fans. Specifying that ASCE 24 is an alternative allows its use where the prescriptive provisions of the IRC may not adequately account for flood risks.

Cost Impact: Use of ASCE 24 is an alternative; there are no cost impacts imposed by providing an alternative.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it provided more flexibility in the code.

Assembly Action: **None**

Final Hearing Results

RB52-13 **AS**

Code Change No: RB52-13

Original Proposal

Section(s): R301.2.4.1, R322.1.1

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows

R301.2.4.1 Alternative provisions. As an alternative to the requirements in Section R322, ~~R322.3 for buildings and structures located in whole or in part in coastal high-hazard areas (V Zones) and Coastal A Zones, if delineated,~~ ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

R322.1.1 Alternative provisions. As an alternative to the requirements in Section R322, ~~R322.3 for buildings and structures located in whole or in part in coastal high-hazard areas (V Zones) and Coastal A Zones, if delineated,~~ ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

Reason: This code change provides an alternative for buildings and structures in any flood hazard areas to be designed and constructed according to the standard ASCE 24 *Flood Resistant Design and Construction*. There is no reason to limit use of ASCE 24 as an alternative. There are many flood hazard areas where the builder, designer or building official may deem it appropriate to not use prescriptive foundations, such as along riverine waterways and some coastal areas (inland of Zone V) where flood depths are significant and dwellings would need very tall foundations or in riverine floodplains where flood velocities are very fast which suggests it is appropriate to specifically consider hydrodynamic loads.

Another situation where use of ASCE 24 is appropriate is for dwellings in flood hazard areas on alluvial fans. The IBC, by reference to ASCE 24, has specific limitations for buildings on alluvial fans. The fact that the IRC does not have explicit provisions for alluvial fans does not mean code officials should ignore credible information on Flood Insurance Rate Maps or other sources that identifies flood hazard areas subject to high risk conditions, including alluvial fans. Specifying that ASCE 24 is an alternative allows its use where the prescriptive provisions of the IRC may not adequately account for flood risks.

Cost Impact: Use of ASCE 24 is an alternative; there are no cost impacts imposed by providing an alternative.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it provided more flexibility in the code.

Assembly Action: **None**

Final Hearing Results

RB52-13	**AS**

Code Change No: RB53-13

Original Proposal

Section(s): R301.3

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

Revise as follows:

R301.3 Story height. The wind and seismic provisions of this code shall apply to buildings with story heights not exceeding the following:

1. For wood wall framing, the maximum *story height* shall not exceed 11 feet 7 inches (3531 mm) and the laterally unsupported bearing wall stud height shall not exceed that permitted by Table R602.3(5) ~~plus a height of floor framing not to exceed 16 inches (406 mm)~~.

   ~~**Exception:** For wood-framed wall buildings with bracing in accordance with Tables R602.10.3(1) and R602.10.3(3), the wall stud clear height used to determine the maximum permitted story height may be increased to 12 feet (3658 mm) without requiring an engineered design for the building wind and seismic force-resisting systems provided that the length of bracing required by Table R602.10.3(1) is increased by multiplying by a factor of 1.10 and the length of bracing required by Table R602.10.3(3) is increased by multiplying by a factor of 1.20. Wall studs are still subject to the requirements of this section.~~

2. For steel wall framing, the maximum *story height* shall not exceed 11 feet 7 inches (3531 mm) and the ~~a~~ maximum unsupported bearing wall stud height shall not exceed ~~of~~ 10 feet (3048 mm)~~, plus a height of floor framing not to exceed 16 inches (406 mm)~~.
3. For masonry walls, the maximum *story height* shall not exceed 13 feet 7 inches (4140 mm) and the ~~a~~ maximum bearing wall clear height shall not exceed ~~of~~ 12 feet (3658 mm) ~~plus a height of floor framing not to exceed 16 inches (406 mm)~~.

   Exception: An additional 8 feet (2438 mm) of bearing wall clear height is permitted for gable end walls.

4. For insulating concrete form walls, the maximum *story height* shall not exceed 11 feet 7 inches (3531 mm) and the maximum unsupported ~~bearing~~ wall height per *story* as permitted by Section R611 tables shall not exceed 10 feet (3048 mm) ~~plus a height of floor framing not to exceed 16 inches (406 mm)~~.

5. For structural insulated panel (SIP) walls, the maximum *story height* shall not exceed 11 feet 7 inches (3531 mm) and the maximum bearing wall height per *story* as permitted by Section R613 tables shall not exceed 10 feet (3048 mm) ~~plus a height of floor framing not to exceed 16 inches (406 mm)~~.

Individual walls or walls studs shall be permitted to exceed these limits as permitted by Chapter 6 provisions, provided *story heights* are not exceeded. ~~Floor framing height shall be permitted to exceed these limits provided the *story height* does not exceed 11 feet 7 inches (3531 mm).~~ An engineered design shall be provided for the wall or wall framing members when they exceed the limits of Chapter 6. Where the *story height* limits of this section are exceeded, the design of the building, or the noncompliant portions thereof, to resist wind and seismic loads shall be in accordance with the *International Building Code*.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The purpose of this proposal is to revise the story height limits. Proposal S100-06/07 introduced the 11'-7" story height limit into the IBC and IRC as an alternative to limiting the floor framing height to 16" where wall stud heights were less than 10'-0". In the IBC this change was implemented directly into the equivalent provision under Section 2308 to Item #1 above. In the IRC, the exception was added to the paragraph following the five individual limits. This has led to confusion with Chapter 6 provisions including stud size/height and wall bracing. This revision relocates the story height limit to each of the individual material limits and coordinates it with the material-specific provisions.

The current exception for wood wall studs is deleted as it is redundant with other provisions of Chapter 6 and not necessary. Table R602.3(5) covers when studs in non-bearing walls can exceed 10'-0". Table R602.3.1 provides limited cases when studs in bearing walls can exceed 10'-0". The wall bracing section provides adjustments to wind and seismic bracing amounts for heights up to 12'-0". It is not necessary to repeat that requirement here, in fact that could result in an accidental double-application of the increase factors. Finally, simply applying the wall bracing provisions for walls permitted to be 12'-0" high does not automatically address other structural concerns resulting from an overall increase in story height. This is why only the limited conditions in Table R602.3.1 are allowed for studs greater than 10' in height and supporting floor or roof loads.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it makes the code much clearer and provides limits within the various building material categories.

Assembly Action: **None**

Final Hearing Results

RB53-13 **AS**

Code Change No: RB54-13

Original Proposal

Section(s): R301.3

Proponent: Edward L. Keith, APA, representing The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R301.3 Story height. The wind and seismic provisions of this code shall apply to buildings with story heights not exceeding the following:

1. For wood wall framing, the laterally unsupported bearing wall stud height permitted by Table R602.3(5) plus a height of floor framing not to exceed 16 inches (406 mm).

   Exception: For wood-framed wall buildings with bracing in accordance with Tables R602.10.3(1) and R602.10.3(3), the wall stud clear height used to determine the maximum permitted *story height* may be increased to 12 feet (3658 mm) without requiring an engineered design for the building wind and seismic force-resisting systems provided that the length of bracing required is increased in accordance with Tables R602.10.3(2) and R602.10.3(4) for wind and seismic, respectively. ~~by Table R602.10.3(1) is increased by multiplying by a factor of 1.10 and the length of bracing required by Table R602.10.3(3) is increased by multiplying by a factor of 1.20.~~ Wall studs are still subject to the requirements of this section.

2 through 5 *(No changes to current text)*

Individual walls or walls studs shall be permitted to exceed these limits as permitted by Chapter 6 provisions, provided story heights are not exceeded. Floor framing height shall be permitted to exceed these limits provided the story height does not ex-ceed 11 feet 7 inches (3531 mm). An engineered design shall be provided for the wall or wall framing members when they ex-ceed the limits of Chapter 6. Where the story height limits of this section are exceeded, the design of the building, or the non-compliant portions thereof, to resist wind and seismic loads shall be in accordance with the International Building Code.

Reason: The original exception proposed for modification requires an increase in the amount of bracing for wind and/or seismic application when the maximum story height is increased from 10 to 12 feet. The factors given in this original section are duplicated in Tables R602.10.3(2) and R602.10.3(4). As it is written it is unclear that the adjustments must only be applied once. Replacing the requirements in Section R301.2.2.2.1 with a reference to the tables in Chapter 6 would make it clear that the adjustments are to be applied only once and eliminate the potential for "double dipping" along with the unnecessary construction costs.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it is a good change that prevents the wall bracing adjustment factors from being applied twice.

Assembly Action: **None**

Final Hearing Results

RB54-13 **AS**

Code Change No: RB58-13

Original Proposal

Section(s): Table R301.5, R311.7.8.1, R317.4, R317.4.1, R507.3

Proponent: Glenn Mathewson, MCP, representing the North American Deck and Railing Association (GlennMathewson@nadra.org)

Revise as follows:

TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
Uninhabitable attics without storage[b]	10
Uninhabitable attics with limited storage[b, g]	20
Habitable attics and attics served with fixed stairs	30
Balconies (exterior) and decks[e]	40
Fire escapes	40
Guards~~rails~~ and handrails[d]	200[h]
Guard~~rail~~ in-fill components[f]	50[h]
Passenger vehicle garages[a]	50[a]
Rooms other than sleeping room	40
Sleeping rooms	30
Stairs	40[c]

R311.7.8.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

Exceptions:

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
2. When handrail fittings or bending are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to guard~~rail~~ or used at the start of a flight, the handrail height at the fittings or bending shall be permitted to exceed the maximum height.

R317.4 Wood/plastic composites. Wood/plastic composites used in exterior deck boards, stair treads, handrails and guard~~rail~~ systems shall bear a *label* indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 7032.

R317.4.1 Labeling. Deck boards and stair treads shall bear a label that indicates compliance to ASTM D 7032 and includes the allowable load and maximum allowable span. Handrails and guard~~rail~~ systems or their packaging shall bear a label that indicates compliance to ASTM D 7032 and includes the maximum allowable span.

R507.3 Wood/plastic composites. Wood/plastic composites used in exterior deck boards, stair treads, handrails, and guard~~rail~~ systems shall bear a label indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 7032.

Reason: There is no construction component recognized or required by the IRC called a "guardrail". A "guard" is clearly defined by the IRC in chapter two and does not in anyway require the presence of a "rail". In the decking industry, it is quite common to see guards constructed as outdoor kitchen counters, benches, planter boxes and numerous other architectural elements. Use of the term "guardrail" inappropriately implies that a "rail" must be present in guard assemblies, and has been known to unnecessarily restrict design freedom in the decking industry. Note that footnote "d", associated with the term "guardrail" uses the correct term "guard" within its text. The use of appropriate, IRC-defined terms clarifies the intent of the provisions.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it appropriately correlates the code text with a current defined term.

Assembly Action: **None**

Final Hearing Results

RB58-13 **AS**

Code Change No: RB60-13

Original Proposal

Section(s): Table R301.7

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

Revise as follows:

TABLE R301.7
ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS [b,c]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Rafters having slopes greater than 3:12 with no finished ceiling attached to rafters	L/180
Interior walls and partitions	H/180
Floors~~/ceilings with plaster or stucco finish~~ (including deck floors)	L/360
Ceilings with brittle finishes (plaster, stucco, etc)	L/360
Ceilings with flexible finishes (gypsum board, etc)	L/240
All other structural members	L/240
Exterior walls—wind loads [a] with plaster or stucco finish	H/360
Exterior walls with other brittle finishes	H/240
Exterior walls with flexible finishes	H/120[d]
Lintels supporting masonry veneer walls [e]	L/600

Note: *L* = span length, *H* = span height.

a. The wind load shall be permitted to be taken as 0.7 times the Component and Cladding loads for the purpose of the determining deflection limits herein.
b For cantilever members, *L* shall be taken as twice the length of the cantilever.
c. For aluminum structural members or panels used in roofs or walls of sunroom additions or patio covers, not supporting edge of glass or sandwich panels, the total load deflection shall not exceed *L*/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed *L*/175 for each glass lite or *L*/60 for the entire length of the member, whichever is more stringent. For sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed *L*/120.
d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of *H*/180.
e. Refer to Section R703.7.2.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

This code change was intended to clarify two issues.

1. There is confusion regarding the deflection allowed for deck joists. It was not clear if the original authors intended deck joists to be considered as a floor joist (L/360) or as "other structural members" (L/240). This clarifies the intention.
2. The other significant change addresses the flexibility/stiffness of gypsum board which is a lot more common than either plaster of stucco in most parts of the country. There is now cleaner differentiation between materials and is consistent with the allowable deflection limits in Table R802.4(1) and R802.4(2).

Cost Impact: None.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee disapproved this code change proposal because they felt that, although it was a good idea conceptually, there was not enough consensus regarding the stiffness of the decking.

Assembly Action: None

Public Comments

Public Comment:

Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE R301.7
ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS [b,c]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Rafters having slopes greater than 3:12 with no finished ceiling attached to rafters	L/180
Interior walls and partitions	H/180
Floors ~~(including deck floors)~~	L/360
Ceilings with brittle finishes (including plaster~~,~~ and stucco~~, etc~~)	L/360
Ceilings with flexible finishes (including gypsum board~~, etc~~)	L/240
All other structural members	L/240
Exterior walls—wind loads [a] with plaster or stucco finish	H/360
Exterior walls with other brittle finishes	H/240
Exterior walls with flexible finishes	H/120[d]
Lintels supporting masonry veneer walls [e]	L/600

Note: *L* = span length, *H* = span height.

a. The wind load shall be permitted to be taken as 0.7 times the Component and Cladding loads for the purpose of the determining deflection limits herein.

b For cantilever members, *L* shall be taken as twice the length of the cantilever.

c. For aluminum structural members or panels used in roofs or walls of sunroom additions or patio covers, not supporting edge of glass or sandwich panels, the total load deflection shall not exceed *L*/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed *L*/175 for each glass lite or *L*/60 for the entire length of the member, whichever is more stringent. For sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed *L*/120.
d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of *H*/180.
e. Refer to Section R703.7.2.

Reason: The ICC Building Code Action Committee (BCAC) is submitting this public comment to address the code development committees concerns:

The revisions to the original proposal are intended to do the following:

1) Removes a proposed reference to decks. There was no consensus as to whether deck floors meant deck boards or deck joists. We leave this controversy unresolved by removing the reference to decks from the original proposal.
2) Retains the separate lines in the table for floors and ceilings, so it is clear that all floors are L/360, which is the current intent of the table (the current entry for “floors/ceilings with plaster or stucco finish” is intended to apply to all floors and all ceilings with plaster or stucco finish);
3) Makes it clear that gypsum board is considered a flexible finish
4) Makes some minor editorial changes to remove “etc.” which is not typical code language.

In short, there are no technical changes to the content of this table with this public comment, only clarification.

Final Hearing Results

RB60-13 **AMPC**

Code Change No: RB62-13

Original Proposal

Section(s): Table R301.7

Proponent: Edward L. Keith, APA, representing The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE R301.7
ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS [b,c]

STRUCTURAL MEMBERS	ALLOWABLE DEFLECTION
Rafters having slopes greater than 3:12 with no finished ceiling attached to rafters	*L*/180
Interior walls and partitions	*H*/180
Floors/ceilings with plaster or stucco finish	*L*/360
All other structural members	*L*/240
Exterior walls – wind loads[a] with plaster or stucco finish	*H*/360
Exterior walls - wind loads[a] with other brittle finishes	*H*/240
Exterior walls - wind loads[a] with flexible finishes	*H*/120[d]
Lintels supporting masonry veneer walls[e]	*L*/600

(Portions of table not shown remain unchanged)

Reason: The proposed changes may be considered editorial. When the current table was put into the 2012 IRC the proposed changes above were inadvertently left out of the table when the changes approved in RB18-09/10 were incorporated.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that the changes are of an editorial nature.

Assembly Action: **None**

Final Hearing Results

RB62-13 **AS**

Code Change No: RB67-13

Original Proposal

Section(s): Table R302.1(1), Table R302.1(2)

Proponent: C. Ray Allshouse AIA, CBO, City of Shoreline, WA, representing the Washington Association of Building Officials Technical Code Development Committee (rallshouse@shorelinewa.gov)

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1(1); or *dwellings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(1)
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from both sides	< 5 feet
	Not fire-resistance rated	0 hours	^{3} 5 feet
Projections	Fire-resistance rated	1 hour on the underside[a, b]	^{3} 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	^{3} 5 feet
Openings in walls	Not allowed	N/A	< 3 feet
	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 5 feet
		None required	5 feet

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable

a. Roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave if fire blocking is provided from the wall top plate to the underside of the roof sheathing.
b. Roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave provided no gable vent openings are installed.

TABLE R302.1(2)
EXTERIOR WALLS-DWELLINGS WITH FIRE SPRINKLERS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Fire-resistance rated	1 hour on the underside[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	N/A	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable
a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler system installed in accordance with P2904, the fire separation distance for nonrated exterior walls and rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line
b. The roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave if fire blocking is provided from the wall top plate to the underside of the roof sheathing.
c. The roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave provided gable vent openings are not installed.

Reason: This change is primarily intended to address construction problems associated with having to simultaneously provide fire-resistive eave projections and adequate roof ventilation vents. In addition, current code language is silent on a potential problem of fire-spread to unprotected attics from exterior sources through roof vents where residential structures are built tight to fire separation requirements. Roof ventilation, typically handled by the installation of “bird block” vents under roof eave projections, unfortunately serve as a path for fire spread from adjacent structures. This problem is further aggravated by the fact that NFPA 13D Fire Sprinkler Systems do not require sprinklers in attic spaces. The proposed change provides a builder’s option to mitigate this situation by providing for the installation of a top-side roof vent in lieu of fire-resistance treatment of the eave projection. The resulting solid wood fire-block in place of the otherwise required eave vents protects the attic from fire intrusion. Under this scenario, the unprotected eave is viewed to be expendable and therefore need not be fire rated.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The following is errata that was not posted to the ICC website.

TABLE R302.1(2)
EXTERIOR WALLS-DWELLINGS WITH FIRE SPRINKLERS

c. The roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave provided gable vent openings are not installed.

(Portions of code change proposal not shown remain unchanged)

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it is a viable option to requiring roof soffits to be fire rated.

Assembly Action: **None**

Final Hearing Results

RB67-13	**AS**

Code Change No: RB68-13

Original Proposal

Section(s): Table R302.1(1)

Proponent: Rick Davidson, City of Maple Grove, Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

TABLE R302.1(1)
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from both sides	< 5 feet
	Not fire-resistance rated	0 hours	^{3} 5 feet
Projections	Fire-resistance rated	1 hour on the underside	^{3} 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	^{3} 5 feet
Openings in walls	Not allowed	N/A	< 3 feet
	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< ~~5~~ 3 feet
		None required	~~5~~ 3 feet

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable.

Reason: This proposal reduces the penetration protection requirements for non sprinklered buildings to the same level as sprinklered buildings. The code currently allows walls 3 feet from a lot line to have openings up to 25% of the wall area but penetrations are required to be protected. This is senseless. The code overreacts to penetration protection. Foundation vents can be installed without limitation up to a lot line. Walls can have openings up to 25% of the area of the wall at 3 feet from the lot line. But install a penetration for a sill cock at 4 feet and it needs protection! This proposal creates some sense of reason to this section of the code.

Cost Impact: None

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because they felt that, while doors and windows are generally visible, penetrations are not. Penetrations more readily allow a fire to enter into an assembly.
.

Assembly Action: **None**

Public Comment

Public Comment 1:

Rick Davidson, City of Maple Grove, representing Association of Minnesota Building Officials, requests Approval as Submitted.

Commenter's Reason: There are significant inconsistencies in how walls, openings, penetrations, parapets, and other components of walls are treated when they approach the line used to determine fire separation distance.

For example, openings are prohibited in walls less than 3 feet from the line used to determine fire separation distance in both sprinklered and non-sprinklered buildings. But foundation vents are permitted in walls right up to the line used to determine fire separation distance. The main purpose of the vents is to allow free movement of air and this will include smoke, flames, and hot gases in fire situations. This is an inconsistency.

Roofs are prohibited from having openings within 4 feet of the parapet wall for townhouses (even though permitted in the IBC), yet foundation vents are permitted.

RB84 was approved by the IRC Committee. If that proposal is not challenged it will allow an unlimited amount of attic vents be placed in an exterior wall (gable) that could be adjacent the line used to determine fire separation distance. Like foundation vents, the sole purpose of these vents is to draw air into a space and vent it out someplace else. These openings can also readily draw in flames, smoke, and hot gases. Again, this is an inconsistency.

This proposal chips away at but a small piece of the problem. It will allow unprotected penetrations in walls that are 3 feet or more from the line used to determine the fire separation distance. These penetrations may be a water spigot or a cable TV wire. The code already allows openings to occupy 25% of the area of the wall. The code allows unlimited openings for foundation vents (and possible attic vents) in walls right up to the line used to determine fire separation distance. There are not suggested to be any limits on the number of penetrations because realistically the number and size of common penetrations will never exceed the potential area of openings, foundation vents, and attic vents. Penetrations must be sealed for weather resistance and protection against intrusion by insects and rodents. This proposal will not result in gaping holes that would allow a fire to penetrate deep into the framework of a dwelling.

Let's look at a real world example. I construct a new building 4 ½ feet from the lot line. I can have an unlimited area of foundation vents. I can have up to 25% of the wall in openings. These openings are not required to have doors or glazing in them. They can be gaping holes in the walls. By RB84 I can have unlimited attic vents. But, if I install a water spigot in this wall, I need to make a trip down to the local building supply store and purchase a tube of expensive fire stop material of which I will use a small fraction and throw the rest away. Explain the rationale to your mayor or other elected official. Would you undergo the effort to write a correction notice and follow it up with a complaint to the local courts? Would you feel justified in explaining the need to seal a cable TV wire next to a large opening in the wall? Of course not. It isn't enough just to write a correction notice. You need to feel confident in bringing an action against the individual in court.

The IRC Committee suggests that penetrations more readily allow fire to penetrate an assembly than an opening would! The assembly will almost always have the stud cavity filled with insulation. The opening, foundation vent, or attic vent provides ample openings allowing free movement of air through them.

It is simply overregulation to require protection of these penetrations when one could have large unprotected openings nearby. Ironically, some of the penetrations labeled as a problem are sometimes run through windows and vents.

Public Comment 2:

Steve Orlowski, representing National Association of Home Builders, requests Approval as Submitted.

Commenter's Reason: The committee's reason for disapproval misses the point that the proponent was attempting to make. There is a need for the code to make reasonable concessions regarding penetrations of the fire-resistant rated assemblies for small penetrations such as sill cocks, dryer vent terminations, mechanical draft terminals and electrical equipment. Keep in mind that these are small penetrations, often smaller then foundation vents which are currently exempt from complying with Table R302.1(1).

Final Hearing Results

RB68-13 **AS**

Code Change No: RB71-13

Original Proposal

Section(s): Table R302.1(1), Table R302.1(2)

Proponent: Steve Thomas, Colorado Code Consulting, LLC representing Colorado Chapter ICC (sthomas@coloradocode.net)

Revise as follows:

TABLE R302.1(1)
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from both sides	< 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Projections	Not allowed	N/A	< 2 feet
	Fire-resistance rated	1 hour on the underside	≥ 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Openings in walls	Not allowed	N/A	< 3 feet
	25% maximum wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 5 feet
		None Required	5 feet

TABLE R302.1(2)
EXTERIOR WALLS – DWELLINGS WITH FIRE SPRINKLERS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from both sides	0 feet
	Not fire-resistance rated	0 hours	3 feet [a]
Projections	Not allowed	N/A	< 2 feet
	Fire-resistance rated	1 hour on the underside	2 feet [a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	N/A	< 3 feet
	Unlimited	0 hours	3 feet [a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None Required	3 feet [a]

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable
a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with Section P2904, the fire separation distance for nonrated exterior walls and rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

Reason: There is currently no specific language that states that projections cannot be any closer to a property line than 2 feet. Table 302.1 infers it, but it is not clear. It appears that this requirement was lost when we put the projection requirements into the table format in the 2009 IRC. Our proposal clears up this hole in the code and provides specific language stating that projections are not permitted within 2 feet of the line used to determine the fire separation distance.

Cost Impact: Construction costs will not be affected by this proposal.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it clarifies that projections are not allowed where the fire separation distance is less than two feet.

Assembly Action: **None**

Final Hearing Results

RB71-13	**AS**

Code Change No: RB79-13

Original Proposal

Section(s): R302.2, R302.2.4

Proponent: Jeffrey M. Shapiro, representing IRC Fire Sprinkler Coalition (jeff.shapiro@intlcodeconsultants.com)

Revise as follows:

R302.2 Townhouses. Each *townhouse* shall be considered a separate building and shall be separated by fire-resistance rated wall assemblies meeting the requirements of Section R302.1 for exterior walls.

Exceptions:

1. Where a fire sprinkler system in accordance with Section P2904 is provided, a~~A~~ common 1-hour-fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.
2. Where a fire sprinkler system in accordance with Section P2904 is not provided, a common 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263 is permitted for townhouses where such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.

R302.2.4 Structural independence. Each individual *townhouse* shall be structurally independent.

Exceptions:

1. Foundations supporting *exterior walls* or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. *Townhouses* separated by a common ~~1-hour fire resistance-rated~~ wall as provided in Section R302.2, Exceptions 1 or 2.

Reason: The 1-hour separation requirements in these sections were reduced from 2-hour ratings in prior editions of the IRC based on the assumption that fire sprinklers mandated by the IRC would be present in all townhouses. Because some jurisdictions are amending the IRC to remove the fire sprinkler requirement, it is essential that the IRC provide for townhouse separation fire ratings to be returned to 2-hours if sprinklers are not provided. No justification, other than sprinklers, was ever provided for allowing a 1-hour separation, and this reduced rating is inappropriate for non-sprinklered buildings.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that a) it takes care of an important omission in the code related to fire sprinkler systems and b) it addresses the many ways in which jurisdictions adopt the code and modify sprinkler requirements.

Assembly Action: **None**

Public Comments

Public Comment:

Jonathan Humble, representing American Iron and Steel Institute; Wayne Jewell, Green Oak Charter Township, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R302.2 Townhouses. ~~Each *townhouse* shall be considered a separate building and shall be separated by fire-resistance rated wall assemblies meeting the requirements of Section R302.1 for exterior walls.~~ Common walls separating townhouses shall be assigned a fire resistance rating in accordance with Section R302.2 Item 1 or Item 2. The common wall shared by two *townhouses* shall be constructed without plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

~~**Exceptions:**~~

1. Where a fire sprinkler system in accordance with Section P2904 is provided, ~~a~~ the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263. ~~is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.~~
2. Where a fire sprinkler system in accordance with Section P2904 is not provided, ~~a~~ the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263. ~~is permitted for townhouses where such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.~~

R302.2.4 Structural independence. Each individual *townhouse* shall be structurally independent.

Exceptions:

1. Foundations supporting *exterior walls* or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. *Townhouses* separated by a common 1-hour fire resistance-rated wall as provided in Section R302.2, Items ~~Exceptions~~ 1 or 2.

Commenter's Reason: This public comment proposes to further modify RB79-13 as follows:

Deletion of the original charging language:
When this proposal was developed there was no longer a need to retain the reference to Section R302.1 and Table R302.1 as the proposed language now covers the fire resistance requirements in R302.2. As a result, we propose to delete that language as part of this modification since it is redundant and rely on the new text to articulate the fire resistance requirements for common walls.

Addition of instructions:
We are proposing new charging language which allows the user to choose the design and construction of the common wall. This is consistent with the RB79-13 and the choice allowed in the exceptions.

Removal of duplicative language in the exceptions:
We also propose the removal of the construction limitations language from the two parts of RB79-13 as it is duplicative, and instead suggest it be relocated into the charging section, thus stating the limitations only once.

Exceptions to Parts:
We propose that the exceptions be labeled as items in order to coordinate with the other modification concerning the revised charging language where the user is allowed to choose a 1-hour or 2-hour rated wall design.

Final Hearing Results

RB79-13	**AMPC**

Code Change No: RB93-13

Original Proposal

Section(s): R302.11.1

Proponent: Tony Crimi, A.C. Consulting Solutions, Inc., representing North American Insulation Manufacturer's Association (NAIMA) (tcrimi@sympatico.ca)

Revise as follows:

R302.11.1 Fireblocking materials. Except as provided in Section R302.11, Item 4, fireblocking shall consist of the following materials.

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25.4 mm) nominal lumber with broken lap joints.
3. One thickness of 23/32-inch (18.3 mm) wood structural panels with joints backed by 23/32-inch (18.3
   mm) wood structural panels.
4. One thickness of 3/4-inch (19.1 mm) particleboard with joints backed by 3/4-inch (19.1 mm) particleboard.
5. One-half-inch (12.7 mm) gypsum board.
6. One-quarter-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool or glass fiber or other *approved* materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation installed as tested in accordance with ASTM E 119 or UL 263, for the specific application.

Reason: This proposal clarifies the code requirement and prevents potentially unintended test methods from being used for these purposes. The proposal aims to provide more detail to the requirement to test cellulose insulation in accordance with the appropriate fire test standards. During the last cycle, FS118-09/10 added spray-applied cellulose to the list of acceptable fireblocking materials. The proponent's statement does identify ASTM E119 as the test standard used by the Cellulose Insulation Manufacturers Association (CIMA) to conduct a variety of fireblocking fire tests.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposal because they felt that it introduces appropriate test methods.

Assembly Action: **None**

Final Hearing Results

RB93-13	**AS**

Code Change No: RB98-13

Original Proposal

Section(s): R303.1

Proponent: Jeff Inks, representing the Window & Door Manufacturers Association.

Revise as follows:

R303.1 Habitable rooms. All habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural *ventilation* shall be through windows, <u>skylights,</u> doors, louvers or other *approved* openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated.

Exceptions:

1. The glazed areas need not be openable where the opening is not required by Section R310 and a whole-house mechanical *ventilation* system is installed in accordance with Section M1507.
2. The glazed areas need not be installed in rooms where Exception 1 above is satisfied and artificial light is provided capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
3. Use of sunroom and patio covers, as defined in Section R202, shall be permitted for natural *ventilation* if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening.

Reason: Openable skylights are intended to provide natural ventilation and should also be expressly included with other fenestration approved for meeting this requirement.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposal because they felt that skylights can be a significant contributor to natural ventilation.

Assembly Action: **None**

Final Hearing Results

RB98-13	**AS**

Code Change No: RB100-13

Original Proposal

Section(s): R303.4

Proponent: Mike Moore, P.E., Newport Ventures, representing Broan-NuTone (mmoore@newportpartnersllc.com), Jeremiah Williams representing U.S. Department of Energy (jeremiah.williams@ee.doe.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Revise as follows:

R303.4 Mechanical ventilation. Where the air infiltration rate of a dwelling unit is ~~less than~~ 5 air changes per hour <u>or less</u> when tested with a blower door at a pressure of 0.2 inch w.c (50 Pa) in accordance with Section N1102.4.1.2, the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

Reason (Moore): The current language is inconsistent with N1103.5, which requires mechanical ventilation for all dwellings, and also requires dwellings in climate zone 1 and 2 to have an air tightness "not exceeding" 5 ACH 50. By changing this language to 5 ACH or less, "the two sections are brought closer into alignment.

Reason (Williams) : Chapter R4 of the International Energy Conservation Code and Chapter 11 of the IRC require air leakage to be equal or less than 5 air changes per hour in climate zones 1 and 2, with lower rates required in other climate zones. This minor code change creates consistency where all buildings constructed to the air tightness levels of the IECC and IRC must have whole house mechanical ventilation systems.

Cost Impact (Moore): There is no additional cost, as mechanical ventilation is already required for these dwellings based on section N1103.5.

Cost Impact (Williams): The code change proposal will increase the cost of construction only if tested air leakage in climate zones 1 and 2 is exactly 5 air changes per hour.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal increases the cost of construction and takes away the ability to avoid having a whole- house ventilation system.

Assembly Action: **None**

Public Comment

Public Comment 1:

Mike Moore, P.E., Newport Ventures, representing Broan-NuTone, requests Approval as Submitted.

Commenter's Reason: In Dallas, the committee disapproved this proposal because they said it, "increases the cost of construction and takes away the ability to avoid a whole-house ventilation system." This statement shows a misunderstanding on the committee's part regarding the intent of this section and the limitations of blower door testing.

First, the intent of this section is to require that buildings that are built to the strict air tightness requirements of the IECC are provided with whole-house mechanical ventilation. The current language does not reflect the original intent because it introduces a loop hole for buildings that test to exactly 5.0 ACH 50. The difference in natural air changes between a building that has an air tightness of 5.0 ACH 50 and 4.9 ACH 50 is ridiculously small when taken over the course of the year, and there is no basis to say that a home at 5 ACH 50 should not need ventilation, whereas the 4.9 ACH 50 home does. In other words, we have a loop hole in the code with no technical basis whatsoever.

Another problem with this loop hole (besides the fact that there is no technical basis to justify it) is that specifications of mechanical ventilation systems happen far in advance of when the air tightness test is performed. It's a ridiculous proposition for a builder to plan to achieve exactly 5.0 ACH 50 on homes. The only way for a builder to plan for and consistently achieve a 5 ACH 50 on each home he builds is either to falsify the results or to build tighter than 5 ACH 50 and then punch holes in the envelope until the building leaks at just the right rate. By keeping the language the way that this is, you're incentivizing builders to follow one of these two paths.

Please approve this proposal as submitted to close the loop hole, provide consistency between the IRC and IECC, and stop incentivizing bad building practices.

Public Comment 2:

Jeremiah Williams, U.S. Department of Energy, requests Approval as Submitted.

Commenter's Reason: Chapter R4 of the International Energy Conservation Code and Chapter 11 of the IRC require air leakage to be 5 air changes per hour or less in climate zones 1 and 2, with lower rates required in other climate zones. This minor code change creates consistency by imposing the same whole-house mechanical ventilation requirements on all buildings constructed to the air tightness levels of the IECC and IRC.

DOE posted its draft proposals and public comments for the IECC on its Building Energy Codes website prior to submitting to the ICC. Interested parties were provided a 30 day public review in June 2013, for which notice was published in the *Federal Register* (Docket No. EERE-2012-BT-BC-0030) and announced via the DOE Building Energy Codes news email list. In response to stakeholder input, DOE revised its proposals and public comments, as appropriate, and submitted to the ICC.

For more information on DOE proposals and public comments, including how DOE participates in the ICC code development process, please visit: http://www.energycodes.gov/development.

Final Hearing Results

RB100-13 **AS**

Code Change No: RB101-13

Original Proposal

Section(s): R303.5.1

Proponent: David Hall, CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Revise text as follows:

R303.5.1 Intake openings. Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks~~, except as otherwise specified in this code~~. ~~Where a source of contaminant is located within 10 feet (3048 mm) of an intake opening, such opening shall be located a minimum of 3 feet (914 mm) below the contaminant source~~.

For the purpose of this section, the exhaust from *dwelling* unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.

Exceptions:

1. The 10 foot (3048 mm) separation is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.
2. Separation distances for appliance vents shall be as allowed in Chapters 18 and 24.

Reason: This proposal is text cleanup**.** The phrase "except as otherwise specified in this code" is not user-friendly since it offers no guidance as to where something else is specified. The new exception # 2 provides the exact text for what is otherwise specified. New exception # 1 is just the original last sentence of this section reworded into an exception format, because it is actually an exception to the 10 foot rule.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Public Comments

Public Comment:

Paul Rimel, City of Staunton, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R303.5.1 Intake openings. Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks.

For the purpose of this section, the exhaust from *dwelling* unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.

Exceptions:

1. The 10 foot (3048 mm) separation is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.
2. ~~Separation distances for appliance vents shall be as allowed in Chapters 18 and 24.~~ Vents and chimneys swerving fuel-burning appliances shall be terminated in accordance with the applicable provisions of Chapter 18 and 24.
3. Clothes dryer exhaust ducts shall be terminated in accordance with M1502.3.

Commenter's Reason: RB101-13 does not reference the clothes dryer termination requirements found in M1502.3 and neither does the next section R303.5.2 (Exhaust openings). The 2nd sentence of the reason statement says "The new exception #2 provides the exact text for what is otherwise specified", however, no exception has been included that references the dryer exhaust separation distances found in Chapter 15. Deleting the current language "except as otherwise specified in the code" will only serve to further reduce the likelihood that users of the code will know to look elsewhere for the dryer termination requirements unless #3 is added to the list of exceptions.

The current wording of this proposal will cause many users of the code to think a dryer exhaust is required to meet the more restrictive provisions of R303.5.1 when it's actually M1502.3 that regulates the minimum distance a dryer exhaust duct is permitted to terminate from building openings. Per M1502.3, a dryer exhaust is only required to terminate 3 feet in any direction from building openings unless stated otherwise in the manufacturer's installation instruction. However, the use of R303.5.1 would require a 10 foot horizontal or 3 foot vertical separation for a type of non-hazardous/noxious exhaust that's already defined in the IMC as environmental air.

In the majority of cases, it would be very difficult to terminate a clothes dryer exhaust at least 10 feet horizontally or 3 feet vertically from all building openings in conventional residential construction and the common practice of terminating through a ground floor band board would be virtually eliminated in houses with crawlspaces due to the proximity of nearby crawlspace vents.

Exception #2 has been modified for clarity.

Final Hearing Results

RB101-13	AMPC

Code Change No: RB102-13

Original Proposal

Section(s): R303.7, R303.7 (New), R303.7.1, R303.8 (New)

Proponent: Rick Davidson, City of Maple Grove, Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

~~**R303.7 Stairway illumination.** All interior and exterior stairways shall be provided with a means to illuminate the stairs, including the landings and treads. Interior stairways shall be provided with an artificial light source located in the immediate vicinity of each landing of the stairway. For interior stairs the artificial light sources shall be capable of illuminating treads and landings to levels not less than 1 footcandle (11 lux) measured at the center of treads and landings. Exterior stairways shall be provided with an artificial light source located in the immediate vicinity of the top landing of the stairway. Exterior stairways providing access to a *basement* from the outside *grade* level shall be provided with an artificial light source located in the immediate vicinity of the bottom landing of the stairway.~~

> ~~**Exception:** An artificial light source is not required at the top and bottom landing, provided an artificial light source is located directly over each stairway section.~~

~~**R303.7.1 Light activation.** Where lighting outlets are installed in interior stairways, there shall be a wall switch at each floor level to control the lighting outlet where the stairway has six or more risers. The illumination of exterior stairways shall be controlled from inside the *dwelling* unit.~~

> ~~**Exception:** Lights that are continuously illuminated or automatically controlled.~~

<u>**R303.7 Interior stairway illumination.** Interior stairways shall be provided with an artificial light source to illuminate the landings and treads. The light source shall be capable of illuminating treads and landings to levels of not less than 1 foot-candle (11 lux) as measured at the center of treads and landings. There shall be a wall switch at each floor level to control the light source where the stairway has six or more risers.</u>

> <u>**Exception:** A switch is not required where remote, central, or automatic control of lighting is provided.</u>

<u>**R303.8 Exterior door illumination.** At least one wall-switch-controlled lighting outlet shall be installed to provide illumination on the exterior side of each exterior door having grade level access, including exterior stairways providing access to a basement.</u>

> <u>**Exception:** A switch is not required where remote, central, or automatic control of lighting is provided.</u>

(Renumber subsequent sections)

Reason: This section is proposed for revision for one reason – it is confusing. The first sentence says that all interior and exterior stairways, including treads and landings, shall be illuminated. The next two sentences state that interior stairs must have lights near the landings and provide a minimum of 1 foot-candle of light. Then the next sentence states that exterior stairs must be provided with a light source in the immediate vicinity of the top landing but seems to exclude treads and landings. So, going back to the first sentence, the code says exterior stairs need landings and tread illuminated. Now just the top landing is illuminated for exterior stairs. Which one is it? The reference to 1 foot-candle of light is only applicable to interior stairs. It seems there is no standard for exterior stairs. But some code officials apply the 1 foot-candle standard to exterior stairs and others do not. Some code officials require exterior stairs to be illuminated along their entire length. Others only require light at the top landing. Then there is the exception that appears to apply only to interior stairs but can be misconstrued to support the contention that exterior stairs must be lit for their entire length.

Furthermore, the code requires the light source be in specific locations and meet certain intensities. If the intensity is met, what difference does it make where the light source is? The text referencing the location of the light source for interior stairs is proposed for deletion since the interest is in the amount of light on the walking surface, not on the light location.

The electrical code will require a switched light at exterior doors but that may not illuminate exterior stairs. This proposal would not waive any requirement found in the electrical code but there seems to be a conflict between what could be argued is the intent of R303.7, which is to illuminate exterior stairs, and the electrical code which only requires illumination of the exterior side of exterior doors having access to grade.

> ***E3903.3 Additional locations.*** *At least one wall-switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power.* ***At least one wall-switch-controlled lighting outlet shall be installed to provide illumination on the exterior side of each outdoor egress door having grade level access****, including outdoor egress doors for attached garages and detached garages with electric power. A vehicle door in a garage shall not be considered as an outdoor egress door. Where one or more lighting outlets are installed for interior stairways, there shall be a wall switch at each floor level and landing level that includes an entryway to control the lighting outlets where the stairway between floor levels has six or more risers.*
>
> > ***Exception:*** *In hallways, stairways, and at outdoor egress doors, remote, central, or automatic control of lighting shall be permitted.*

The proposed revisions create separate sections for interior stairways and exterior doorways. It eliminates a term that is difficult to enforce - “immediate vicinity”. It uses the same text found in the electrical code to identify the light location at exterior doors and the exception addressing controls. Some text is editorially revised to eliminate repetitive language but the basic intent is left unchanged. The light levels and exceptions are retained as they are in the current rule. It is believed that this change helps to eliminate some confusion and improve uniformity of application and creates consistency between the building and electrical portions of the IRC.

Cost Impact: None

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because they felt that it should include language that requires that the light must shine on the stair.

Assembly Action: **None**

Public Comments

Public Comment:

Public Comment:

Rick Davidson, City of Maple Grove, representing Association of Minnesota Building Officials, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R303.7 Interior stairway illumination. Interior stairways shall be provided with an artificial light source to illuminate the landings and treads. The light source shall be capable of illuminating treads and landings to levels of not less than 1 foot-candle (11 lux) as measured at the center of treads and landings. There shall be a wall switch at each floor level to control the light source where the stairway has six or more risers.

> **Exception:** A switch is not required where remote, central, or automatic control of lighting is provided.

R303.8 Exterior ~~door~~ stairway illumination. ~~At least one wall-switch-controlled lighting outlet shall be installed to provide illumination on the exterior side of each exterior door having grade level access, including exterior stairways providing access to a basement~~. Exterior stairways shall be provided with an artificial light source located at the top landing of the stairway. Exterior stairways providing access to a *basement* from the outside *grade* level shall be provided with an artificial light source located at the bottom landing of the stairway.

> ~~**Exception:** A switch is not required where remote, central, or automatic control of lighting is provided.~~

(Portions of proposal not shown to remain unchanged)

Commenter's Reason: This proposal was presented as an ***editorial*** revision to the stair illumination requirements which is necessary to reduce the confusion that is occurring with application of the rule and to prevent a jurisdiction from finding themselves deep in the prosecution of a violation only to determine that no code requirement exists.

In the current code there is one paragraph that regulates both interior and exterior stairways. The proposal seeks to split the paragraph in two with one paragraph regulating interior and one paragraph regulating exterior stairs. There is no intent to change the meaning of the code or expand the requirements. It is believed that the current language confuses the application of stair illumination because of the structure of the paragraph which can lead the reader to believe that there are more to the rules for exterior stair illumination than exists.

Reading the existing text, the first sentence of the paragraph states that interior and exterior stairs must be illuminated. This is the sentence that causes the confusion because it states that exterior stairs must be illuminated. But this directive is clarified in the fourth sentence addressed below.

The second and third sentences provide direction on how ***<u>interior</u>*** stairs must be illuminated. It provides both a prescriptive standard for the location of the light source and a performance standard in the form of a minimum level of illumination. Because meeting the prescriptive standard does not mean meeting the performance standard and vice versa, only a performance standard of 1 foot-candle on each tread and at landings is proposed as the most reasonable and least hazardous.

The fourth (and troublesome) sentence provides direction on how ***<u>exterior</u>*** stairs must be illuminated. Current code language ***<u>only provides that a light source be placed at the top landing of the stairway</u>***. It provides ***<u>no direction on illumination of the stair itself</u>***.

This is supported by the IRC Commentary which follows and which states that "Exterior stairs require illumination only at the top landing".

As was stated at the Dallas hearings, this proposal is not intended to provide illumination on exterior stairs because that is not currently required. That would be another code change. This modification amends the original submittal to include the language in the current code regarding exterior stairs. It does delete references to "immediate vicinity" because the term is undefined and the electrical code provides direction on the location and operation of this light source.

You can argue all you wish that this proposal does not provide for illumination of exterior stairs and you would be right. But you can't get to illuminated exterior stairs with the current rules either.

If you want a light source on the treads of exterior stairs, the current language does not provide that and this proposal does not provide that. Another code change would need to be submitted that directs how exterior stairs should be illuminated and how the illumination would be controlled.

If you should disagree with this line of reasoning, the question that begs asking is "what is the standard of lighting that applies to exterior stairs?" If you believe that exterior stairs must be illuminated and you write a correction notice to that effect, what standard does a compliant lighting system need achieve? If you prosecute this as a violation and you are asked by a judge what standard is necessary to achieve compliance, what code section do you cite? It isn't enough that we just write correction orders for how we thing a building should be built, we need to be able to cite code sections that will withstand challenges on prosecution.

Let's get the language improved so that it is uniformly and rightly applied. If you wish to change expand the rule in the next cycle, please do.

Don't throw the baby out with the bathwater because exterior stair illumination is not provided here. The change is necessary to eliminate the confusion that was readily apparent at the Dallas hearings.

R303.6 Stairway illumination. All interior and exterior stairways shall be provided with a means to illuminate the stairs, including the landings and treads. Interior stairways shall be provided with an artificial light source located in the immediate vicinity of each landing of the stairway. For interior stairs the artificial light sources shall be capable of illuminating treads and landings to levels not less than 1 foot-candle (11 lux) measured at the center of treads and landings. Exterior stairways shall be provided with an artificial light source located in the immediate vicinity of the top landing of the stairway. Exterior stairways providing access to a basement from the outside grade level shall be provided with an artificial light source located in the immediate vicinity of the bottom landing of the stairway.

> **Exception:** An artificial light source is not required at the top and bottom landing, provided an artificial light source is located directly over each stairway section.

❖ Interior and exterior stairs may be illuminated in two ways. The first option is to install artificial lighting in the vicinity of each landing. This would include top, intermediate and bottom landings. For interior stairs, the artificial light must be capable of illuminating treads and landings to not less than 1 foot candle (11 lux). The measurement of 1 foot candle is to be taken at the center of landings and treads. Exterior stairs require illumination only at the top landing. See Commentary Figure R303.6.

Exterior stairs to a basement must have artificial illumination near the bottom landing.

The exception allows the light source to be installed over each individual stair section, thus eliminating the lighting over the landings.

Final Hearing Results

RB102-13	**AMPC**

Code Change No: RB106-13

Original Proposal

Section(s): R304.1, R304.2

Proponent: Thomas Meyers, CBO representing self (Codeconsultant@gmail.com)

Revise as follows:

R304.1 Minimum area. ~~Every *dwelling* unit shall have at least one habitable room that shall have not less than 120 square feet (11 m2) of gross floor area.~~

~~**R304.2 Other rooms.** Other~~ Habitable rooms shall have a floor area of not less than 70 square feet (6.5 m2).

Exception: Kitchens.

Reason: The code has long provided a minimum room area that was historically accommodated by market expectation. Recently, proponents of minimalist living have advocated living in smaller dwellings to reduce environmental impact and provide for lower living costs through reduced mortgage and maintenance expenses. These dwellings are intended to allow for a minimalist lifestyle that doesn't demand large volumes of living space. Extreme examples of these "minimalist" dwellings may be found by using search engine term "tiny house".

During the past three years, I have attempted to research the basis of the requirement for the minimum room area. There is little, if any, documentation on the life safety benefit of having a certain area provided as a minimum. Logically, there is no real benefit to a minimum area provided that the activities necessary in "dwelling" may be accommodated within the space provided. The code has previously set a minimum of 70sf to perform any "habitable" use. Therefore, that is the value that should be applicable throughout.

Removal of this requirement may provide for a gain in overall life safety. My research indicates that a considerable number of these structures are purposefully built to evade building code oversight. The main reason cited is the minimum area provisions. If the code reduced the minimum area to 70sf, the main objective would be removed.

Consumers make a purposeful and informed decision as to the appropriateness of the housing they choose to live in. It isn't appropriate that the code place arbitrary restrictions that have no demonstrable life-safety benefit.

Cost Impact: Proposed change will reduce the cost of construction

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that, although micro units may not be everyone's dream, and there should be minimum room size requirements, there is no technical, safety or general welfare reason to require one room of at least 120 square feet.

Assembly Action: **None**

Final Hearing Results

RB106-13	AS

Code Change No: RB108-13

Original Proposal

Section(s): R305.1, R305.1.1

Proponent: Rick Davidson, City of Maple Grove, Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

SECTION R305
CEILING HEIGHT

R305.1 Minimum height. *Habitable space*, hallways, ~~bathrooms, toilet rooms, laundry rooms~~ and portions of *basements* containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

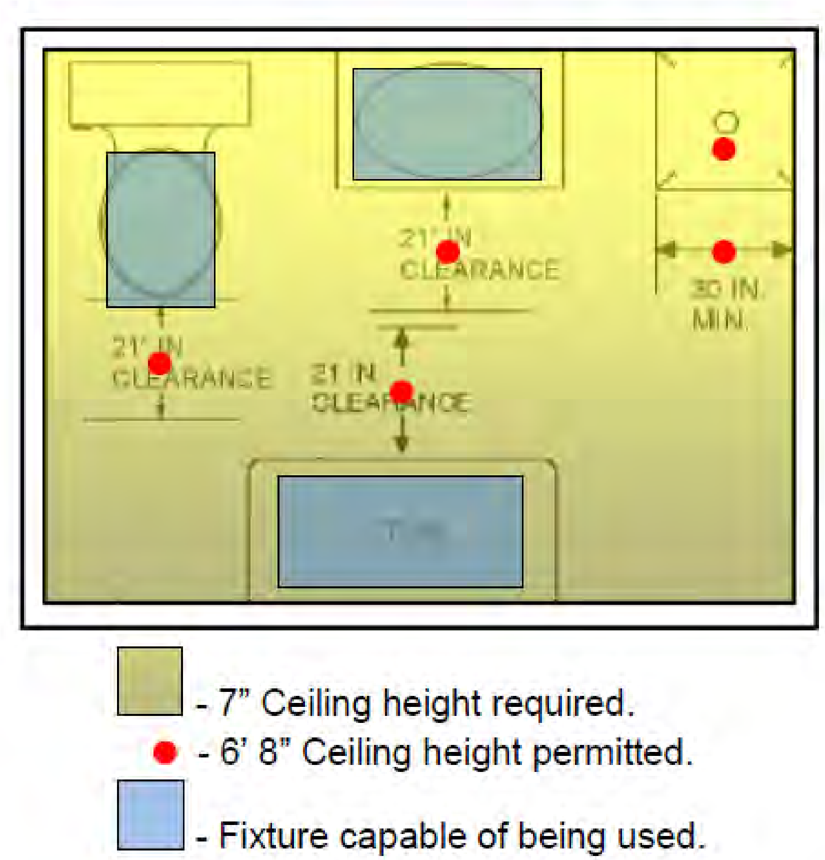
Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
2. ~~Bathrooms shall have a minimum ceiling height of 6 feet 8 inches (2032 mm) at the center of the front clearance area for fixtures as shown in Figure R307.1.~~ The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a minimum ceiling height of 6 feet 8 inches (2032 mm) above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.

R305.1.1 Basements. Portions of *basements* that do not contain *habitable space*~~,~~ or hallways~~, bathrooms, toilet rooms and laundry rooms~~ shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exception: Beams, girders, ducts or other obstructions may project to within 6 feet 4 inches (1931 mm) of the finished floor.

Reason: This proposal sets the required ceiling height for bathrooms, toilet rooms, and laundry rooms at 6 feet 8 inches. The current language requires ceiling heights in these spaces to be 7 feet. Then the exception allows the ceiling height to be 6 feet 8 inches in front of the fixtures (the most used area of the space) so the exception is really the rule. It only makes sense that the entire room be permitted to be 6 feet 8 inches, not just the most used areas of the room.



Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that, if the ceiling height can be 6'-8" in front of a plumbing fixture, why not the entire bathroom. This will provide more flexibility in basements. Laundries are similar to bathrooms in that their use is temporary and a lower ceiling in these types of spaces would not create an inconvenience or sacrifice health or safety concerns.

Assembly Action: **None**

Public Comments

Public Comment 3:

Michael D. Fischer, Kellen Company, representing American Institute of Building Design, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

Revise as follows:

SECTION R305
CEILING HEIGHT

R305.1 Minimum height. *Habitable space*, hallways, ~~bathrooms, toilet rooms, laundry rooms~~ and portions of *basements* containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
2. Bathrooms shall have a minimum ceiling height of 6 feet 8 inches (2032 mm) at the center of the front clearance area for fixtures as shown in Figure R307.1. The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a minimum ceiling height of 6 feet 8 inches (2032 mm) above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.
3. Beams,girders, ducts or other obstructions in basements containing habitable space shall be permitted to project to within 6 feet 4 inches (1931mm) of the finished floor.

R305.1.1 Basements. Portions of *basements* that do not contain *habitable space*, or hallways, ~~bathrooms, toilet rooms and laundry rooms~~ shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exception: Beams, girders, ducts or other obstructions may project to within 6 feet 4 inches (1931 mm) of the finished floor.

Commenter's Reason: During the past several code cycles, there have been numerous changes to the ceiling height and support beam projection height for habitable spaces in basements. This creates an issue when homes built to the previous standards include beams located in unfinished basements at heights that would allow the conversion to habitable space. Once the code changes, these spaces no longer fit the dimensions, and the option to convert this "future finished basement" evaporates. Rarely do codes become retro-active to previous construction, but this is one case where code changes can affect existing designs.

The 2003 IRC allowed ceiling heights in habitable basement spaces to be at 7 feet above the finished floor (a.f.f.), and beams could project 6 inches lower than the ceiling (to 6'6"). Non-habitable spaces in basements could have ceilings at 6'8", with beams at 6'4". Designers could set the non-habitable basement ceiling height at 7', with beams at 6'6", knowing that the space could later be converted to habitable space.

The 2009 IRC removed the 6" projection below the ceiling height as an option. Under this change, designers would have no option for any beam heights below 7' in any habitable basement space. Beams could be located at 6'4" in non-habitable basements. The proposed modification would reinstate the option to accommodate beams and girders in basements containing habitable spaces. With this language added, the designer can establish the ceiling height of an unfinished basement at 7 feet, while setting the beam height at 6'4" a.f.f., thus allowing for the basement to be converted to habitable space.

There are numerous reasons why restoring this design option make sense. Allowing ducts to be located within conditioned basement space can help improve the energy efficiency of the home, and finishing basements to add living space is an important design option- saving space and optimizing the available floor area. The sloped ceiling option would theoretically allow the designer to encase beams within sloped ceilings that are permitted to be as low as 5 feet a.f.f., so restoring this option does nothing to adversely impact ceiling clearances. This option provides greater design flexibility and versatility of the space, while maintaining appropriate levels of safety.

Final Hearing Results

RB108-13	**AMPC3**

Code Change No: RB111-13

Original Proposal

Section(s): **R308.4.2**

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

Revise as follows:

R308.4.2 Glazing adjacent doors. Glazing in an individual fixed or operable panel adjacent to a door shall be considered a hazardous location ~~where the nearest vertical edge of the glazing is within a 24-inch (610 mm) arc of either vertical edge of the door in a closed position and where~~ if the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the floor or walking surface ~~shall be considered a hazardous location~~ and it meets either of the following conditions:

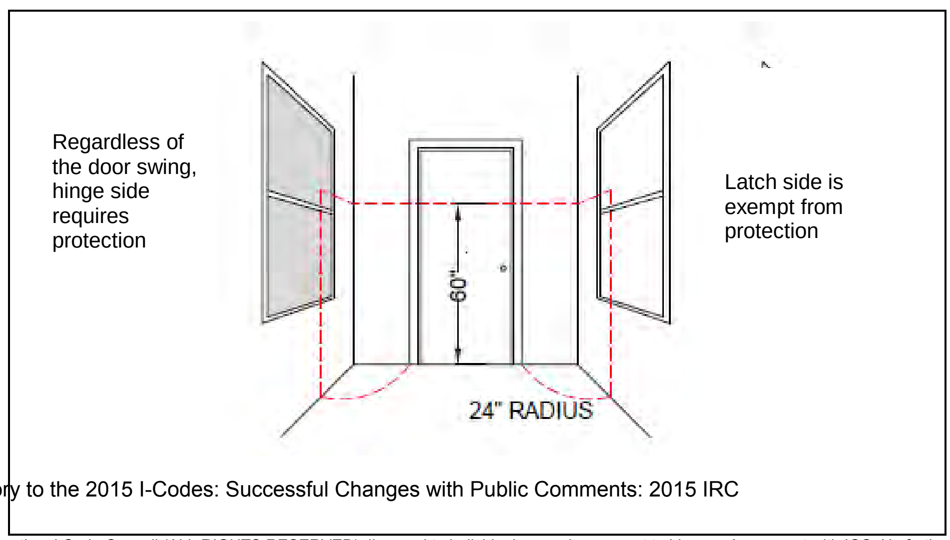
1. Where the glazing is within 24" of either side of the door in the plane of the door in a closed position,
2. Where the glazing is on a wall perpendicular to the plane of the door in a closed position and within 24" of the hinge side of an in-swinging door.

Exceptions:

1. Decorative glazing.
2. When there is an intervening wall or other permanent barrier between the door and the glazing.
3. ~~Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position~~
4. Where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in this application shall comply with section R308.4.3.
5. Glazing that is adjacent to the fixed panel of patio doors.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

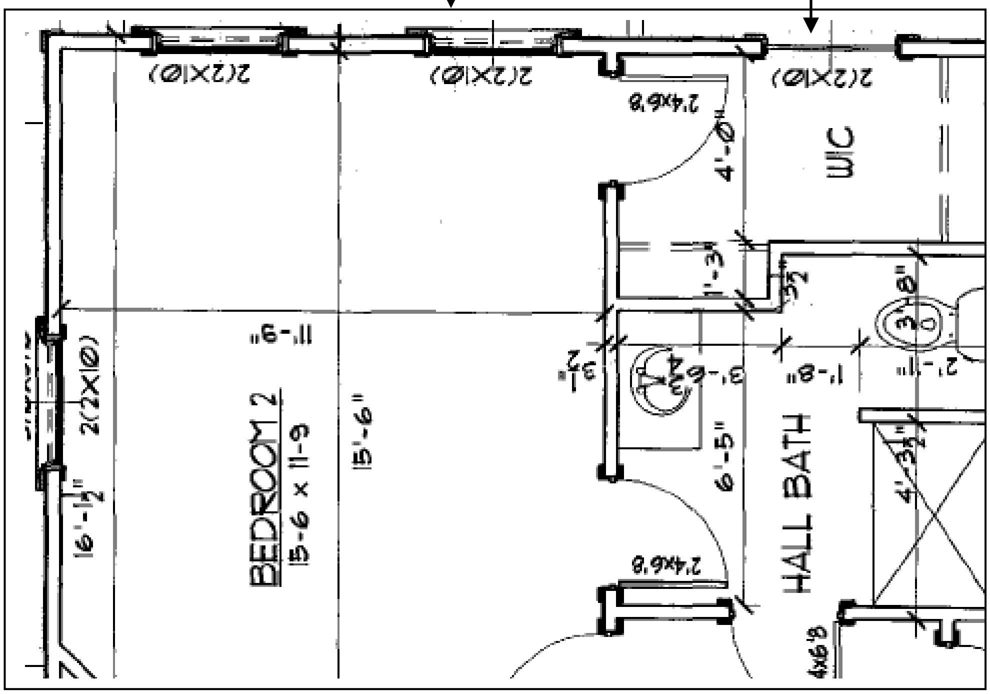
Exception 3: Currently the code requires safety glazing for windows on the hinge side of walls perpendicular to the door plane – regardless of the door swing. See sketch below.

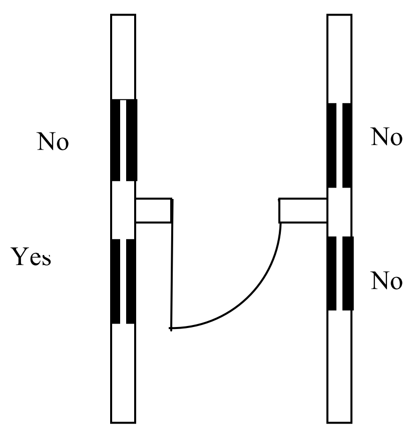


This code change was rewritten to say that the safety glazing is only required on the hinge side of an in-swinging door where someone could get knocked out of the window if someone opens the door from the other side. There is no similar threat for the person on the outside of the door swing.

Currently this window is NOT exempt by rule # 3 (or #4) and would have to be safety glazed. If this proposal is accepted, this window would NOT have to be safety glazed.

This window is currently exempt because the arc is more the 24" from the door hinge.





These are the four possible configurations of windows adjacent/perpendicular to a door. Only the one with an in-swinging door on the hinge side would be required to be safety glazed.

Cost Impact: This proposal may decrease the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it restricts the use of safety glazing to where it is needed and clarifies the code, though there are some details that should be addressed through public comment. For example, the word "inswinging" might be changed to "hinge-side" or something similar.

Assembly Action: **None**

Final Hearing Results

RB111-13 **AS**

Code Change No: RB113-13

Original Proposal

Section(s): R308.4.5

Proponent: Tim Pate, City and County of Broomfield, CO, representing the Colorado Chapter Code Change Committee

Revise as follows:

R308.4.5 Glazing and wet surfaces. Glazing in walls, enclosures or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface shall be considered a hazardous location. This shall apply to single glazing and all panes in multiple glazing.

> **Exception:** Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the ~~water's~~ edge of a bathtub, hot tub, spa, whirlpool, or swimming pool <u>or from the edge of a shower, sauna, or steam room.</u>

Reason: This code change is proposing to add the language "shower, sauna, steam room" to the laundry list in the exception to require safety glazing in locations within and adjacent to areas with wet surfaces. The laundry list should match what is in the main section R308.4.5. This code change will also delete the word "water's" so that it will make sense with the added items. There will typically not be any depth of water in a shower, sauna, or steam room.

This will help provide clarity to the code user to show that if you have glazing at any height above floor and it is at least 60" away from edge of these items it would be exempt from the requirement to have glass be safety glazing. All of these items will potentially have very slippery floor surfaces and if one were to fall down the person would not extend out past 60" with their arms and hands or bodies when falling. This will match the requirements and concept for exception for safety glazing measured from bottom tread of stairs.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

R308.4.5 Glazing and wet surfaces. Glazing in walls, enclosures or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface shall be considered a hazardous location. This shall apply to single glazing and all panes in multiple glazing.

> **Exception:** Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the <u>water's</u> edge of a bathtub, hot tub, spa, whirlpool, or swimming pool or from the edge of a shower, sauna, or steam room.

Committee Reason: The committee approved this code change proposal because they felt it addressed areas that are slippery that should be included in the code language. The modification corrects an oversight by the proponent that makes this proposal work. There were some good ideas presented on the floor by Mr. Davidson that the proponent might consider to improve the proposal, such as switching two clauses, in the public comment period.

Assembly Action: **None**

Final Hearing Results

RB113-13 **AM**

Code Change No: RB115-13

Original Proposal

Section(s): R308.4.7

Proponent: Tim Pate, City and County of Broomfield, CO representing Colorado Chapter Code Change Committee

Revise as follows:

R308.4.7 Glazing adjacent to the bottom stair landing. Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches (914 mm above the landing and within a 60 inch~~es~~ (1524 mm) ~~horizontally of~~ horizontal arc less than 180 degrees from the bottom tread nosing shall be considered a hazardous location.

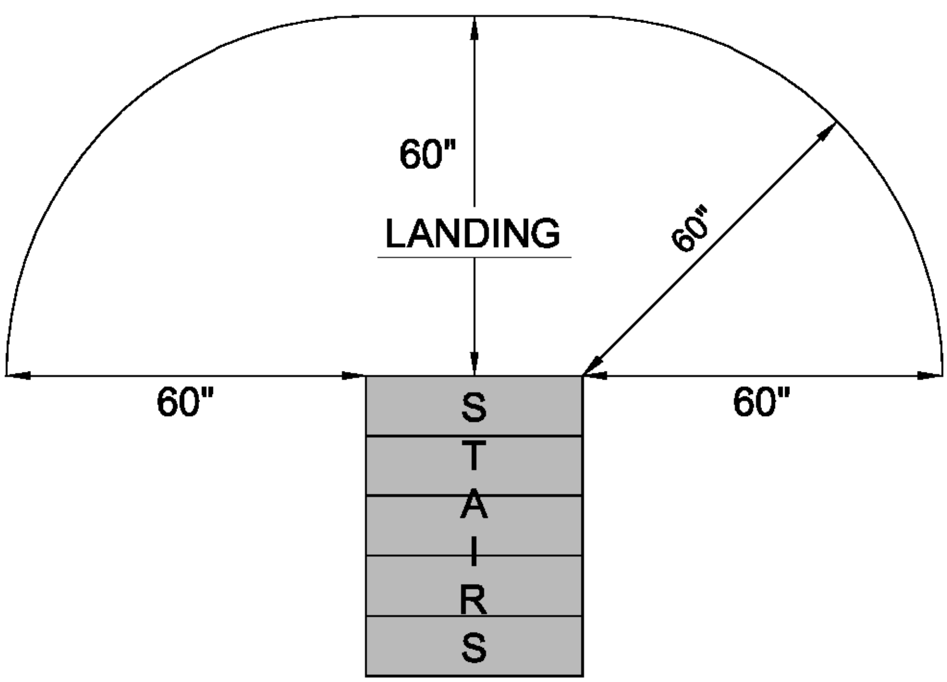
> **Exception:** The glazing is protected by a guard complying with Section 312 and the plane of the glass is more than 18 inches (457 mm) from the guard.

Reason: Previous editions of the IRC before the 2012 required glazing that is 60" horizontally in any direction to be approved safety glazing. It is not clear why this requirement was changed in the 2012. The previous editions had the additional wording "in any direction" when applying the 60" horizontal rule. This is due to the "splay" factor for when someone gets to the last tread and falls. The tendency is for someone to flail out in any direction.

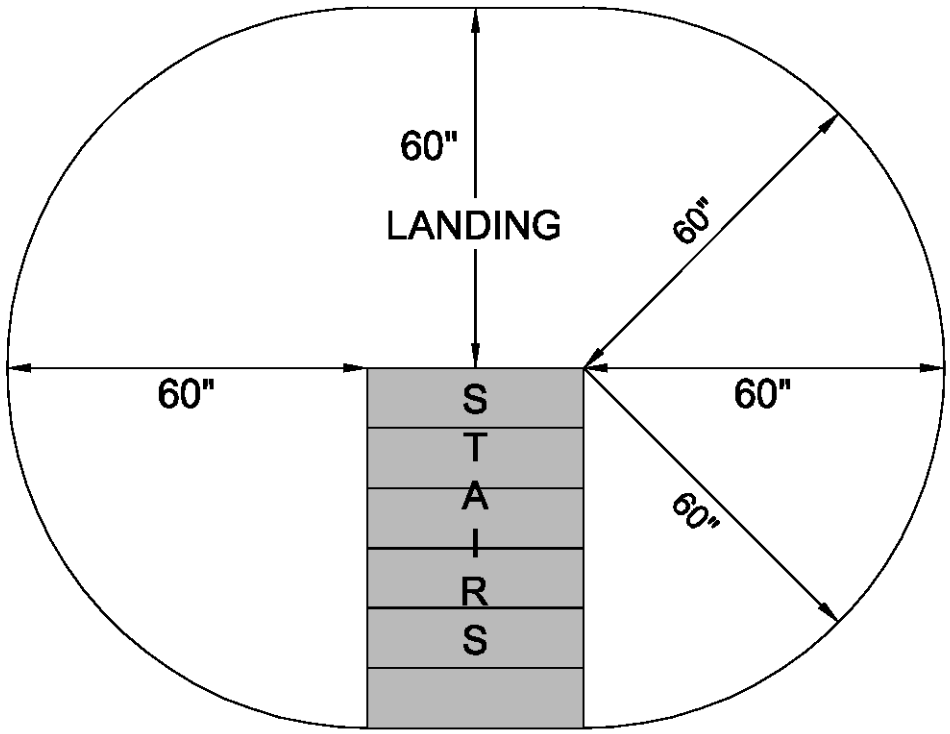
This added wording will make this section only apply to any glazing that is in a wall that is less than 180 degrees from the bottom tread nosing. I believe that adding the wording which would limit the area needing safety glazing to any glazing that falls within a 180 degree arc from bottom tread nosing and extending out 60" makes more sense since it is extremely unlikely that someone will fall out and backwards. I have added an illustration which should help everyone see what this changed wording will do.

Please note that there is still a requirement to provide approved safety glazing when located within 36" horizontally of the sides of the stairs.

The new code language will incorporate the areas shown in the following diagram:



The current code language incorporates the area shown below in the diagram:



This same code change proposal was reviewed and approved at the Final Action Hearings for the 2015 IBC – therefore this proposal for the IRC will get the two code sections to match which is important for consistency.

Cost Impact: This code change will reduce construction cost.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that, in this case, it is beneficial for the International Residential Code and the International Building Code to be coordinated. This language is preferable to other code changes that address similar code requirements. It would be nice if the drawing could be included in the code along with the language.

Assembly Action: **None**

Public Comments

Public Comment:

Tim Pate, City and County of Broomfield, representing Colorado Chapter Code Change Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Add the following figure to the proposal:

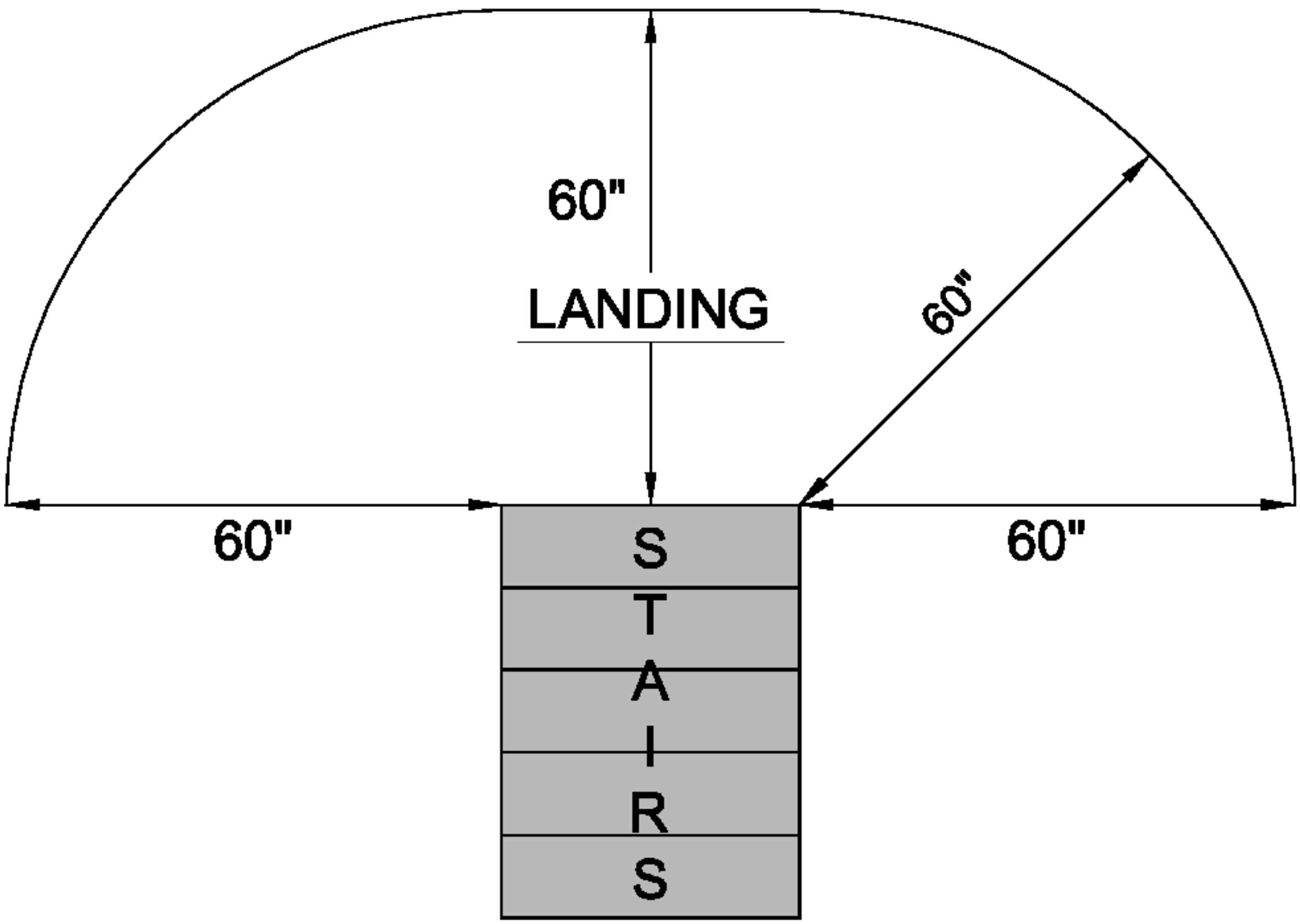


Figure R308.4.7

(Portions of proposal not shown to remain unchanged)

Commenter's Reason: Based on the recommendation from one of the IRC Code Change Committee members when approving my original code change proposal I suggest that the figure I provided in my original code change reason statement be added as a figure within the body of the Code so as to help code users understand the new code language – " a 60 inch horizontal arc less than 180 degrees from the bottom tread nosing …"

Final Hearing Results

RB115-13	AMPC

Code Change No: RB116-13

Original Proposal

Section(s): R308.6.9.1 (New), Chapter 44

Proponent: Jeff Inks, Window and Door Manufacturers Association, representing the Window & Door Manufacturers Association.

Add new text as follows:

R308.6.9 Testing and labeling. Unit skylights and tubular daylighting devices shall be tested by an approved independent laboratory, and bear a label identifying manufacturer, performance grade rating and approved inspection agency to indicate compliance with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440.

R308.6.9.1 Comparative analysis for glass-glazed unit skylights. Structural wind load design pressures for glass-glazed unit skylights different than the size tested in accordance with Section R308.6.9 shall be permitted to be different than the design value of the tested unit when determined in accordance with one of the following comparative analysis methods:

1. Structural wind load design pressures for glass-glazed unit skylights smaller than the size tested in accordance with Section 308.6.9 shall be permitted to be higher than the design value of the tested unit provided such higher pressures are determined by accepted engineering analysis. All components of the smaller unit shall be the same as those of the tested unit. Where such calculated design pressures are used, they shall be validated by an additional test of the glass-glazed unit skylight having the highest allowable design pressure.
2. In accordance with WDMA I.S. 11.

Add new standard to Chapter 44 as follows:

WDMA Window & Door manufacturers Association
1400 East Touhy Avenue, Suite 470
Des Plaines, IL 60018

WDMA I.S.11-13 Analytical Method for Design Pressure Rating of Fenestration Products…..R308.6.9.1

Reason: Comparative analysis based on accepted engineering methods provides a proven, accurate and reliable means for determining design pressures of different sized products within a fenestration product line based on testing of specimen unit/s from the respective line. This alleviates the need for costly testing of all sizes within the line saving considerable construction costs and providing greater design flexibility without incurring additional time and costs, especially for specialty/custom products, for testing that isn't necessary in order to determine the correct DP.

Currently the IRC only allows comparative analysis for windows and doors in Section 612.3.1 which has been and continues to be widely utilized for those products for the reasons stated above. Since comparative analysis as noted above is equally applicable to glass-glazed unit skylights, it should also be permitted by the IRC for them.

Proposed method #1 is taken verbatim from the existing comparative analysis provision in Section 612.3.1 except for substituting "glass-glazed unit skylights" for "windows and door units". However, the existing provision is limited only to allowing comparative analysis for units smaller than the unit tested, not larger. Because comparative analysis can also be effectively used to accurately determine DP ratings for fenestration products that are larger in width and/or height than the actual tested specimen/s provided proper analytical methods are followed, it should also be permitted by the IRC for glass-glazed unit skylights for that purpose as long as proper engineering analysis is required.

The intent of this proposal is to provide for that by allowing for comparative analysis to also be used on units larger than the tested unit if determined in accordance with proposed method #2 -- WDMA I.S. 11. WDMA I.S. 11 - *Industry Standard for Voluntary Analytical Method for Design Pressure (DP) Ratings of Fenestration Products*, provides more comprehensive alternative methods appropriate for using comparative analysis to determine DP of units different in size, both smaller and larger, than that of the tested unit/s within a product line. The comparative analysis methods included in WDMA I.S. 11 are based on accepted engineering analysis which must also be sealed by a licensed Professional Engineer (PE) making it technically sound for use in the IRC for this purpose. This same alternative method is also being proposed for Section 612.3.1 for windows and doors for the same reasons.

Copies of the standard are being submitted to ICC for ICC and IRC code committee review accordingly. The standard is also available on WDMA's website via the following link: https://www.wdma.com/OnlineBookstore/tabid/61/pid/20/WDMA-I-S-11-09-Voluntary-Analytical-Method-for-Design-Pressure-Rating-of-Fenestration-Products-PDF-Download.aspx

Cost Impact: This code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [WDMA I.S.11-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Based upon the committee's previous action on RB343-13. The new standard will provide for a cost effective alternate for testing of skylights.

Assembly Action: **None**

Final Hearing Results

RB116-13 **AS**

Code Change No: RB117-13

Original Proposal

Section(s): R310

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee (bajnaic@chesterfield.gov)

Delete and substitute as follows:

R310
EMERGENCY ESCAPE AND RESCUE OPENINGS

~~**R310.1 Emergency escape and rescue required.** Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, emergency egress and rescue opening shall be required in each sleeping room. Where emergency escape and rescue openings are provided, they shall have a sill height of not more than 44 inches (1118 mm) measured from the finished floor to the bottom of the clear opening. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency and escape rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.~~

> ~~**Exception:** Storm shelters and basements used only to house mechanical equipment not exceeding total floor area of 200 square feet (18.58 m2)~~

~~**R310.1.1 Minimum opening area.** All emergency and escape rescue openings shall have a minimum met clear opening of 5.7 square feet.~~

> ~~**Exception:** Grade floor openings shall have a minimum net clear opening of 5 square feet.~~

~~**R310.1.2 Minimum opening height.** The minimum net clear opening height shall be 24 inches.~~

~~**R310.1.3 Minimum opening width.** The minimum net clear opening width shall be 20 inches (508 mm).~~

~~**R310.1.4 Operational constraints.** Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools or special knowledge.~~

~~**R310.2 Window wells.** The minimum horizontal area of the window well shall be 9 square feet (0.9 m2), with a minimum horizontal projection and width of 36 inches (914 mm). The area of the window well shall allow the emergency escape and rescue opening to be fully opened.~~

> ~~**Exception:** The ladder or steps required by SectionR310.2.1 shall be permitted to encroach a maximum of 6 inches (152mm) into the required dimensions of the window well.~~

~~**R310.2.1 Ladder and steps.** Window wells with a vertical depth greater than 44 inches (1118 m) shall be equipped with a permanently affixed ladder or steps usable with the window in the fully open position. Ladders or steps required by this section shall not be required to comply with Sections R311.7 and~~

~~R311.8. Ladders or rungs shall have an inside width of at least 12 inches (305 mm), shall project at least 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457mm)on center vertically for the full height of the window well.~~

~~**R310.2.2 Drainage.** Window wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section R504.1 or by an approved alternative method.~~

> ~~**Exception:** A drainage system for window wells is not required when the foundation is on well-drained soil or sand-gravel mixture soils according to the United Soil Classification System, Group I Soils, as detailed in Table R405.1.~~

~~**R310.3 Bulkhead enclosures.** Bulkhead enclosures shall provide direct access to the basement. The bulkhead enclosure with the door panels in the fully open position shall provide the minimum net clear opening required by Section R310.1.1. Bulkhead enclosures shall also comply with Section R311.7.8.2.~~

~~**R310.4 Bars, grilles, covers and screens.** Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosures, or window wells that serve such openings, provided the minimum net clear opening size complies with Sections R310.1.1 to R310.1.3, and such devices shall be releasable or removable from the inside without the use of a key, tool, special knowledge or force greater than that which is required for normal operation of the escape and rescue opening.~~

~~**R310.5 Emergency escape windows under decks and porches.** Emergency escape windows are allowed to be installed under decks and porches provided the location of the deck allows the emergency escape window to be fully opened and provides a path not less than 36 inches (914 mm) in height to a yard or court.~~

R310.1 Emergency escape and rescue opening required. Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, an emergency escape and rescue opening shall be required in each sleeping room. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

> **Exception:** Storm shelters and basements used only to house mechanical equipment not exceeding a total floor area of 200 square feet (18.58 m2)

R310. 1.1 Operational constraints. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools or special knowledge.

R310.2 Emergency escape and rescue openings. Emergency and escape rescue openings shall have minimum dimensions as specified in this section.

R310.2.1 Minimum opening area. All emergency and escape rescue openings shall have a minimum net clear opening of 5.7 square feet. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. The minimum net clear height opening shall be 24" and the minimum net clear width shall be 20"

> **Exception:** Grade floor or below-grade openings shall have a minimum net clear opening of 5 square feet.

R310.2.2 Window sill height. Where a window is provided as the emergency escape and rescue opening, it shall have a sill height of not more than 44 inches (1118 mm) above the floor; if the sill height is below-grade, it shall be provided with a window well in accordance with Section R310.2.3.

R310.2.3 Window wells. The minimum horizontal area of the window well shall be 9 square feet (0.9 m2), with a minimum horizontal projection and width of 36 inches (914 mm). The area of the window well shall allow the emergency escape and rescue opening to be fully opened.

> **Exception:** The ladder or steps required by Section R310.2.1 shall be permitted to encroach a maximum of 6 inches (152mm) into the required dimensions of the window well.

R310.2.3.1 Ladder and steps. Window wells with a vertical depth greater than 44 inches (1118 m) shall be equipped with a permanently affixed ladder or steps usable with the window in the fully open position. Ladders or steps required by this section shall not be required to comply with Sections R311.7 and R311.8. Ladders or rungs shall have an inside width of at least 12 inches (305 mm), shall project at least 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457mm)on center vertically for the full height of the window well.

R310.2.3.2 Drainage. Window wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section R504.1 or by an approved alternative method.

> **Exception:** A drainage system for window wells is not required when the foundation is on well-drained soil or sand-gravel mixture soils according to the United Soil Classification System, Group I Soils, as detailed in Table R405.1.

R310.2.4 Emergency escape and rescue openings under decks and porches. Emergency escape and rescue openings shall be permitted to be installed under decks and porches provided the location of the deck allows the emergency escape and rescue openings to be fully opened and provides a path not less than 36 inches (914 mm) in height to a yard or court.

R310.3 Emergency escape and rescue doors. Where a door is provided as the required emergency escape and rescue opening, it shall be permitted to be a side hinged door or a slider. Where the opening is below the adjacent ground elevation, it shall be provided with a bulkhead enclosure.

R310.3.1 Minimum door opening size. The minimum net clear height opening for any door that serves as an emergency and escape rescue opening shall be in accordance with Section R310.2.1.

R310.3.2 Bulkhead enclosures. Bulkhead enclosures shall provide direct access from the basement. The bulkhead enclosure shall provide the minimum net clear opening equal to the door in the fully open position.

R310.3.2.1 Drainage. Bulkhead enclosures shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section R504.1 or by an approved alternative method.

> **Exception:** A drainage system for bulkhead enclosures is not required when the foundation is on well-drained soil or sand-gravel mixture soils according to the United Soil Classification System, Group I Soils, as detailed in Table R405.1.

R310.4 Bars, grilles, covers and screens. Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosures, or window wells that serve such openings, provided the minimum net clear opening size complies with Sections R310.1.1 to R310.1.3, and such devices shall be releasable or removable from the inside without the use of a key, tool, special knowledge or force greater than that which is required for normal operation of the escape and rescue opening.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

This code change is primarily for reorganizational purposes. It separates emergency escape and rescue openings (EERO) window and door provisions, which are currently intermingled. It also says that EERO doors do not have to be “egress” doors, that is, side hinged doors. The new code language allows sliders from basements.

Most people think of emergency escape and rescue openings as windows, and in fact, the current subsections in R310 all seem to define and quantify this type of application: minimum opening height, minimum opening width, window wells, ladders and steps from window wells, drainage from window wells, bars and grilles on windows, windows under decks.
However the most basic EERO is a door. In case of a fire, would prefer to exit through a door or a window? Will a fire fighter prefer to enter through a door or a window?

This revision acknowledges doors as a viable EERO and defines the minimum requirements for EERO doors. It allows side hinged doors or sliders to be used as EEROs.

An EERO door would not have to be an egress door but an egress door would automatically be an EERO door.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it reorganized the code text in a manner that clarifies the code. While the application to doors is implied in the existing text, it is good to point it out.

Assembly Action: **None**

Final Hearing Results

RB117-13	**AS**

Code Change No: RB122-13

Original Proposal

Section(s): R310.1.5 (New)

Proponent: Jeff Inks, Window and Door Manufacturers Association, representing the Window & Door Manufacturers Association.

Add new text as follows:

R310.1.5 Replacement windows. Replacement windows installed in buildings meeting the scope of this code shall be exempt from the maximum sill height requirements of Sections R310.1 and Sections R310.1.1, R310.1.2, and R310.1.3 provided the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement window is not part of a change of occupancy.

Reason: First, while this provision is applicable to existing construction (for the reasons stated below), it is being proposed for inclusion in the main body of the IRC because window replacements are more common than other significant changes made to existing one- or two-family homes and townhomes, and in addition, for consistency with what is being proposed for IRC Appendix J and IEBC Chap 7 by us and the ICC CTC.

The proposed provisions and language are also based on Minnesota's residential code which does effectively incorporate the provisions into the main body of the code in the same location (R310.1.5) being proposed above.
The provisions and language have also already been approved for IEBC Chap. 4 which occurred during the Group A proceedings.

Most importantly, it's important to note that the provisions do not allow for any decrease in safety and rather will help ensure improvements in safety can be made.

More specifically, the intent of this proposal is to ensure that the IRC does not discourage or prevent improvements in emergency escape and rescue openings, especially for fire safety, in older residential occupancies by requiring replacement windows to meet all of the provisions of Section 310 when doing so can only be accomplished by increasing the size of the rough opening or altering the interior wall.

Because many of these older buildings were constructed under codes that did not include the same emergency escape and rescue opening provisions that the IRC now requires for new construction, the only way to fully meet all of the requirements of Section 310 for new construction if required when windows are replaced is to enlarge the rough opening and/or make significant alterations to the interior wall in order to accommodate any increase in window size or lowering of a sill.

At the very least, the significant cost and design challenges of altering the rough opening and/or interior wall can discourage or prevent window replacement and at worst can discourage or prevent the replacement of older windows that are harder to operate or are inoperable all together because of their age or poor maintenance and, that are significantly less energy efficient. When that happens, improvements to safety as well as energy efficiency are needlessly compromised.

Furthermore and on the whole, while some bedroom windows in older homes may not provide the full clear opening that is required for new construction or may have a sill height above 44 inches, they nonetheless still provide a viable emergency and escape rescue opening which is the primary intent of the code. Replacement of these windows with the same type of operating window or other type that can provide an equal or greater clear opening than the existing window -- even if they do not fully meet the clear opening or sill height requirements of Section 310 – is always an improvement in safety, especially when a replacement opening can provide a larger clear opening than the existing window. Such improvements in safety should not be discouraged or prevented by overly onerous requirements for replacement windows.

This proposal will help ensure that doesn't happen by providing limited exceptions to the requirements of Section 310 that can only be applied when certain conditions are met and that as already noted, will not result in a decrease in safety.

The requirements for new construction that emergency escape and rescue openings be provided as well as the operational requirements of Section 310.1.4 are maintained and still applicable to replacement windows.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this proposal because they felt that, although there are difficulties in replacing existing windows, the existing building provisions are a location where it might be appropriate to state conditions where full compliance is required versus some relief. Some older residences had windows for ventilation only that have sill heights that are 52" or are 3 by 3 double-hungs. At some point we need to address emergency escape and rescue openings where there is an opportunity. Where requirements are too restrictive it will discourage the maintenance and upkeep of older homes.

Assembly Action: **None**

Public Comment

Public Comment:

Jeff Inks, representing Window & Door Manufacturers Association, requests Approval as Submitted.

Commenter's Reason: While these same provisions have been approved for the IRC Appendix J (RB-467) and the IEBC Chapter 7 (EB-15) for the reasons stated in those proposals, we are still requesting for approval as submitted of this proposal for the inclusion of them in the main body of the IRC for jurisdictions that do not adopt Appendix J.

The provisions are critical to providing needed, reasonable replacement requirements for EERO windows that do not discourage or prevent EERO window replacements while at the same time ensure there is no reduction in safety (as discussed in the above reason statement for the proposal). Jurisdictions that do not adopt Appendix J will lack these provisions, which is why we have also proposed them for inclusion in Chapter 3. Including them in Chapter 3 clarifies the applicability of **Section R102.7.1, Additions, alternations or repairs,** with respect to EERO window replacements.

We therefore urge approval as submitted for the reasons stated in the proposal to ensure these provisions are in place for all jurisdictions that adopt the IRC regardless of whether or not they adopt Appendix J

Final Hearing Results

RB122-13	**AS**

Code Change No: RB123-13

Original Proposal

Section(s): R310.1.5 (New)

Proponent: Jeff Inks, Window and Door Manufacturers Association, representing the Window & Door Manufacturers Association.

Add new text as follows:

R310.1.5 Window opening control devices. Window opening control devices complying with ASTM F 2090 shall be permitted for use on windows serving as a required *emergency escape and rescue opening.*

Reason: It has been brought to our attention that the IRC needs further clarity regarding the permitted installation of window opening control devices (wocd's) compliant with ASTM F2090 on EERO windows. While that is clearly implied and intended by Section 312 and the purpose of F2090 is specifically for wocd's with emergency release mechanisms for use on EERO windows, providing express language under Section 310.1 will provide further clarification that the installation of F2090 compliant devices is permitted on EERO windows.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it clarifies that window opening control devices are permitted to be used on emergency escape and rescue openings.

Assembly Action: **None**

Final Hearing Results

RB123-13	**AS**

Code Change No: RB124-13

Original Proposal

Section(s): R310.6 (New), R310.7 (New)

Proponent: Rick Davidson, City of Maple Grove, Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

R310.6 Dwelling additions. Where dwelling additions occur that contain sleeping rooms, an emergency escape and rescue opening shall be provided in each new sleeping room. Where dwelling additions occur that have basements, an emergency escape and rescue opening shall be provided in the new basement.

Exceptions:

1. An emergency escape and rescue opening is not required in a new basement that contains a sleeping room with an emergency escape and rescue opening.
2. An emergency escape and rescue opening is not required in a new basement where there is an emergency escape and rescue opening in an existing basement that is accessible from the new basement.

R310.7 Alterations or repairs of existing basements. An emergency escape and rescue opening is not required where existing basements undergo alterations or repairs.
Exception: New sleeping rooms created in an existing basement shall be provided with emergency escape and rescue openings in accordance with R310.1.

Reason: There continues to be confusion in the code enforcement community as to the requirements for emergency escape and rescue opening requirements as they apply to existing basements and additions. Hopefully this proposal will make it clearer that emergency escape and rescue openings are only required in additions if there are sleeping rooms and/or a basement and then only if the new basement does not have a sleeping room or access to an emergency escape and rescue opening in the existing basement. Furthermore, this amendment is intended to clarify that existing basements that do not undergo expansion and where no sleeping rooms are added need not have emergency escape and rescue openings installed when remodeling occurs. At least in our area, code officials sometimes require emergency escape and rescue openings be installed when basements are finished or remodeled even when no sleeping rooms occur. This was never the intent of the code.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it improves the clarity of the code with regard to existing buildings. Some requirements might be better located elsewhere in the code, but this is an improvement.

Assembly Action: **None**

Final Hearing Results

RB124-13 **AS**

Code Change No: RB125-13

Original Proposal

Section(s): R311.1

Proponent: Paul Armstrong, PE, CBO; Orange Empire Chapter – Code Committee; Orange Empire Chapter

Revise as follows:

R311.1 Means of egress. All dwellings shall be provided with a means of egress as provided in this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the dwelling to the ~~exterior of the dwelling at the~~ required egress door without requiring travel through a garage. <u>The required egress door shall open to a yard or court that leads to a public way.</u>

Reason: The purpose of this change is to clarify the means of egress from dwellings under the IRC. The proposal attempts to split the egress path into two simpler sentences. The original sentence has been revised to address interior path of egress travel up to the required egress door. The new sentence addresses the exterior area from the required egress door and also clarifies that the required egress door opens to a yard or court that leads to a public way. The new text is consistent with the requirement for emergency escape and rescue openings in Section R310.1.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

R311.1 Means of egress. All dwellings shall be provided with a means of egress as provided in this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the dwelling to the required egress door without requiring travel through a garage. The required egress door shall open <u>directly into a public way or</u> to a yard or court that ~~leads~~ <u>opens</u> to a public way.

Committee Reason: The committee approved this proposed code change because they felt that the means of egress should not have lesser requirements than those for emergency escape and rescue openings, which require egress to a yard or court that leads to a public way. The modification improves the proposal and references language that is consistent with Section R310.1.

Assembly Action: None

Final Hearing Results

RB125-13	**AM**

Code Change No: RB126-13

Original Proposal

Section(s): R311.3.2

Proponent: Wesley Walters, Clark County Nevada Development Services, representing self

Revise as follows:

R311.3.2 Floor elevations for other exterior doors. Doors other than the required egress door shall be provided with landings or floors not more than 7 ¾ inches (196 mm) below the top of the threshold.

> **Exception:** A top landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.

Reason: The code does not define which landing is not required, this will clarify that it is only the top one being eliminated.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it adds clarity and aligns with Section R311.7.6 regarding landings at stairs. The language could use some additional cleanup in the public comment period.

Assembly Action: **None**

Final Hearing Results

RB126-13	**AS**

Code Change No: RB131-13

Original Proposal

Section(s): R311.7.2, R311.7.5.1, R311.7.5.2.1.

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

R311.7.2 Headroom. The minimum headroom in all parts of the stairway shall not be less than 6 feet 8 inches (2032 mm) measured vertically from the sloped line adjoining the tread nosing or from the floor surface of the landing or platform on that portion of the stairway.

~~Exception:~~ Exceptions:

1. Where the nosings of treads at the side of a flight extend under the edge of a floor opening through which the stair passes, the floor opening shall be allowed to project horizontally into the required headroom a maximum of 4¾ inches (121 mm).
2. The headroom for spiral stairways shall be in accordance with Section R311.7.10.1

R311.7.5.1 Risers. The maximum riser height shall be 73/4 inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the opening between treads does not permit the passage of a 4-inch-diameter (102 mm) sphere.

~~Exception:~~ Exceptions:

1. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.
2. The opening between adjacent treads is not limited on spiral stairways.
3. The riser height of spiral stairways shall be in accordance with Section R311.7.10.1

R311.7.5.2.1 Winder treads. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth.

Exception: The tread depth of spiral stair stairways shall be in accordance with Section R311.7.10.1

Reason: Exception 2 **Headroom** - The user of the code is currently only directed to R311.7.10.1 Spiral Stairways under R311.7.1 Width. Specific cross reference is needed under Headroom.

Exception 1 **Risers** – No change except numbering

Exception 2 **Risers** - Conformance with the IBC allowing open risers on spiral stairways.

Exception 3 **Risers** and new exception to **Winder treads** - The user of the code is currently only directed to R311.7.10.1 Spiral Stairways under R311.7.1 Width. Specific cross reference is needed under risers and winder treads.

Cost Impact: This code change will not increase the cost of construction

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it adds clarity to the code, fills in gaps and coordinates with the International Building Code regarding open riser issues.

Assembly Action: **None**

Final Hearing Results

RB131-13	**AS**

Code Change No: RB132-13

Original Proposal

Section(s): R311.7.3

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

R311.7.3 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than ~~12 feet (3658 mm)~~ 147 inches (3734 mm) between floor levels or landings.

Reason: The elevation of 147 inches is a multiple of the maximum riser height of 7-3/4 inches (197 mm). (See Table 1) This minor change of just 3 inches (76 mm) in the total rise of the flight would in many cases eliminate the cost of incorporating a landing and the space required, reducing construction costs. As can be seen in the table below this change would require no additional steps in the stair than the current code requires and a change in riser height of just 5/32 inch (4 mm) or less when the minimum number of risers is desired. This represents no discernable difference consequential to the user.

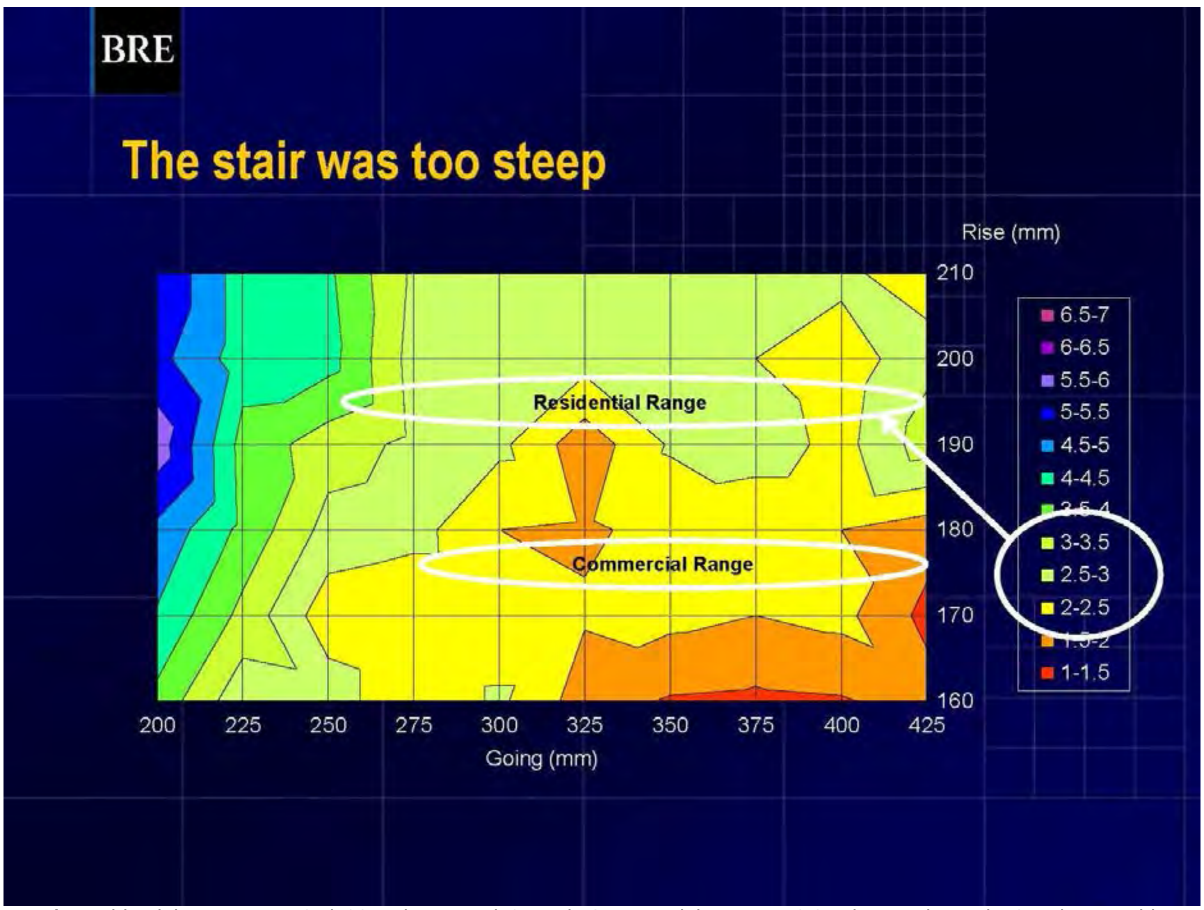


Figure 1 Residential Range = 7.58" (193mm) – 7.74" (197mm), Commercial Range = 6.84" (174mm) – 7" (178mm) see Table 1
Please note that the described circled ranges have been added to figures 1&2 by the proponent for the purpose of explanation.

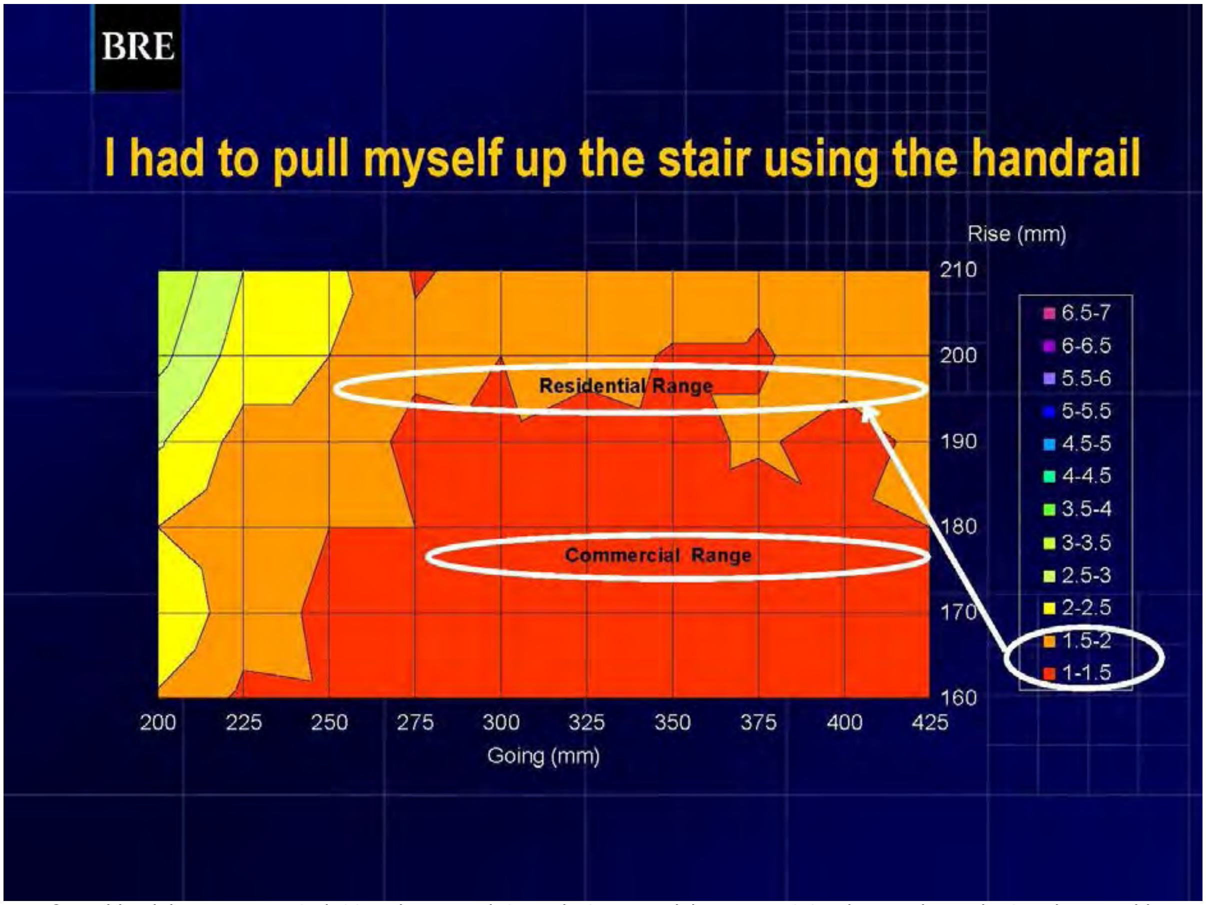


Figure 2 Residential Range = 7.58" (193mm) – 7.74" (197mm), Commercial Range = 6.84" (174mm) – 7" (178mm) see Table 1
Please note that the described circled ranges have been added to figures 1&2 by the proponent for the purpose of explanation.

	Vertical Rise	# Risers	Riser Height Inches	Change in Riser Height inches	Riser Height mm	Change in Riser Height mm
Most Occupancies	144	21	6.86		174	
	147	21	7.00	0.14	178	4
Dwelling Units	144	19	7.58		193	
	147	19	7.74	0.16	197	4

Table 1

Testing in support of this proposal, as shown in the data presentations (Figure 1 and 2) from; "The Influence of Rise and Going Combinations on Stair Safety" by M S Roys, June 2004, 7th World Conference on Injury Prevention and Safety Promotion, Vienna[1], the minor variation in rise does not produce any consequential effect that can be noticed by users when comparing riser heights within the range in question. *Please note that the circled ranges have been added to figure 1 & 2 by the proponent for the purpose of explanation*. Figures one and two can be related to the perceived energy required in ascent as described by the subjective rating of the steepness of the stair and the need to pull oneself up the stair using the handrail. In these figures the user's ratings are on a scale of 1-7 and color coded. The visual display of the data shows little difference in the users ratings over the range in question.

Additional testing data from this same study further illustrates little difference in the user's perception of riser height. When asked to rate descent of the stairway in response to the statement "I felt safe when walking down the stair" the risers heights of 6.69 inches, 7.09 inches, 7.48 inches (170 mm, 180 mm, 190 mm) all were rated the same with a tread depth of 10.83 inches (275 mm). Compared with the same tread depth the riser heights of 7.87 inches, 6.30 inches (200 mm, 160 mm) were within approximately 0.5 points on a scale of 7 points further indicating little difference being perceived by the users. This provides further validation that the change proposed is reasonable and will not affect stair safety.

Construction cost reduction – It is common for the total rise to exceed 144 inches (3658 mm) with oversight of the requirement or minor changes in floor systems and finish flooring options. In particular new floor truss systems and engineered joist materials increase floor thickness and story height especially when added to older designs. This requires the addition of an intermediate landing. Adding a landing increases the footprint of the stairway and the cost if the space is available.

Understanding and Compliance – This change will not increase the number of risers needed in the stairway or make the stairway less safe, or add any significant or perceived increase in energy to climb the stairway. This needed change provides a direct relationship between the vertical rise requirement and the requirements for riser height that would assure better understanding and compliance.

Bibliography:

1. "The influence of rise and going combinations on stair safety"; M.S. Roys, 7th World Conference on Injury Prevention and Safety Promotion, Vienna, June 2004

Cost Impact: This will reduce the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that the 3-inch difference in maximum stair flight height was negligible and because it is coordinated with maximum permitted riser heights.

Assembly Action: **None**

Final Hearing Results

RB132-13 **AS**

Code Change No: RB133-13

Original Proposal

Section(s): R311.7.5.1

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

R311.7.5.1 Risers. The maximum riser height shall be 7¾ inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any *flight* of *stairs* shall not exceed the smallest by more than ⅜ inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that ~~the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.~~ riser openings between treads located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the lower edge of the riser do not permit the passage of a 4 inch diameter (102 mm) sphere.

> ~~**Exception:** The opening between adjacent treads is not limited on stairs with total rise of 30 inches (762 mm) or less.~~

Reason: The exception allows unrestricted openings in risers if the stair has a 30" total rise. This is a flawed requirement. Flights stacked in a well could have a total rise of 30 inches and an exposure to a much greater fall distance to the next level or flight below. This change correctly identifies the hazard and the needed requirement applies the language found in section R312, Guard and window fall protection.

Cost Impact: This code change would not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this proposed code change because they felt that it creates enforcement problems in that many different measurements might be required, and because the proposed language was confusing.

Assembly Action: **None**

Public Comments

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R311.7.5.1 Risers. The maximum riser height shall be 7¾ inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any *flight* of *stairs* shall not exceed the smallest by more than ⅜ inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided ~~that riser~~ the openings ~~between treads~~ located more than 30 inches (762 mm) measured vertically to the floor or grade below ~~at any point within 36 inches (914 mm) horizontally to the lower edge of the riser~~ do not permit the passage of a 4 inch diameter (102 mm) sphere.

Commenter's Reason: The current exception in the code allows unrestricted openings in risers if the stair has a 30" total rise. This is a flawed requirement. Flights stacked in a well could have a total rise of 30 inches and an exposure to a much greater fall distance to the next level or flight below. This change correctly identifies the hazard. The modification addresses the committee's concern by clearly stating the requirement in simple understandable terms and eliminates the need for the exception

Final Hearing Results

RB133-13	**AMPC**

Code Change No: RB135-13

Original Proposal

Section(s): R311.7.5.3

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

R311.7.5.3 Nosings. The radius of curvature at the nosing shall be no greater than 9/16 inch (14 mm). A nosing projection not less than ¾ inch (19 mm) but not more than 1¼ inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than ⅜ inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosings shall not exceed ½ inch (12.7 mm).

> **Exceptions:** A nosing projection is not required where the tread depth is a minimum of 11 inches (279 mm).

Reason: The addition of the word "projection" corrects and clarifies the intent of the requirement and exception.

Cost Impact: This code change does not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it adds clarity to the intent of the stair nosing provisions.

Assembly Action: **None**

Final Hearing Results

RB135-13 **AS**

Code Change No: RB137-13

Original Proposal

Section(s): R311.7.9

Proponent: Wesley Walters, Clark County Nevada Development Services, representing self

Revise as follows:

R311.7.9 Illumination. All ~~stairs~~ stairways shall be provided with illumination in accordance with Section R303.~~6~~ 7.

Reason: Section R303.7 heading is Stairways not stairs. Stairs are a component of a stairway.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it adds clarity and corrects wrongly called out code sections.

Assembly Action: **None**

Final Hearing Results

RB137-13	**AS**

Code Change No: RB138-13

Original Proposal

Section(s): R311.7.10.1

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

R311.7.10.1 Spiral stairways. Spiral *stairways* are permitted, provided the minimum clear width at and below the *handrail* shall be 26 inches (660 mm) ~~with~~ and the walkline radius is not greater than 24½ inches (622 mm). E~~e~~ach tread ~~having~~ shall have a minimum tread depth not less than 7½ inch (190 mm) ~~minimum~~ ~~tread depth~~ at ~~12 inches (914 mm) from the narrower edge~~ the walkline. All treads shall be identical, and the ~~rise~~ riser height shall be no more than 9½ inches (241 mm). ~~A minimum~~ ~~h~~Headroom shall be not less than 6 feet 6 inches (1982 mm~~) shall be provided~~.

Reason: The difference between Spiral Stairways and Curved Stairways is subject to interpretation. Spiral stairways provide a space saving alternative and by their nature are safely used with taller risers and treads that are narrower at the walkline. Currently spiral stairways may be of unrestricted size. This change defines a reasonable limit for the design of spiral stairways with the allowed "exceptions" for headroom, riser height and tread depth.

Stairs beyond the limit stated would be considered a curved stair. A 24½ inches maximum walkline radius dimension effectively provides a minimum radius no greater than 12½ inches at the inside of the turn. It represents that point at which the 6 inches minimum tread width of winder treads can be achieved with 13 treads in one revolution a typical and common manufacturing standard. Beyond this point curved stairways complying with **R311.7.5 Stair treads and risers** and **R311.7.2 Headroom** would be required. This change is meant to correlate with the newly proposed IRC definition of spiral stairway and eliminating the reference to a supporting column as found in the IBC.

We have also made editorial changes and substituted the code section title terms "walkline" and "riser height" to clarify and provide for more consistent interpretation.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it describes spiral stairs in a manner that provides qualifications and limits that were missing from the code previously.

Assembly Action: **None**

Final Hearing Results

RB138-13	**AS**

Code Change No: RB139-13

Original Proposal

Section(s): R311.7.10.1

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

R311.7.10.1 Spiral stairways. Spiral *stairways* are permitted, provided the minimum clear width at and below the *handrail* shall be 26 inches (660 mm) with each tread having a ~~7½~~ 6¾ inch (~~190~~ 171 mm) minimum tread depth at 12 inches (914 mm) from the narrower edge. All treads shall be identical, and the rise shall be no more than 9½ inches (241 mm). A minimum headroom of 6 feet 6 inches (1982 mm) shall be provided.

Reason: This change is largely editorial. Treads within Spiral Stairways meet the definition of winder treads and are sometimes interpreted to be measured for tread depth in the same fashion. This change simply adjusts the spiral stair tread depth in conformance with the 2009 change in the method of measuring for winder tread depth at the intersections of the walkline with the nosings instead of the prior method which was square to the leading edge. The effective tread depth remains unchanged as can be seen in figure one.

The intent of the 2009 change in measuring methods was to provide for consistent tread depth measurements conforming with stair design methodology not to change or increase tread depth.

The long accepted 7½ inches tread depth was based on the typical spiral layout with 13 treads per revolution or 27.692 degrees per tread. Figure one illustrates the 7½ inches measurement made square to the leading edge of the tread, and also shows the tread depth when measured at the intersections of the walkline and nosings. For the ease of enforcement we have rounded the required tread depth to 6¾ inches

This change is necessary to allow long accepted manufacturing, material and design standards to continue to meet the requirement and does not change the effective depth of the tread.

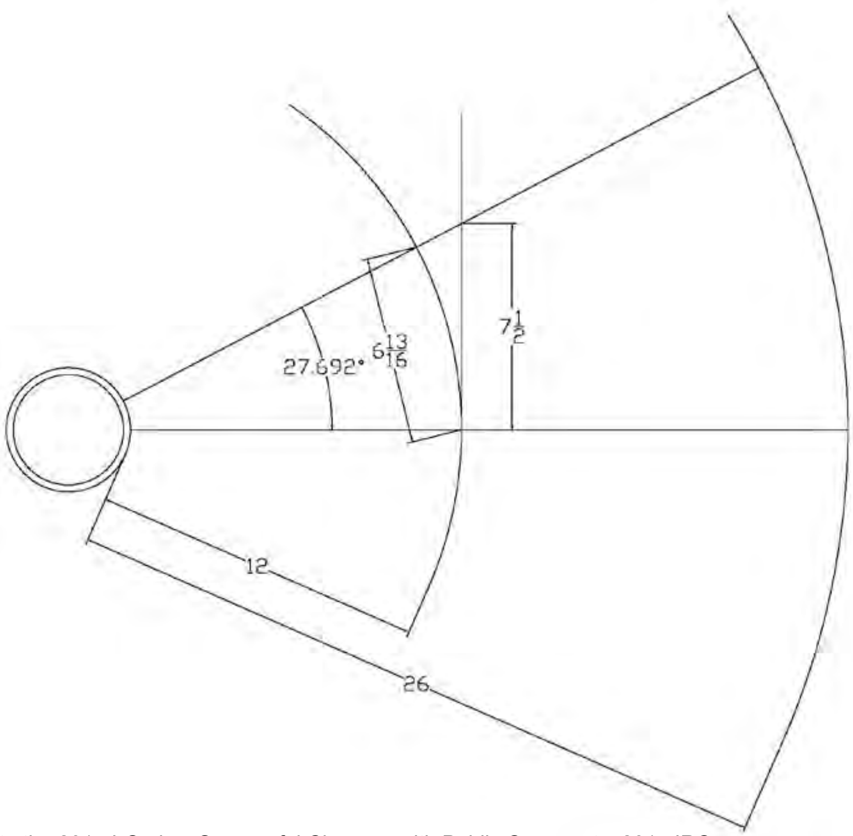


FIGURE ONE illustrates a winder tread from a typical spiral stairway with 13 treads per revolution. The dimensions shown allow comparison of the tread depth when measured square to the leading edge and when measured at the intersection of the walkline with the nosings. This simply shows that the old requirement of 7½ inches needs to change to accommodate the new measuring method cited in **R311.7.5.2.1 Winder Treads.**

Cost Impact: This change will eliminate unintended increases in the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it reflects the actual stair tread measurements without changing the actual dimensions intended by the code. It should also be easier to check the measurements in the field using this methodology.

Assembly Action: **None**

Final Hearing Results

RB139-13 **AS**

Code Change No: RB140-13

Original Proposal

Section(s): R202, R311.7.11 (New)

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association (sma@stairways.org)

Add new definition as follows:

SECTION R202
DEFINITIONS

<u>**ALTERNATING TREAD DEVICE.** A device that has a series of steps between 50 and 70 degrees (0.87 and 1.22 rad) from horizontal, usually attached to a center support rail in an alternating manner so that the user does not have both feet on the same level at the same time.</u>

Add new text as follows:

<u>**R311.7.11 Alternating tread devices.** *Alternating tread devices* shall not be used as an element of a means of egress. *Alternating tread devices* shall be permitted provided the required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches (508 mm).</u>

<u>**R311.7.11.1 Treads of alternating tread devices.** *Alternating tread devices* shall have a tread depth of not less than 5 inches (127 mm), a projected tread depth of not less than 8 1/2 inches (216 mm), a tread width of not less than 7 inches (178 mm) and a riser height of not more than 9 1/2 inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.</u>

<u>**R311.7.11.2 Handrails of alternating tread devices.** *Handrails* shall be provided on both sides of *alternating tread devices* and shall comply with R311.7.8.2 thru R311.7.8.4. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).</u>

<u>**R311.7.12 Ship ladders.** Ship ladders shall not be used as an element of a means of egress. Ship ladders shall be permitted provided a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches.</u>

<u>**R311.7.12.1 Treads of ship ladders.** Treads shall have a tread depth of not less than 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the *nosing* projection is not less than 8 1/2 inches (216 mm). The riser height shall be not more than 91/2 inches (241 mm).</u>

<u>**R311.7.12.2 Handrails of ship ladders.** *Handrails* shall be provided on both sides of ship ladders and shall comply with R311.7.8.2 thru R311.7.8.4. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).</u>

Reason: Alternating tread devices and ship ladders are used in residential applications but are not regulated. This language adopts the specifications from the IBC providing the needed guidance when they are used. This further clarifies that an Alternating Tread Device and or Ship Ladder cannot be used as an element of a means of egress, and can only be used when a means of egress is not required or when the required means of egress stairway or ramp is provided to serve the same spaces at each level.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that we will see more use of these types of stairs and it allows for more design flexibility.

Assembly Action: **None**

Final Hearing Results

RB140-13 **AS**

Code Change No: RB141-13

Original Proposal

Section(s): R311.8.1

Proponent: Rick Davidson, City of Maple Grove Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

R311.8.1 Maximum slope. Ramps <u>serving the egress door required by section R311.2</u> shall have a maximum slope of 1 unit vertical in 12 units horizontal (8.3-percent slope). <u>All other ramps shall have a maximum slope of 1 unit vertical to 8 units horizontal (12.5-percent slope).</u>

Exception: Where it is technically infeasible to comply because of site constraints, ramps may have a maximum slope of one unit vertical in eight horizontal (12.5-percent slope).

Reason: When ramp slope requirements were changed a few years back, the reason stated was to enable persons with disabilities to stay in their homes. However, the scope of the proposal included all ramps, even those that could not be used by persons with disabilities. For example, dwelling additions to older homes sometimes have new basements at a deeper level and the owner wishes to make the transition by ramp. A 1:12 slope can sometimes be difficult to achieve and absorbs much more space than need be. Media rooms are often designed to have sloping floors with ramps serving the seating and again the 1:12 slope is problematic. This proposal gives some relief for those situations where accessibility may not be an issue. This also is consistent with section 1010.3 of the IBC which allows a 1:8 slope for pedestrian ramps not used as a means of egress.

IBC
SECTION 1010
RAMPS

1010.3 Slope. *Ramps* used as part of a *means of egress* shall have a running slope not steeper than one unit vertical in 12 units horizontal (8-percent slope). The slope of other pedestrian *ramps* shall not be steeper than one unit vertical in eight units horizontal (12.5-percent slope).

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that a 1 in 12 ramp slope is a reasonable maximum when serving the egress door, but ramps serving other areas should have more flexible requirements.

Assembly Action: **Disapproved**

Final Hearing Results

RB141-13 **AS**

Code Change No: RB142-13

Original Proposal

Section(s): R311.8.1, R311.8.2

Proponent: Glenn Mathewson, MCP., representing self (GlennMathewson@nadra.org)

Revise as follows:

R311.8.1 Maximum slope. Ramps shall have a maximum slope of 1 unit vertical in 12 units horizontal (8.3-percent slope).

> **Exception:** Where it is technically infeasible to comply because of site constraints, ramps shall ~~may~~ have a maximum slope of ~~one~~ 1 unit vertical in ~~eight~~ 8 units horizontal (12.5-percent slope).

R311.8.2 Landings required. There shall be a floor or landing at the top and bottom of each ramp, where doors open onto ramps, and where ramps change directions. The width of the landing perpendicular to the ramp slope shall be not less than the width of the ramp. The depth of the landing in the direction of the ramp slope shall be not less than 36-inches. ~~A minimum 3-foot-by-3-foot (914 mm by 914 mm) landing shall be provided:~~

1. ~~At the top and bottoms of ramps.~~
2. ~~Where doors open onto ramps.~~
3. ~~Where ramps change directions.~~

Reason:-It is inconsistent to present slope in one section using numerical symbols, and then in the exception use textual language. It appears to be more common in the IRC to use numerical symbols, thus the choice to modify the exception.
-Use of the word "may" is in appropriate when referring to a maximum value. "Shall" is clearer that the maximum value is the undisputable limit.
All other landings in the IRC (doors/stairs) reference the width of the feature they serve, as this is sensible. Currently ramp provisions refer to a specific geometric width, and would not properly and safely accommodate a ramp that was wider than the minimum 36 inches. Likely…landings are already built to the width of the ramps they serve.
-The use of a list of landing locations is not consistent with other similar IRC sections. The proposed language is more similar to that used to describe landings on stairs…a very similar feature.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it provides clarity with regard to dimensions.

Assembly Action: **None**

Final Hearing Results

RB142-13 **AS**

Code Change No: RB145-13

Original Proposal

Section(s): R312.1.2

Proponent: Rick Davidson, City of Maple Grove, Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov); Steve Thomas, Colorado Code Consulting, LLC representing the Colorado Chapter ICC (sthomas@coloradocode.net)

Revise as follows:

R312.1.2 Height. Required *guards* at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches (914 mm) high measured vertically above the adjacent walking surface~~, adjacent fixed seating~~ or the line connecting the leading edges of the treads.

Exceptions:

1. *Guards* on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the *guard* also serves as a handrail on the open sides of stairs, the top of the *guard* shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Reasons:
Davidson: This proposal deletes the term "adjacent fixed seating" from the rules on guards. The term "fixed seating" is not defined. This makes the intent ambiguous and unclear. This will result in a lack of uniformity. There is no evidence to suggest that this rule serves any purpose or that it corrects any problems. There was never any evidence submitted that there is a problem.

The intent of the current language could result in guards being five or six feet in height. Designing a guard to meet the load requirements at the top of such a guard will result in significant attachment concerns because the current load requirements were based on the assumption that the guard would only be 36 inches high and the code requires that the design load for guards be at the top. This code requirement is unreasonable because compliance with the rule will be extremely expensive yet provide little increase in safety over the previous rules.

Furthermore, it penalizes designs using fixed seating all the while ignoring chairs and other furniture than can be easily pushed next to a guard creating the same potential circumstances. If we really wanted to address a safety hazard, we would require self closing gates be installed across all stairways to prevent children from falling down stairs which is a much more frequent occurrence.

To avoid expensive and unintended design costs and to avoid confusion and a lack of uniformity of enforcement, this term must be deleted. It is reasonable to delete the term because the current language in the code has not been shown to cause unsafe conditions.

Thomas: This change is to delete the requirement to extend a guard 36 inches above the surface of fixed seating. The same requirement was deleted out of the 2012 IBC. Subsequent attempts to put it back in the 2015 IBC failed in Portland. This proposal will make the two codes consistent with each other in this area.

The original requirement was lumped in a larger change that was made to the guard provisions in the code. There was no technical justification to raise the height of the guard at the back of fixed seating. There was also no definition of what fixed seating is. This should never have been put in the IRC in the first place.

We feel that this requirement is over-restrictive. The responsibility of keeping children from climbing on the back of a deck bench or some type of landscape wall should not be placed on the code. At some point, parents need to be responsible for their children. Raising the height of the bench back rest to a height of 54 inches above the deck will not prevent children from climbing over and falling.

Cost Impacts :
Davidson: None
Thomas: This will reduce the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that children cannot be prevented from moving many other objects and climbing on these as well. Parents must monitor children.

Assembly Action: **None**

Final Hearing Results

RB145-13	**AS**

Code Change No: RB146-13

Original Proposal

Section(s): R312.2.1

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee (cbaldassarra@rjagroup.com)

Revise as follows:

R312.2 Window fall protection. Window fall protection shall be provided in accordance with Sections R312.2.1 and R312.2.2.

R312.2.1 Window sills. In dwelling units, where ~~the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter (102 mm) sphere where such openings are located within 24 inches (610 mm) of the finished floor.~~ the top of the sill of an operable window opening is located less than 24 inches above the finished floor and greater than 72 inches (1829 mm) above the finished grade or other surface below on the exterior of the building, the operable window shall comply with one of the following:

~~**Exceptions:**~~

1. Operable windows whose openings will not allow a 4- inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. Operable windows ~~Openings~~ that are provided with window fall prevention devices that comply with ASTM F 2090.
3. Operable windows that are provided with window opening control devices that comply with Section R312.2.2.

Reason: This proposed change is a result of the CTC's investigation of the area of study entitled "Child Window Safety". The scope of the activity is noted as:

To evaluate the necessity of developing code proposals for the inclusion of requirements dealing with the conditions, circumstances and devices for window safety which could reduce the number of falls by children to surfaces below.

The purpose of this proposal is to coordinate the IRC with the changes approved to the IBC in the 2012 Group A cycle. Specifically, Code change E109-12 was approved as submitted to revise Section 1013.8 of the IBC (see below).

The CTC examined the IBC provisions during the preparation of the code changes for existing buildings and several questions came up regarding the original intent and the scope of what was being regulated. The IBC language was clarified to specify that the hazard exists with all windows in a dwelling unit and the height is to be measured to the top of the sill of an operable window. Additionally, , the exceptions aren't actually exceptions, but conditions where various devices and their standards are allowed to be used. It should be noted that the minimum sill height in the IBC is 36 inches and this proposal retains the current 24 inch minimum sill height in the IRC.

For reference, the approved IBC text is as follows:

IBC 1013.8 Window openings. *All windows in Groups R-2 and R-3 buildings including dwelling~~s~~ units, where the top of the sill of an operable window opening is located less than 36 inches above the finished floor and greater than 72 inches (1829 mm) above the finished grade or other surface below on the exterior of the building, shall comply with one of the following:*

1. *Operable windows where the top of the sill of the opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below and that are provided with window fall prevention devices that comply with ASTM F 2006.*
2. *Operable windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position.*
3. *Operable windows whose openings that are provided with window fall prevention devices that comply with ASTM F 2090.*

4. Operable windows that are provided with window opening control devices that comply with Section 1013.8.1.

1013.8.1 Window opening control devices. *Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2.*

This proposal is submitted by the ICC Code Technology Committee. The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/default.aspx. Since its inception in April/2005, the CTC has held twenty-five meetings - all open to the public. In 2012, three of the 25 face-to face meetings were held. In addition to the CTC meetings, the CTC established Study Groups (SG) of interested parties for each of the areas of study. These SG’s are responsible for reviewing the available information and making recommendations to the CTC. All totaled, the SG’s held over 70 conference calls in 2012.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it clearly states requirements and is a very good improvement to the code.

Assembly Action: **None**

Final Hearing Results

RB146-13 **AS**

Code Change No: RB149-13

Original Proposal

Section(s): R313.1.1

Proponent: Rita Neiderheiser, representing Road Sprinkler Fitters Local Union 669 (4ritan@gmail.com)

Revise as follows:

R313.1.1 Design and installation. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904 <u>or NFPA 13D.</u>

Reason: The current language is unclear as to whether National Fire Protection Association (NFPA) 13D designed and installed systems are allowed to be used in townhouses. Adding "NFPA 13D" to Section R313.1.1 will make it clear that either a NFPA 13D system or a system that complies with Section P2904 of the IRC may be installed in townhouses.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it was consistent with the standard referenced in P2904.1 and it adds clarity by having it in both sections. P2904.1 does not contain charging language. R313.1.1 does have charging language and that is where this language should be.

Assembly Action: **None**

Final Hearing Results

RB149-13	**AS**

Code Change No: RB154-13

Original Proposal

Section(s): R314

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee (bajnaic@chesterfield.gov), and Adolf Zubia, Chairman IAFC Fire and Life Safety Section, representing ICC Fire Code Action Committee

Delete and substitute as follows:

SECTION R314
SMOKE ALARMS

~~**R314.1 Smoke detection and notification.** All smoke alarms shall be listed and labeled in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning *equipment* provisions of NFPA 72.~~

~~**R314.2 Smoke detection systems.** Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms. Where a household fire warning system is installed using a combination of smoke detector and audible notification device(s), it shall become a permanent fixture of the occupancy and owned by the homeowner. The system shall be monitored by an *approved* supervising station and be maintained in accordance with NFPA 72.~~

~~**Exception:** Where smoke alarms are provided meeting the requirements of Section R314.4.~~

~~**R314.3 Location.** Smoke alarms shall be installed in the following locations:~~

~~1. In each sleeping room.~~
~~2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.~~
~~3. On each additional *story* of the *dwelling*, including *basements* and habitable attics but not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.~~

~~**R314.3.1 Alterations, repairs and additions.** When *alterations*, repairs or *additions* requiring a *permit* occur, or when one or more sleeping rooms are added or created in existing *dwellings*, the individual *dwelling unit* shall be~~
~~equipped with smoke alarms located as required for new *dwellings*.~~

~~**Exceptions:**~~

~~1. Work involving the exterior surfaces of *dwellings*, such as the replacement of roofing or siding, or the *addition* or replacement of windows or doors, or the *addition* of a porch or deck, are exempt from the requirements of this section.~~
~~2. Installation, *alteration* or repairs of plumbing or mechanical systems are exempt from the requirements of this section.~~

~~**R314.4 Power source.** Smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.~~

~~**Exceptions:**~~

1. ~~Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power.~~
2. ~~Hard wiring of smoke alarms in existing areas shall not be required where the *alterations* or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an *attic*, crawl space or *basement* available which could provide access for hard wiring without the removal of interior finishes.~~

~~**R314.5 Interconnection.** Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.~~

~~**Exception:** Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for interconnection without the removal of interior finishes.~~

R314.1 General. Smoke alarms shall comply with NFPA 72 and Section R314.

R314.1.1 Listings. Smoke alarms shall be listed in accordance with UL 217. Combination smoke/carbon monoxide alarms shall be listed in accordance with UL 217 and UL 2034.

R314.2 Where required. Smoke alarms shall be provided in accordance with this section.

R314.2.1 New construction. Smoke alarms shall be provided in dwelling units.

R314.2.2 Alterations, repairs and additions. When alterations, repairs or additions requiring a permit occur, or when one or more sleeping rooms are added or created in existing dwellings, the individual dwelling unit shall be equipped with smoke alarms located as required for new dwellings.

Exceptions:

1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck, are exempt from the requirements of this section.
2. Installation, alteration or repairs of plumbing or mechanical systems are exempt from the requirements of this section.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional *story* of the *dwelling*, including *basements* and habitable attics but not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

R314.4 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

Exception: Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for interconnection without the removal of interior finishes.

R314.5 Combination alarms. Combination smoke/carbon monoxide alarms shall be permitted to be used in lieu of smoke alarms.

R314.6 Power source. Smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:

1. Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power.
2. Smoke alarms installed in accordance with Section R314.2.2 shall be permitted to be battery powered.

R314.7 Fire alarm systems. Fire alarm systems shall be permitted to be used in lieu of smoke alarms and shall comply with Sections R314.7.1 through R315.7.4.

R314.7.1 General. Fire alarm systems shall comply with the provisions of this code and the household fire warning *equipment* provisions of NFPA 72. Smoke detectors shall be listed in accordance with UL 268.

R314.7.2 Location. Smoke detectors shall be installed in the locations specified in Section R314.3.

R314.7.3 Permanent fixture. Where a household fire alarm system is installed, it shall become a permanent fixture of the occupancy, owned by the homeowner and shall be monitored by an approved supervising station.

R314.7.4 Combination detectors. Combination smoke/carbon monoxide detectors shall be permitted to be installed in fire alarm systems in lieu of smoke detectors, provided they are listed in accordance with UL 268 and UL 2075.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC). These ICC committees were established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the these committees have held 6 open meetings and numerous workgroup meetings which included members of the committees as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the CAC website at: http://www.iccsafe.org/cs/CAC/Pages/default.aspx.

This proposal reformats the Section R314 smoke alarm requirements in a more logical order. It is not the intent of this proposal to increase or lessen the overall smoke alarm requirements. The format for this section is similar to one used on a companion proposal to the Section R315 carbon monoxide alarm requirements. Comments on the origin of specific requirements in this proposal are as follows:

1. R314.1 is a new simplified charging paragraph for the section. The UL 217 Listing requirement was moved to R314.1.1. The reference to NFPA 72 was moved to R314.7.1.
2. R314.1.1 includes new provisions to allow combination smoke/carbon monoxide alarms, if they are provided, to be listed in accordance with UL 217 and UL 2034.

3. R314.2 includes requirements for new construction and alterations and repairs. The section includes editorial revisions, but no substantive changes to existing requirements. R314.2.1 requirements are identical to existing R314.3.1 requirements.
4. The R314.3 location requirements are unchanged.
5. R314.4 requirements for interconnection are identical to the existing requirements in R314.5.
6. R314.5 allows listed combination smoke/carbon monoxide alarms to be used in lieu of smoke alarms. A companion change to allow these units to be used in lieu of carbon monoxide alarms is also being proposed for Section R315. If both of these proposals are accepted, a single combination unit can be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms and comply with R314 and R315 requirements.
7. R314.6 includes power supply requirements that are equivalent to the current power supply requirements in R314.4. There should be no changes for the applications under which permanently connected or battery operated smoke alarms are required.
8. R314.7 includes revised requirements for smoke detection systems. Sections R314.7.1 through R314.7.3 include requirements that are equivalent to existing R314.2 requirements.
9. R314.7.4 includes new requirements that allow the option to use combination smoke/carbon monoxide detectors.

Cost Impact: These revisions have the potential to reduce the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

R314.7.3 Permanent fixture. Where a household fire alarm system is installed, it shall become a permanent fixture of the occupancy, owned by the homeowner ~~and shall be monitored by an approved supervising station~~.

(Portions of proposal not shown to remain unchanged)

Committee Reason: The committee approved this code change proposal because they felt that it is a good reorganization and cleanup that clarifies the code and allows for new technology with regard to combination alarms.

Assembly Action: **None**

Final Hearing Results

RB154-13 **AM**

Code Change No: RB155-13

Original Proposal

Section(s): R314.2, R315.2

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov), and Adolf Zubia, Chairman IAFC Fire and Life Safety Section, representing ICC Fire Code Action Committee

Revise as follows:

R314.2 Smoke detection systems. Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms. Where a household fire warning system is installed using a combination of smoke detector and audible notification device(s), it shall become a permanent fixture of the occupancy and owned by the homeowner. ~~The system shall be monitored by an approved supervising station and be maintained in accordance with NFPA 72.~~

> **Exception:** Where smoke alarms are provided meeting the requirements of Section R314.4.

R315.2 Carbon monoxide detection systems. Carbon monoxide detection systems that include carbon monoxide detectors and audible notification appliances, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720, shall be permitted. The carbon monoxide detectors shall be listed as complying with UL 2075. Where a household carbon monoxide detection system is installed, it shall become a permanent fixture of the occupancy~~,~~ and owned by the homeowner. ~~and shall be monitored by an approved supervising station.~~

> **Exception:** Where carbon monoxide alarms are installed meeting the requirements of Section R315.1, compliance with Section 315.2 is not required.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC). These ICC committees were established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the these committees have held 6 open meetings and numerous workgroup meetings which included members of the committees as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the CAC website at: http://www.iccsafe.org/cs/CAC/Pages/default.aspx.

The code requires smoke alarms and carbon monoxide alarms to be installed in the dwelling, or allows smoke detection systems and carbon monoxide detection systems to be provided in lieu of individual alarms to provide the desired protection. These systems need to be a permanent fixture of the occupancy and owned by the homeowner. This is because the systems could be leased to the homeowner by an alarm company. If the homeowner discontinued service with the alarm company there is nothing to prevent them from removing the system from the premise. Then the home would be left with no protection.

It is difficult to justify requiring these systems to be monitored by an approved supervising station, as long as they provide local alarm notification. In addition Section 907.7.5 does not require monitoring of an automatic sprinkler system in one- and two-family dwellings. However there is nothing that prohibits these systems from being monitored.

In addition the reference in R314.2 to systems being maintained in accordance with NFPA 72 is being removed since the scope of the IRC does not cover maintenance of systems.

Cost Impact: The proposal has the potential to reduce costs.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it is reasonable to delete the monitoring requirement due to its cost and because it becomes redundant where an alarm system is already in place. In addition, the language proposed is not enforceable.

Assembly Action: **None**

Final Hearing Results

RB155-13	**AS**

Code Change No: RB156-13

Original Proposal

Section(s): R314.3.1 (New) and R314.3.2 (New)

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee (bajnaic@chesterfield.gov), and Adolf Zubia, Chairman IAFC Fire and Life Safety Section, representing ICC Fire Code Action Committee

Add new text as follows:

R314.3.1 Installation near cooking appliances. Smoke alarms shall not be installed in the following locations unless this would prevent placement of a smoke alarm in a location required by Section R314.3.

1. Ionization smoke alarms shall not be installed less than 20 feet (6.1 m) horizontally from a permanently installed cooking appliance.
2. Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3 m) horizontally from a permanently installed cooking appliance.
3. Photoelectric smoke alarms shall not be installed less than 6 feet (1.8 m) horizontally from a permanently installed cooking appliance.

R314.3.2 Installation near bathrooms. Smoke alarms shall be installed not less than 3 feet (0.91 m) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by Section R314.3.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC). These ICC committees were established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the these committees have held 6 open meetings and numerous workgroup meetings which included members of the committees as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the CAC website at: http://www.iccsafe.org/cs/CAC/Pages/default.aspx

This proposal is intended to reduce nuisance alarms attributed to locating smoke alarms in close proximity to cooking appliances and bathrooms in which steam is produced. The proposed provisions are based on the findings in the Task Group Report - Minimum Performance Requirements for Smoke Alarm Detection Technology - February 22, 2008, and are consistent with similar requirements included in Section 29.8.3.4 of the 2010 and 2013 editions of NFPA 72.

Cost Impact: None.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it gives clear dimensions on the placement of smoke alarms that will limit the possibility of nuisance alarms. Builders are unintentionally placing these devices in the wrong locations in the field based on current literal IRC requirements. This language coordinates the code provisions with some of the details that are included in NFPA 72.

Assembly Action: **None**

Final Hearing Results

RB156-13	**AS**

Code Change No: RB160-13

Original Proposal

Section(s): R315

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee (bajnaic@chesterfield.gov), and Adolf Zubia, Chairman IAFC Fire and Life Safety Section, representing ICC Fire Code Action Committee

Delete and substitute as follows:

SECTION R315
CARBON MONOXIDE ALARMS

~~**R315.1 Carbon monoxide alarms.** For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in *dwelling units* within which fuel-fired *appliances* are installed and in dwelling units that have attached garages.~~

~~**R315.2 Carbon monoxide detection systems.** Carbon monoxide detection systems that include carbon monoxide detectors and audible notification appliances, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720, shall be permitted. The carbon monoxide detectors shall be listed as complying with UL 2075. Where a household carbon monoxide detection system is installed, it shall become a permanent fixture of the occupancy, owned by the homeowner and shall be monitored by an approved supervising station.~~

> ~~**Exception:** Where carbon monoxide alarms are installed meeting the requirements of Section R315.1, compliance with Section 315.2 is not required.~~

~~**R315.3 Where required in existing dwellings.** Where work requiring a *permit* occurs in existing *dwellings* that have attached garages or in existing dwellings within which fuelfired *appliances* exist, carbon monoxide alarms shall be provided in accordance with Section R315.1.~~

~~**R315.4 Alarm requirements.** Single-station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.~~

R315.1 General. Carbon monoxide alarms shall comply with Section R315.

R315.1.1 Listings. Carbon monoxide alarms shall be listed in accordance with UL 2034. Combination carbon monoxide/smoke alarms shall be listed in accordance with UL 2034 and UL 217.

R315.2 Where required. Carbon monoxide alarms shall be provided in accordance with this section.

R315.2.1 New construction. Carbon monoxide alarms shall be provided in dwelling units when either or both of the following conditions exist.

1. The dwelling unit contains a fuel-fired appliance.
2. The dwelling unit has an attached garage with an opening that communicates with the dwelling unit.

R315.2.2 Alterations, repairs and additions. When alterations, repairs or additions requiring a permit occur, or when one or more sleeping rooms are added or created in existing dwellings, the individual dwelling unit shall be equipped with carbon monoxide alarms located as required for new dwellings.

Exceptions:

1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck, are exempt from the requirements of this section.
2. Installation, alteration or repairs of plumbing or mechanical systems are exempt from the requirements of this section.

R315.3 Location. Carbon monoxide alarms in dwelling units shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms. When a fuel-burning appliance is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom.

R315.4 Combination alarms. Combination carbon monoxide/smoke alarms shall be permitted to be used in lieu of carbon monoxide alarms.

R315.5 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:

1. Carbon monoxide alarms shall be permitted to be battery operated when installed in buildings without commercial power.
2. Carbon monoxide alarms installed in accordance with Section R315.2.2 shall be permitted to be battery powered.

R315.6 Carbon monoxide detection systems. Carbon monoxide detection systems shall be permitted to be used in lieu of carbon monoxide alarms and shall comply with Sections R315.6.1 to R315.6.4.

R315.6.1 General. Household carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be listed in accordance with UL 2075.

R315.6.2 Location. Carbon monoxide detectors shall be installed in the locations specified in Section R315.3. These locations supersede the locations specified in NFPA 720.

R315.6.3 Permanent fixture. Where a household carbon monoxide detection system is installed, it shall become a permanent fixture of the occupancy, owned by the homeowner and shall be monitored by an approved supervising station.

R315.6.4 Combination detectors. Combination carbon monoxide/smoke detectors shall be permitted to be installed in carbon monoxide detection systems in lieu of carbon monoxide detectors, provided they are listed in accordance with UL 2075 and UL 268.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC). These ICC committees were established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the these committees have held 6 open meetings and numerous workgroup meetings which included members of the committees as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the CAC website at: http://www.iccsafe.org/cs/CAC/Pages/default.aspx.

This proposal clarifies requirements for the installation of CO alarm and CO detection systems as follows:

1. Section R315 was reorganized to provide requirements in a more logical location. Except as noted below no technical changes were made to the existing requirements.
2. Listed combination carbon monoxide/smoke alarms, and combination carbon monoxide /smoke detectors are readily available on the market. This proposal identifies the UL standards used to List these products, and allows them to be used in lieu of carbon monoxide alarms and detectors. A companion change to allow these units to be used in lieu of smoke alarms and smoke detectors is being proposed for Section R314. If both of these proposals are accepted, a single combination unit can be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms and comply with R314.3 (2) and R315.3 (above).
3. Current Section R315.1 requires carbon monoxide alarms to be provided in dwelling units with attached garages. Carbon monoxide is most likely to enter a dwelling from an attached garage if there is a communicating opening between the garage and dwelling. Some homes with attached garages do not have a communicating opening. Accordingly, proposed Section R315.2.1, item 2, only requires carbon monoxide alarms when the dwelling unit has an attached garage with an opening that communicates with the dwelling unit.
4. Current Section R315.3 requires CO alarms to be installed in existing dwellings whenever any kind of work that requires a permit is conducted, such as reroofing or adding a deck. Proposed section R315.2.2 reflects the more realistic requirements for providing carbon monoxide alarms in existing dwelling units to match the triggers used to require smoke alarms in existing dwelling units that are included in Section R314.3.1. In addition Section R315.5(2) only requires these alarms to be battery powered.
5. The IRC allows fuel burning appliances to be installed in bedrooms and bathrooms, but this is not a common practice. Section R315.3 requires carbon monoxide alarms to be installed in a bedroom when it or its attached bathroom contains a fuel burning appliance. This protects occupants who sleep with their bedroom door closed.
6. R315.5 clarifies the requirements for powering CO alarms that is consistent with R314.4 smoke alarm requirements.
7. The carbon monoxide detection system requirements have been moved from Section R315.2 to proposed Sections R315.6 through R315.6.2. The basic requirements for these systems are unchanged, but additional language was added to clarify that:
   a. These systems can be used in lieu of carbon monoxide alarms.
   b. All devices and equipment in the system must be listed for their intended purpose (see NFPA 720, section 9.3.1)
   c. Combination carbon monoxide/smoke detectors can be used.
   d. Detectors only need to be installed in locations specified in section R315.3, not in all locations specified in NFPA 720.

The code requires smoke alarms and carbon monoxide alarms to be installed in the dwelling, but allows smoke detection systems and carbon monoxide detection systems to be provided in lieu of individual alarms to provide the desired protection. These systems need to be a permanent fixture of the occupancy and owned by the homeowner. This is because the systems could be leased to the homeowner by an alarm company. If the homeowner discontinued service with the alarm company there is nothing to prevent them from removing the system from the premise. Then the home would be left with no protection.

It is difficult to justify requiring these systems to be monitored by an approved supervising station, provided they provide local alarm notification. In addition Section 907.7.5 does not require monitoring of an automatic sprinkler system in one- and two-family dwellings. However there is nothing that prohibits these systems from being monitored.

In addition the reference in R314.2 to systems being maintained in accordance with NFPA 72 is being removed since the scope of the IRC does not cover maintenance of systems.

Cost Impact: These revisions have the potential to reduce the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

R315.6.3 Permanent fixture. Where a household carbon monoxide detection system is installed, it shall become a permanent fixture of the occupancy, owned by the homeowner~~ and shall be monitored by an approved supervising station~~.

Committee Reason: The committee approved this code change proposal because they felt that it is a good reorganization that clarifies the code. The modification was made to be consistent with prior committee action on Proposal RB154.

Assembly Action: **None**

Final Hearing Results

RB160-13 **AM**

Code Change No: RB161-13

Original Proposal

Section(s): R315.3

Proponent: Jerry Anderson, City of Overland Park, Ks, representing self (jerry.anderson@opkansas.org)

Revise as follows:

R315.3 Where required in existing dwellings. Where work requiring a permit occurs in existing dwellings that have attached garages or in existing dwellings within which fuel fired appliances exist, carbon monoxide alarms shall be provided in accordance with Section R315.1.

Exceptions:

1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck, are exempt from the requirements of this section.
2. Installation, alteration or repairs of plumbing or mechanical systems are exempt from the requirements of this section.

Reason: The purpose of the code change is to exempt some minor work from triggering carbon monoxide detectors. The exceptions to the base requirement for installing carbon monoxide detectors in existing dwellings are exactly the same as found in section R314.3.1 for smoke detectors. This change will make the code consistent in its approach in providing early warning detection devices in dwellings. It is unreasonable require the installation of carbon monoxide detectors for any work that is done on an existing dwelling.

Cost Impact: No cost associated with this change

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it appears to exempt some minor work from carbon monoxide requirements. This action is consistent with the requirements of R314.3.1 for smoke detectors.

Assembly Action: **None**

Final Hearing Results

RB161-13 **AS**

Code Change No: RB165-13

Original Proposal

Section(s): R316.3

Proponent: Michael D. Fischer, Kellen Company, representing the Center for the Polyurethanes Industry (mfischer@kellencompany.com)

Revise as follows:

R316.3 Surface burning characteristics. Unless otherwise allowed in Section R316.5 or R316.6, all foam plastic or foam plastic cores used as a component in manufactured assemblies used in building construction shall have a flame spread index of not more than 75 and shall have a smoke developed index of not more than 450 when tested in the maximum thickness <u>and density</u> intended for use in accordance with ASTM E 84 or UL 723. Loose-fill-type foam plastic insulation shall be tested as board stock for the flame spread index and smoke-developed index.

> **Exception:** Foam plastic insulation more than 4 inches (102 mm) thick shall have a maximum flame spread index of 75 and a smoke-developed index of 450 where tested at a minimum thickness of 4 inches (102 mm), provided the end use is *approved* in accordance with Section R316.6 using the thickness and density intended for use.

Reason: As applied to foam plastics, performance certifications (i.e. *approvals*) based on results for tests in accordance to ASTM E84 are limited to the maximum (nominal) thickness and density of the materials tested. Adding language with regard to density to R316.3 serves to more fully clarify and communicate the application of ASTM E84 test results to foam plastics.

Cost Impact: None.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it was a good addition that gave clarity to the code.

Assembly Action: **None**

Final Hearing Results

RB165-13 **AS**

Code Change No: RB167-13

Original Proposal

Section(s): R316.4

Proponent: Dennis Pitts, American Wood Council, representing American Wood Council (dpitts@awc.org)

Revise as follows:

R316.4 Thermal barrier. Unless otherwise allowed in Section R316.5 or Section R316.6, foam plastic shall be separated from the interior of a building by an *approved* thermal barrier of minimum 1/2 inch (12.7 mm) gypsum wallboard, <u>23/32 inch (18.2 mm) wood structural panel</u> or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

Reason: Wood structural panels are permitted prescriptively as a thermal barrier in various thicknesses in subsections of R316.5. R316.5.2 allows 15/32" WSP as a thermal barrier in roofs, R316.5.3 allows ¼" WSP for attics, and R316.5.4 allows ¼" WSP for crawlspaces. This proposal would prescriptively allow a thicker WSP to be used as a thermal barrier in other applications that might arise.

Prior to a recent change in NFPA 275 that essentially requires a Class A flame spread rating for materials used as thermal barriers, 23/32" WSP complied with NFPA 275. This proposal prescriptively recognizes a history of satisfactory service as a thermal barrier, even for thinner panels, although the material isn't a Class A material.

Cost Impact: No increase in cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that such panels have been used for years between foam and the interior of the house and have served quite well. If the panels burn through, the problem will be greater than those caused by the foam.

Assembly Action: **None**

Final Hearing Results

RB167-13	**AS**

Code Change No: RB168-13

Original Proposal

Section(s): R316.5.3

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement*, James Hardie Building Products, and Self

Revise as follows:

R316.5.3 Attics. The thermal barrier specified in Section R316.4 is not required where all of the following apply:

1. *Attic* access is required by Section R807.1.
2. The space is entered only for purposes of repairs or maintenance.
3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
   3.1. 1½-inch-thick (38 mm) mineral fiber insulation;
   3.2. 1/4-inch-thick (6.4 mm) wood structural panels;
   3.3. 3/8-inch (9.5 mm) particleboard;
   3.4. 1/4-inch (6.4 mm) hardboard;
   3.5. 3/8-inch (9.5 mm) gypsum board; ~~or~~
   3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm);
   3.7. 1½-inch-thick (38 mm) cellulose insulation; or
   3.8. ¼-inch (6.4 mm) fiber-cement panel, soffit or backer board.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.

Reason: ¼-inch fiber-cement panel complying with ASTM C1186, Type A, or ASTM C1288, or ISO 8336, Category C, has a flame spread of 0 and smoke developed index of 5 or less. The proposed fiber-cement is also classed as noncombustible in accordance with ASTM E 136 (see attached ICC-ES ESR-1381[reference Section 3.0], ESR-1572[reference Section 3.0], ESR-1844[reference Section 3.1], ESR-2290[reference Section 3.1], and ESR-2894[reference Section 3.2]) documenting these claims. The fiber-cement panel has also been tested in accordance with NFPA 268 (see attached test reports) for compliance with the provisions of IBC Section 2603.5.7 “Exceptions” for “Ignition”.

IBC Section 2603.5.7 has, as a result of the Group A IBC Code Hearings, been revised to add fiber-cement when tested in accordance with both ASTM E84 and NFPA 268. This proposed revision brings the two building codes (IBC & IRC) and the applicable code sections and standards references into general alignment.

Performance requirements of ISO 8336, *Fibre-cement flat sheets – Product specification and test methods*, have been harmonized with the performance requirements of ASTM C1288, *Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets*. Fiber-cement producers in Mexico, Central and South America, Europe, Asia, Australia and New Zealand currently manufacture and test their fiber-cement products for compliance with ISO 8336. The inclusion of this Standard reference in the IRC will permit manufacturers worldwide to demonstrate product compliance to IBC requirements. The addition of a reference to ISO 8336 in the Code removes a barrier to trade.

Cost Impact: The code change proposal will not increase the cost of construction because the proposed code change is editorial in nature to better clarify and present the backer board products currently recognized in the Code.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it added another option for protection that was well substantiated.

Assembly Action: **None**

Final Hearing Results

RB168-13	**AS**

Code Change No: RB170-13

Original Proposal

Section(s): **R316.5.3**

Proponent: John Woestman, Kellen Company, representing Extruded (jwoestman@kellencompany.com)

Revise as follows:

R316.5.3 Attics. The thermal barrier specified in Section R316.4 is not required where <u>the foam plastic insulation has been tested in accordance with R316.6 or where</u> all of the following apply:

1. *Attic* access is required by Section R807.1.
2. The space is entered only for purposes of repairs or maintenance.
3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
   3.1. 11/2-inch-thick (38 mm) mineral fiber insulation;
   3.2. 1/4-inch-thick (6.4 mm) wood structural panels;
   3.3. 3/8-inch (9.5 mm) particleboard;
   3.4. 1/4-inch (6.4 mm) hardboard;
   3.5. 3/8-inch (9.5 mm) gypsum board; or
   3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm);
   3.7. 11/2-inch-thick (38 mm) cellulose insulation.

~~The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.~~

Reason: This proposal is an attempt to clarify requirements of the IRC in Section R316.5.3. Section R316.6 specifically allows foam plastic insulation meeting one of the tests specified in R316.6 to not be required to meet the prescriptive requirements of Sections R316.3 through R316.5. This proposal makes it explicitly clear Items 1 and 2 (and Item 3) of R316.5.3 are not a requirement for foam plastic insulation that complies with R316.6.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Modified**

Replace the original proposal with the following:

R316.5.3 Attics. The thermal barrier specified in Section R316.4 is not required where all of the following apply:

1. *Attic* access is required by Section R807.1.
2. The space is entered only for purposes of repairs or maintenance.
3. The foam plastic insulation <u>has been tested in accordance with Section R316.6</u> or ~~where~~ <u>the foam plastic insulation</u> is protected against ignition using one of the following ignition barrier materials:
   3.1. 11/2-inch-thick (38 mm) mineral fiber insulation;
   3.2. 1/4-inch-thick (6.4 mm) wood structural panels;
   3.3. 3/8-inch (9.5 mm) particleboard;
   3.4. 1/4-inch (6.4 mm) hardboard;
   3.5. 3/8-inch (9.5 mm) gypsum board; or
   3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm);
   3.7. 11/2-inch-thick (38 mm) cellulose insulation.

~~The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.~~

Committee Reason: The committee approved this code change proposal because they felt that was a good reorganization of the section that clarified the requirements. The modification further clarified the code requirements.

Assembly Action: **None**

Final Hearing Results

RB170-13	**AM**

Code Change No: RB171-13

Original Proposal

Section(s): R316.5.4

Proponent: John Woestman, Kellen Company, Representing Extruded Polystyrene Foam Association (XPSA) (jwoestman@kellencompany.com)

Revise as follows:

R316.5.4 Crawl spaces. The thermal barrier specified in Section R316.4 is not required where <u>the foam plastic insulation has been tested in accordance with Section R316.6 or where</u> all of the following apply:

1. Crawlspace access is required by Section R408.4
2. Entry is made only for purposes of repairs or maintenance.
3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
   3.1. 11/2-inch-thick (38 mm) mineral fiber insulation;
   3.2. 1/4-inch-thick (6.4 mm) wood structural panels;
   3.3. 3/8-inch (9.5 mm) particleboard;
   3.4. 1/4-inch (6.4 mm) hardboard;
   3.5. 3/8-inch (9.5 mm) gypsum board; or
   3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).

~~The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.~~

Reason: This proposal is an attempt to clarify requirements of the IRC in Section R316.5.4. Section R316.6 specifically allows foam plastic insulation meeting one of the tests specified in R316.6 to not be required to meet the prescriptive requirements of Sections R316.3 through R316.5. This proposal makes it explicitly clear Items 1 and 2 (and Item 3) of R316.5.4 are not a requirement for foam plastic insulation that complies with R316.6.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Modified**

Replace the original proposal with the following:

R316.5.4 Crawl spaces. The thermal barrier specified in Section R316.4 is not required where all of the following apply:

1. Crawlspace access is required by Section R408.4
2. Entry is made only for purposes of repairs or maintenance.
3. The <u>foam plastic insulation has been tested in accordance with Section R316.6 or the</u> foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
   3.1. 11/2-inch-thick (38 mm) mineral fiber insulation;
   3.2. 1/4-inch-thick (6.4 mm) wood structural panels;
   3.3. 3/8-inch (9.5 mm) particleboard;
   3.4. 1/4-inch (6.4 mm) hardboard;
   3.5. 3/8-inch (9.5 mm) gypsum board; or
   3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).

~~The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.~~

Committee Reason: The committee approved this code change proposal because they felt that it is a good reorganization that provides clarity and is consistent with the committee’s prior action on proposal RB170. The modification further clarifies the code.

Assembly Action: **None**

Final Hearing Results

RB171-13	**AM**

Code Change No: RB172-13

Original Proposal

Section(s): R316.5.11

Proponent: Rick Davidson, City of Maple Grove, Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

R316.5.11 Sill plates and headers. Foam plastic shall be permitted to be ~~spray~~ applied to ~~a~~ sill plates and headers or installed in the perimeter joist space without the thermal barrier specified in Section R316.4 subject to all of the following:

1. The maximum thickness of the foam plastic shall be 31/4 inches (83 mm).
2. The density of the foam plastic shall be in the range of 0.5 to 2.0 pounds per cubic foot (8 to 32 kg/m^3).
3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723.

Reason: This proposal extends the same liberties to rigid foam that are currently enjoyed by spray foam products provided they meet the same criteria. Also, the language is tweaked to make clear that the application includes the rim joist area.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

R316.5.11 Sill plates and headers. Foam plastic shall be permitted to be spray applied to sill plates and headers or installed in the perimeter joist space without the thermal barrier specified in Section R316.4 subject to all of the following:

1. The maximum thickness of the foam plastic shall be 31/4 inches (83 mm).
2. The density of the foam plastic shall be in the range of 0.5 to 2.0 pounds per cubic foot (8 to 32 kg/m^3).
3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723.

Committee Reason: The committee approved this code change proposal because they felt that it was a good reorganization that clarifies the code by addressing exactly where spray foam can be applied in relation to sill plates and headers. The modification further clarifies the proposal and addresses the fact that the foam assemblies were tested with spray applied foam plastics.

Assembly Action: **None**

Final Hearing Results

RB172-13	**AM**

Code Change No: RB174-13

Original Proposal

Section(s): R316.6

Proponent: Tony Crimi, A.C. Consulting Solutions, Inc., representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca)

Revise as follows:

R316.6 Specific approval. Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of one of the following *approved* tests: NFPA 286 with the acceptance criteria of Section R302.9.4, FM4880, UL 1040, or UL 1715, or fire tests related to actual end-use configurations. Approval shall be based on the actual end use configuration and shall be performed on the finished foam plastic assembly in the maximum thickness intended for use. <u>Foam plastics that are used as an interior finish on the basis of special tests shall also conform to the smoke-developed requirements of Section R302.9.4 or Section R316.3.</u> Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason: At a minimum, the provision for special approvals for foamed plastics, which waives other requirements of the IRC for foamed plastics needs to provide a comparable level of performance and safety to the existing provisions. The exception for foamed plastics in R316.6 does not adequately cover smoke developed performance of foamed plastics. Current requirements for glass fiber, mineral fiber, cellulose and reflective plastic core insulation all require both flame spread and smoke development requirements either based on ASTM E84 or UL 723 or R302.10 Alternative methods are acceptable for use, however, their performance level needs to address the same hazards as the base requirement, plus any additional hazards that might arise as a result of a specific material. This proposal makes the section more consistent with the parallel provision in the IBC.

Justification: For all other thermal and sound insulating materials within the IRC, including non-combustible insulation materials, the minimum performance level for materials permitted to be used includes at least some requirements for both flame spread (fire growth) and smoke production. These requirements are primarily based on either ASTM E84 testing or alternative methods such as NFPA 286 and CAN/ULC-S102.2. However, in the case of foamed plastics, of the four alternative test methods permitted by 2603.9, only NFPA 286 contains any limits on smoke developed for any foamed plastics by virtue of the inclusion of a reference to section R302.9.4.

Room corner tests such as FM 4880, UL 1040, NFPA 286 or UL 1715 do evaluate fire growth and flashover. However, with the exception of the criteria for NFPA 286 in R302.9.4, the pass/fail criteria proposed for the room corner tests in the proposed acceptance criteria do not include quantitative evaluation of smoke density. Criteria for fire and smoke performance of building materials are based as much on issues arising from smoke production from burning materials, and smoke migration within the occupied spaces. It is not reasonable to provide an exception to the basic ASTM E84 flame spread and smoked developed requirements which apply to all other types of insulations, even non-combustible insulations, for foamed plastics based on room corner tests unless the limits on smoke production are applied to all of the room corner tests.

There are numerous reported instances of the hazards associated with smoke production from building materials. One is the tragic fire at the Greenwood Health Center in Hartford, CT on Feb 26 2003. The New York Times quoted Chief Charles A. Teale of the Hartford Fire Department as stating that “Most of the 10 residents killed, ranging in ages from 27 to 76, died of smoke inhalation”. The same article further goes on to quote officials as saying: “The nursing home itself suffered little damage, though, and the fire was put out in about 15 minutes. Most of the residents were then led back inside, and by midday, 84 of the 148 residents remained at the center”.

It is reasonable to allow alternative methods of testing materials to determine their acceptability for use, however, their performance criteria needs to address the same hazards as the base requirement, plus any additional hazards that might arise as a result of a specific material.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this proposed code change because they felt that it duplicated other code requirements and because the proponent needs to clarify what the phrase “special testing” refers to.

Assembly Action: **None**

Public Comments

Public Comment 2:

Jesse J. Beitel, Hughes Associates, Inc. representing The Extruded Polystyrene Foam Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

Revise text as follows:

R316.3 Surface burning characteristics. Unless otherwise allowed in Section R316.5 ~~or R316.6~~, all foam plastic or foam plastic cores used as a component in manufactured assemblies used in building construction shall have a flame spread index of not more than 75 and shall have a smokedeveloped index of not more than 450 when tested in the maximum thickness intended for use in accordance with ASTM E 84 or UL 723. Loose-fill-type foam plastic insulation shall be tested as board stock for the flame spread index and smoke-developed index.

> **Exception:** Foam plastic insulation more than 4 inches (102 mm) thick shall have a maximum flame spread index of 75 and a smoke-developed index of 450 where tested at a minimum thickness of 4 inches (102 mm), provided the end use is approved in accordance with Section R316.6 using the thickness and density intended for use.

R316.6 Specific approval. Foam plastic not meeting the requirements of Sections ~~R316.3~~ R316.4 through R316.5 shall be specifically *approved* on the basis of one of the following approved tests: NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040, or UL 1715, or fire tests related to actual end-use configurations. Approval shall be based on the actual end use configuration and shall be performed on the finished foam plastic assembly in the maximum thickness intended for use. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Commenter’s Reason: This comment will require that foam plastic insulations and foam plastic cores evaluated under Section R316.6 also meet the flame spread and smoke-developed requirements of Section R316.3. This requirement will bring the IRC into conformity with the requirements of the IBC.

Final Hearing Results

RB174-13 **AMPC2**

Code Change No: RB175-13

Original Proposal

Section(s): R316.5.12, R316.8 (New), Chapter 44

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council – Plastics Division (Jcrandell@aresconsulting.biz)

Revise as follows:

R316.5.12 Sheathing. Foam plastic insulation used as sheathing shall comply with Section R316.3 and Section R316.4. Where the foam plastic sheathing is exposed to the *attic* space at a gable or knee wall, the provisions of Section R316.5.3 shall apply. Where foam plastic insulation is used as exterior wall sheathing on framed wall assemblies, it shall comply with Section R316.8.

R316.8 Wind Resistance. Foam plastic insulation complying with ASTM C 578 and ASTM C 1289 and used as exterior wall sheathing on framed wall assemblies shall comply with SBCA FS 100 for wind pressure resistance unless installed directly over a sheathing material that is separately capable of resisting the wind load or otherwise exempted from the scope of SBCA FS 100.

Add new standards to Chapter 44 as follows:

SBCA

Standard Reference number	Title	Referenced in code section
FS 100-12	Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies ……….	R316.8

Reason: This ANSI standard (FS 100-12) was approved for the 2015 IBC. It also is needed in the IRC to address the use of foam plastic insulating sheathing in exterior wall covering assemblies where resistance to wind pressure is required. This standard provides a methodology by which a manufacturer can qualify their product, through testing, to meet the requirements of the I-codes in establishing the wind pressure resistance of the product. It also provides for on-going quality control procedures to ensure that the product continues to meet its qualified wind pressure resistance. The ANSI standard supplements the applicable ASTM materials standards also referenced in the code change proposal. The current version of the standard is available at www.sbcindustry.com/fs100.php

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, [SBCA FS 100-12] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

For staff analysis of the content of SBCA FS 100 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it provided a new accredited standard that will be useful to the entire building industry.

Assembly Action: **None**

Final Hearing Results

RB175-13 **AS**

Code Change No: RB176-13

Original Proposal

Section(s): R317.3

Proponent: Randall Shackelford, P.E., representing Simpson Strong-Tie Co., Inc. (rshackelford@strongtie.com)

Revise Sections as follows:

R317.3 Fasteners and connectors in contact with preservative-treated and fire-retardant-treated wood. Fasteners, including nuts and washers, and connectors in contact with preservative-treated wood and fire-retardant-treated wood shall be in accordance with this section. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153. <u>Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F 1667.</u>

Reason: The reason for this proposal is to specify the permissible types of stainless steel that driven fasteners used with treated wood can be manufactured from.

ASTM F 1667 reads as follows:

6. Material Requirements

6.1 Steel wire used in the manufacture of driven fasteners shall be of low carbon, medium-low carbon, or medium-high carbon.

6.2 Stainless steel wire used in the manufacture of driven fasteners shall be of Types 302, 304, 305, or 316. So the intent here is to require fasteners used with treated wood to be manufactured from Types 302, 304, 305, or 316 stainless steel.

There has been a lot of work done on fasteners and connectors in contact with treated wood in the last 8-10 years. All the testing and historical performance of stainless steel were based on the traditional use of 300 series stainless steel.
Yet there are many types of stainless steel, and some are much less corrosion resistant than others. By limiting the types of stainless steel to these specific series, it ensures that the stainless steel fasteners will be corrosion resistant when exposed to treated wood.

There is precedent for this. Section 402.1.1 specifies that for wood foundations stainless steel fasteners must be “of Type 304 or 316 stainless steel”. Section R905.10.4 states “Copper, brass, bronze, copper alloy and 300-series stainless steel fasteners shall be used for copper roofs.” Further, ASTM F 1667 is already specified for several different types of fasteners in the IRC.
The result of this proposal is not to require the exclusive use of 300-series stainless steel fasteners. This section permits hot-dipped, zinc-coated galvanized steel, stainless steel, silicon bronze, or copper fasteners. The existing sentence before the added one is meant to specify a minimum coating weight for the galvanized fasteners so they perform as expected. The new proposed sentence does the same thing for stainless steel fasteners.

Cost Impact: The vast majority of driven stainless steel fasteners are manufactured from 300 series stainless steel. However, if a manufacturer were supplying the lesser-performing (and lower cost) stainless steel types and a builder had to use the standard 300 series stainless steel instead, there could be a cost increase. But the increase in performance would justify the additional cost. However, the use of the stainless steel fastener is not required anyway, as stated in the reason statement.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it was an important addition to the code that clarified the type of stainless steel fasteners that must be used.

Assembly Action: **None**

Final Hearing Results

RB176-13 **AS**

Code Change No: RB177-13

Original Proposal

Section(s): R320.1, R320.1.1 (New)

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee (cbaldassarra@rjagroup.com)

Revise as follows:

R320.1 Scope. Where there are four or more *dwelling* units ~~or *sleeping units*~~ in a single structure, the provisions of Chapter 11 of the *International Building Code* for Group R-3 shall apply.

R320.1.1 Guest rooms. A dwelling with guestrooms shall comply with the provisions of Chapter 11 of the *International Building Code* for Group R-3. For the purpose of applying the requirements of IBC chapter 11, *guestrooms* shall be considered sleeping units.

Exception: Lodging houses.

Reason: Residential and institutional occupancies with 6 or more residents are within the scope of the IBC only and cannot be constructed under the IRC. This is based on both the scope of the IRC and IBC. Scoping provisions of the IRC and IBC, and code provisions within the IBC permit some residential and institutional occupancies with 5 or fewer occupants to be constructed in accordance with the IRC as an alternative to compliance with the IBC. The IBC occupancies that allow use of the IRC for five or fewer guests are: Group R-3 lodging houses (see G40-13), lodging houses are also in the scope of the IRC in section 101.2 #2; section 308.3.1 for Group I-1 and 308.4.1 for Group I-2.

Per the 2010 ADA Standard for Accessible Design and the IBC 1103.2.11 owner occupied lodging houses with 5 or fewer guests are not required to be accessible. So compliance with the IRC works for this condition without causing any conflicts with the IBC. If the lodging house is not owner occupied or accommodates more than 5 guests the building is outside of the scope of the IRC and accessibility is addressed since the building will be constructed per the IBC.

The issue addressed by this code change is how to handle 2012 IBC Sections 308.3.1 for I-1 and 308.4.1 for I-2. These sections classify the building as Group R-3 or allow use of the IRC for these institutional uses that have 5 or fewer care recipients. If it is classified as Group R-3 then IBC section 1107.6.3 provides requirements for accessibility of the building. Clearly the intent of Section 1107.6.3 is that if you have 4 or 5 care recipients the "sleeping units" must be Type B (subject to Section 1107.7 exceptions). The problem is that IRC structures by scope and definition do not have sleeping units:

> **R101.2 Scope.** The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, *alteration,* movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures.*
>
> **DWELLING.** Any building that contains one or two *dwelling units* used, intended, or designed to be built, used, rented, leased, let or hired out to be occupied, or that are occupied for living purposes.

Adding the IBC definition of sleeping units to the IRC does not work because IBC sleeping units are not part of a dwelling unit. The current IBC definition of sleeping units states that "Such rooms and spaces that are also part of a dwelling unit are not sleeping units". Having a building constructed under the IRC that is not a dwelling unit, but a building with multiple sleeping units, is outside of the scope of the IRC.

Any of the Group I uses for 5 and under that are built to the IRC should have the same accessibility requirements as a Group R-3 constructed building. The IRC does not have sleeping units. Under the IRC such facilities are a dwelling unit with guest rooms. While the IRC contains a definition for guestroom, it is not clear on how the guestrooms should be counted for accessibility. Since the resident rooms are not sleeping units but guest rooms the current Section R320.1 does not require accessibility per Chapter 11 of the IBC for any IRC structures that have multiple guest rooms in one dwelling unit. The solution proposed here is to delete sleeping units from Section R320.1 to remove the confusion about the scope of sleeping units in the IRC and to add new Section R320.1.1 to address guestrooms. The statement that guestrooms shall be considered sleeping units for the purpose of applying IBC Chapter 11 is necessary because we cannot change the IBC language until the 2018 cycle. We plan to propose a more coordinated change for both the IBC and IRC to address this issue in the 2018 cycle. The exception for lodging houses is to maintain the exemption from accessibility requirements for lodging houses consistent with IBC Section 1103.2.11.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party.

The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/default.aspx. Since its inception in April/2005, the CTC has held twenty five meetings - all open to the public.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it provided a useful pointer to the related provisions in the International Building Code.

Assembly Action: **None**

Public Comments

Public Comment:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee and Steve Orlowski, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R320.1 Scope. Where there are four or more *dwelling* units in a single structure, the provisions of Chapter 11 of the *International Building Code* for Group R-3 shall apply.

R320.1.1 Guest rooms. A dwelling with guestrooms shall comply with the provisions of Chapter 11 of the *International Building Code* for Group R-3. For the purpose of applying the requirements of IBC chapter 11, *guestrooms* shall be considered sleeping units.

> **Exception:** ~~Lodging houses.~~ <u>Owner-occupied lodging houses with five or fewer guestrooms constructed in accordance with the *International Residential Code* are not required to be accessible.</u>

Commenter’s Reason: The original proposed language deals with townhouses and group homes/hotels separately. Unfortunately, with the passage of both RB177 and RB178, the result will be confusing. The proposed modification to the exception would do 3 things:

1. Include the more specific language for the exception in RB178
2. More closely align with IRC scoped for lodging houses (i.e., bed-n-breakfast), and
3. Would be consistent with the exemption IBC Group R-1 in Section 1103.2.11 (i.e., bed-n-breakfast).

The IRC scope now includes some small group homes, live/work units and bed-n-breakfast hotels. The 2012 IRC scope, Section 101.2, Exception 2, is limited to “Owner-occupied lodging houses with five or fewer guestrooms shall be permitted to be constructed in accordance with the IRC when equipped with a fire sprinkler system in accordance with Section P2904.”

Guestrooms and lodging houses are defined in the IRC (see definitions below). Sleeping units are not defined in the IRC, but they are relevant to Fair Housing/Type B unit requirements.

Guestroom – Any room or rooms used or intended to be used by one or more guests for living or sleeping purposes.

Lodging House – A one-family dwelling, where one or more occupants are primarily permanent in nature, and rent is paid for guest rooms.

While some may not prefer to define sleeping rooms in group homes as guestrooms, with the current language, that is the best fit. The CTC will be looking at this next cycle to try and coordinate accessibility requirements and language between the IBC and IRC. They will also look at accessibility for live/work units.

This solution is supported by the proponents of both proposals, RB177 and RB178.

Final Hearing Results

RB177-13 **AMPC**

Code Change No: RB180-13

Original Proposal

Section(s): R322.1, R322.1.6, R322.1.8, R322.1.9, R322.2, R322.2.1, R322.3, R322.3.2, R322.3.3, R322.3.4, and R106.1.3

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov; Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows:

R322.1 General. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones and Coastal A Zones) as established in Table R301.2(1) shall be designed and constructed in accordance with the provisions contained in this section. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

R322.1.6 Protection of mechanical and electrical systems. Electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall be located at or above the elevation required in Section R322.2 (flood hazard areas including A Zones) or R322.3 (coastal high-hazard areas including V Zones and Coastal A Zones). If replaced as part of a substantial improvement, electrical systems, equipment and components; heating, ventilation, air conditioning and plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

> **Exception:** Locating electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment is permitted below the elevation required in Section R322.2 (flood hazard areas including A Zones) or R322.3 (coastal high-hazard areas including V Zones and Coastal A Zones) provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in accordance with ASCE 24. Electrical wiring systems are permitted to be located below the required elevation provided they conform to the provisions of the electrical part of this code for wet locations.

R322.1.8 Flood-resistant materials. Building materials used below the elevation required in Section R322.2 (flood hazard areas including A Zones) or R322.3 (coastal high-hazard areas including V Zones and Coastal A Zones) shall comply with the following:

1. All wood, including floor sheathing, shall be pressure-preservative-treated in accordance with AWPA U1 for the species, product, preservative and end use or be the decay–resistant heartwood of redwood, black locust or cedars. Preservatives shall be listed in Section 4 of AWPA U1.
2. Materials and installation methods used for flooring and interior and exterior walls and wall coverings shall conform to the provisions of FEMA-TB-2.

R322.1.9 Manufactured homes. New or replacement manufactured homes shall be elevated in accordance with Section R322.2 (flood hazard areas including A Zones) or Section R322.3 in coastal high-hazard areas (V Zones and Coastal A Zones). The anchor and tie-down requirements of Sections

AE604 and AE605 of Appendix E shall apply. The foundation and anchorage of manufactured homes to be located in identified floodways shall be designed and constructed in accordance with ASCE 24*.*

R322.2 Flood hazard areas (including A Zones). All areas that have been determined to be prone to flooding but not subject to high-velocity wave action shall be designated as flood hazard areas. Flood hazard areas that have been delineated as subject to wave heights between 1.5 feet and 3 feet or otherwise designated by the jurisdiction shall be designated as Coastal A Zones and are subject to the requirements in Section R322.3. All buildings and structures constructed in whole or in part in flood hazard areas shall be designed and constructed in accordance with Sections R322.2.1 through R322.2.3.

R322.2.1 Elevation requirements.

1. Buildings and structures in flood hazard areas not designated as Coastal A Zones shall have the lowest floors elevated to or above the design flood elevation.
~~2. Buildings and structures in flood hazard areas designated as Coastal A Zones shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or to the design flood elevation, whichever is higher.~~
2.~~3~~ In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet (mm) on the FIRM, or at least 2 feet (610 mm) if a depth number is not specified.
3.4 Basement floors that are below grade on all sides shall be elevated to or above the design flood elevation.

Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R322.2.2.

R322.3 Coastal high-hazard areas (including V Zones and Coastal A Zones, where designated). Areas that have been determined to be subject to wave heights in excess of 3 feet (914 mm) or subject to high-velocity wave action or wave–induced erosion shall be designated as coastal high-hazard areas. Flood hazard areas that have been delineated as subject to wave heights between 1.5 feet and 3 feet or otherwise designated by the jurisdiction shall be designated as Coastal A Zones. All buildings and structures constructed in whole or in part in coastal high-hazard areas and in Coastal A Zones, where designated, shall be designed and constructed in accordance with Sections R322.3.1 through R322.3.6.

R322.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing, is:
1.1 Located at or above the design flood elevation, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees from the direction of approach, or
1.2 Located at the base flood elevation plus one foot (305 mm), or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees from the direction of approach.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings, and for support of parking slabs, pool decks, patios, and walkways.

Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5.

R322.3.3 Foundations. All buildings and structures erected in coastal high-hazard areas and Coastal A Zones, shall be supported on pilings or columns and shall be adequately anchored to such pilings or columns. The space below the elevated building shall be either free of obstruction or, if enclosed with walls, the walls shall meet the requirements of Section R322.3.4. Piling shall have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift). Water loading values used shall be those associated with the design flood. Wind loading values shall be those required by this code. Pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling. Pile systems design and installation shall be certified in accordance with Section R322.3.6. Spread footing, mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the spread footing, mat, raft or other foundation is subject to scour or erosion from wave–velocity flow conditions. If permitted, spread footing, mat, raft or other foundations that support columns shall be designed in accordance with ASCE 24. Slabs, pools, pool decks and walkways shall be located and constructed to be structurally independent of buildings and structures and their foundations to prevent transfer of flood loads to the buildings and structures during conditions of flooding, scour or erosion from wave-velocity flow conditions, unless the buildings and structures and their foundation are designed to resist the additional flood load.

> **Exception:** In Coastal A Zones, stem wall foundations supporting a floor system above and backfilled with soil or gravel to the underside of the floor system shall be permitted provided the foundations are designed to account for wave action, debris impact, erosion, and local scour. Where soils are susceptible to erosion and local scour, stem wall foundations shall have deep footings to account for the loss of soil.

R322.3.4 Walls below design flood elevation. Walls and partitions are permitted below the elevated floor, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical, and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a design safe loading resistance of not less than 10 (479 Pa) and no more than 20 pounds per square foot (958 Pa); or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), the construction documents shall include documentation prepared and sealed by a registered design professional that:
   - 4.1. The walls and partitions below the design flood elevation have been designed to collapse from a water load less than that which would occur during the design flood.
   - 4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on all building components (structural and nonstructural). Water loading values used shall be those associated with the design flood. Wind loading values used shall be those required by this code.
5. In Coastal A Zones walls shall be provided with flood openings that meet the criteria of Section 322.2.2.

Add new text as follows:

R106.1.3 Information for construction in flood hazard areas. For buildings and structures located in whole or in part in flood hazard areas as established by Table R301.2(1), construction documents shall include:

1. Delineation of flood hazard areas, floodway boundaries and flood zones and the design flood elevation, as appropriate;

2. The elevation of the proposed lowest floor, including basement; in areas of shallow flooding (AO zones), the height of the proposed lowest floor, including basement, above the highest adjacent finished grade; and
3. The elevation of the bottom of the lowest horizontal structural member in coastal high hazard areas (V Zone) <u>and in Coastal A Zones where such zones are delineated on flood hazard maps identified in Table R301.2(1) or otherwise designated by the jurisdiction</u>; and
4. If design flood elevations are not included on the community's Flood Insurance Rate Map (FIRM), the building official and the applicant shall obtain and reasonably utilize any design flood elevation and floodway data available from other sources.

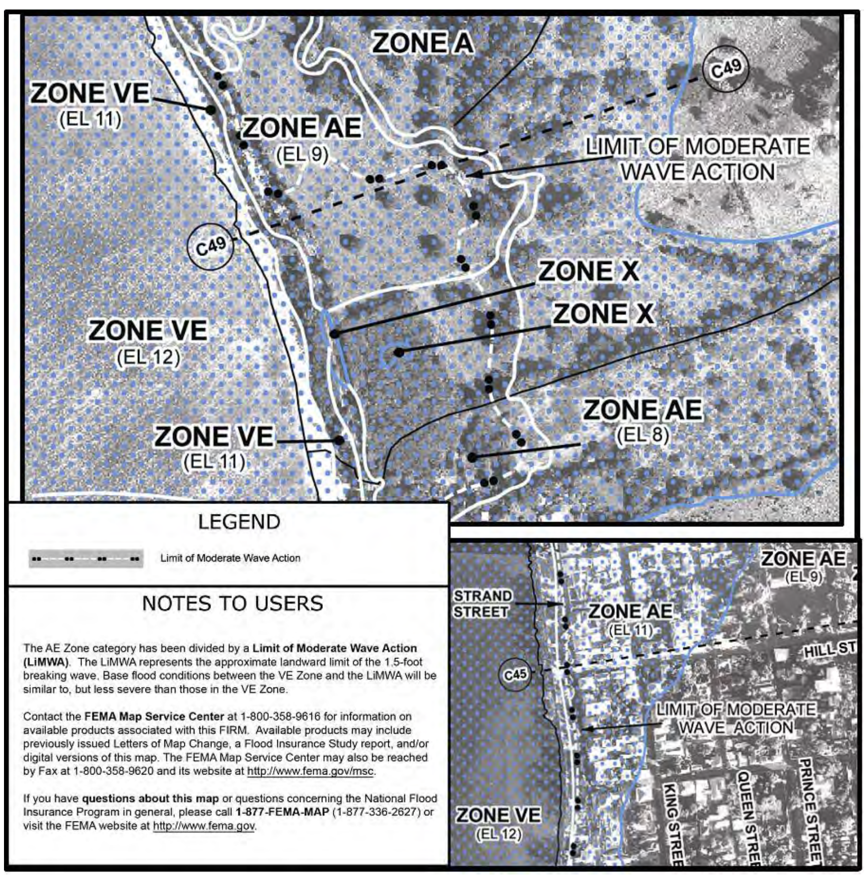
Reason: This proposal would require that dwellings in areas designated as "Coastal A Zones" meet the requirements of Section 322.3 for dwellings in coastal high hazard areas (Zone V), including open foundations (pilings or columns) with an exception that permits filled stemwalls.

The Coastal A Zone (CAZ) has been in ASCE 7 since the late '90s and in ASCE 24 since its initial publication in 1998. Recognition of CAZ was added to the 2009 edition of IRC Section R322.2, with the only requirement that if the area subject to waves between 1.5 ft and 3 ft is delineated, then the area is designated a Coastal A Zone and lowest floors shall be at least one-foot above the design flood elevation (i.e., in all other respects, the 2009 and 2012 IRC requires dwellings in Coastal A Zones to comply with the requirements for Zone A).

The inland boundary of the coastal high hazard area (Zone V) is drawn by FEMA where breaking wave heights are expected to drop below 3.0 ft during base flood conditions. The requirements for foundations of dwellings that are located just landward of the Zone V boundary are predicated on the assumption that hydrodynamic loads associated with waves – even waves that are 2.9-ft – are not significant and that conventional foundations such as perimeter walls can resist those loads and associated erosion and local scour.

FEMA's many post-disaster investigations after severe coastal storms have long recommended application of coastal high hazard area (Zone V) requirements to areas inland of the Zone V/Zone A boundary – in the area subject to waves between 1.5 ft and 3 ft – the area now referred to as "Coastal A Zone". Starting in fiscal year 2009, all coastal flood studies by FEMA will include analyses of moderate wave action and FIRMs will show the Limit of Moderate Wave Action (LiMWA).

The total land area that is likely to be designated as CAZ is small. FEMA has estimated that less than 3 percent of all mapped flood hazard areas are Zone V and the LiMWA generally is determined to be a relatively short distance inland from the Zone V boundary. The graphic below is from the December 2008 Procedure Memorandum No. 50 which established FEMA's policy to delineate the LiMWA on FIRMs



Every FEMA publication on coastal construction since mid-2000 has recommended the use of Zone V construction requirements in Coastal A Zones. As early as 1979 some communities were augmenting the minimum NFIP requirements because of observed wave damage to conventional, closed foundations (Santa Rosa Island Authority, Florida, 1979). FEMA's first Coastal Construction Manual, published in 1981, recognized that "high velocity water may be experienced due to the forward momentum of breaking waves, especially in the vicinity of the V zone/A zone interface." The defined term "Coastal A Zone" is used in the 1986 revision of the Coastal Construction Manual, and numerous papers and investigations have followed. Research performed in 1992 for the U.S. Army Corps of Engineers demonstrated that buildings on typical Zone A foundations (masonry walls, masonry piers, shallow piles, and slabs) "would be subject to failure for shallow erosion and /or wave heights less than 2-3 feet."

Observations after Superstorm Sandy continue to reinforce the damage potential in areas just inland of the Zone V boundary. FEMA's report based on field investigations will be completed mid-2013. Given that open foundations (piles and columns) perform well under velocity and wave conditions, FEMA believes it is time for the IRC to acknowledge that dwellings in Coastal A Zones should meet the same requirements as dwellings in coastal high hazard areas – with the exception of filled stemwalls that account for the potential for scour and erosion. Surveys and press reports after major coastal events such as Superstorm Sandy regularly report that citizens support stricter requirements (see www.reuters.com/article/2012/11/27/us-storm-sandy-newjersey-idUSBRE8AQ0V620121127, http://blog.nj.com/njv_editorial_page/2012/11/editorial_rebuild_carefully.html).

Cost Impact: This proposal will increase the cost of construction in areas shown on Flood Insurance Rate Maps as seaward of the Limit of Moderate Wave Action (or if a community elects to designate areas as "Coastal A Zones"). However, the risk of wave-induced damage or damage due to erosion and local scour is significantly reduced.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee disapproved this code change proposal because they felt that the regulatory process provides an opportunity for everyone to participate, that is what congress intended and that is the procedure that needs to be followed. The proposal does not take into account that all coastal areas are not the same with regard to weather or wave action, yet this proposal applies to thousands and thousands of existing and new dwellings. Pulling coastal A areas into V Zones has far reaching implications. There have not been enough studies to justify this.

Assembly Action: None

Public Comment

Public Comment:

Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency; Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency, requests Approval as Submitted.

Commenter's Reason: The committee action on this proposal was Disapproval. The reasons for disapproval are not accurate and appear to be based on a misunderstanding of the forces associated with wave action, FEMA's initiative to delineate areas subject to moderate wave action areas on Flood Insurance Rate Maps, and how those areas are determined. When FEMA delineates such areas, a Limit of Moderate Wave Action (LiMWA) is shown on the FIRM and the area between the LiMWA and the Zone V boundary is called the Coastal A Zone (see R322.2).

By definition, the engineering analyses that evaluate wave action take into account that all coastal areas are not the same. Many locational factors are considered when FEMA evaluates whether to delineate a LiMWA, including fetch (length of open water over which wind blows to generate waves), orientation of the shoreline to prevalent direction of wind and waves, land elevation relative to water depths, and the presence of dunes, buildings, and other elements of the landscape that have the effect of breaking up waves. Many reaches of shoreline subject to tidal flooding do not have conditions that produce moderate wave action, in which case the FIRM will not show a LiMWA.

The concept of the Coastal A Zone and recognition of the fact that waves inland of the Zone V boundary, while less than 3-ft in height, cause damage was first documented in a paper presented by FEMA at the 1990 conference of the Association of State Floodplain Managers. Many subsequent studies and reports, and post-disaster investigations, have reinforced that finding.

For more than 20 years FEMA has documented Mitigation Assessment Team investigations that were conducted after many major coastal disasters. Virtually every report identifies damage due to moderate waves and calls for application of Zone V requirements: Hurricane Opal (1995), Hurricane Fran (1996), Hurricane Georges (1998), Hurricane Isabel (2003), Hurricane Ivan (2004), Hurricane Dennis (2005), Hurricane Katrina (2005), and Hurricane Ike (2008). In addition, the 1998 editions of ASCE 7 and ASCE 24 require consideration of moderate wave action and application of Zone V requirements in Coastal A Zones.

Observations after last year's Hurricane Sandy continue to reinforce the damage potential in open coast areas just inland of the Zone V boundary. FEMA's report based on field investigations will be completed mid-2013.

Given that open foundations (piles and columns) perform well under velocity and wave conditions, it is time for the IRC to acknowledge that dwellings in Coastal A Zones should meet the same requirements as dwellings in Zone V. The exception, as specified in the code proposal, is filled stemwalls that provide resistance to wave loads and that have deeper footings that account for the potential for scour and erosion. Surveys and press reports after major coastal events regularly report that citizens support stricter requirements (see http://www.reuters.com/article/2012/11/27/us-storm-sandy-newjersey-idUSBRE8AQ0V620121127 and http://blog.nj.com/njv_editorial_page/2012/11/editorial_rebuild_carefully.html).

Final Hearing Results

RB180-13	**AS**

Code Change No: RB182-13

Original Proposal

Section(s): **R322.1.5**

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows:

R322.1.5 Lowest floor. The lowest floor shall be the <u>lowest</u> floor of the lowest enclosed area, including basement, but excluding any unfinished flood-resistant enclosure that is useable solely for vehicle parking, building access or limited storage provided that such enclosure is not built so as to render the building or structure in violation of this section.

Reason: The addition makes this provision match the definition in the NFIP regulations at 44 CFR 59.1 which is shown below (bold emphasis added to show where in the federal definition the word appears):

> "Lowest Floor means the **lowest** floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of Sec. 60.3."

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it clarifies the code.

Assembly Action: **None**

Final Hearing Results

RB182-13	**AS**

Code Change No: RB183-13

Original Proposal

Section(s): R322.1.8

Proponent: Dennis Pitts, American Wood Council, representing American Wood Council (dpitts@awc.org)

Revise as follows:

R322.1.8 Flood damage-resistant materials. Building materials and installation methods used below the elevation required in Section R322.2 (flood hazard areas including A Zones) or R322.3 (coastal high-hazard areas including V Zones) shall be flood damage-resistant materials that conform to the provisions of FEMA TB-2. ~~comply with the following:~~

1. ~~All wood, including floor sheathing, shall be pressure-preservative-treated in accordance with AWPA U1 for the species, product, preservative and end use or be the decay–resistant heartwood of redwood, black locust or cedars. Preservatives shall be listed in Section 4 of AWPA U1.~~
2. ~~Materials and installation methods used for flooring and interior and exterior walls and wall coverings shall conform to the provisions of FEMA-TB-2.~~

Reason: This proposal reflects changes approved to the IBC in FS150-12. Adoption of this change will make the IBC and IRC consistent. The specific requirement for preservative-treated wood or naturally decay-resistant wood below the elevation required in Section R322.2 is deleted because wood products such as plywood sheathing, plywood panel siding, and stud walls have been shown to be resistant to the effects of flood exposure without the aid of preservatives or the use of naturally durable wood.

Primary considerations for material performance and use in flood hazard areas are outlined in FEMA *TB2, Flood Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas*, which is already referenced in the IRC. A flood damage resistant material is one that is "… capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage." Evaluation consists of consideration of material performance following 72 hour immersion and presence of only limited damage requiring no more than cosmetic repair (i.e. cleaning, sanitizing and resurfacing such as sanding, repair of joints, repainting). Research conducted by Oak Ridge National Laboratory and Tuskegee University (ORNL/TM-2005/34 *Field Testing of Energy-Efficient Flood-Damage-Resistant Residential Envelope Systems Summary Report,* June 2004) and field observations of material performance from actual floods were considerations in the update of FEMA TB2-2008. Within TB2 examples of wood that are not required to be preservative treated for flood damage resistance that may form a part of exterior walls and floors include studs and Exterior and Marine plywood used as wall sheathing. While preservative treated studs and preservative treated exterior plywood sheathing were not tested in the ORNL/Tuskegee study, it is not expected that presence of preservative treatment would improve the already acceptable performance of these materials.

General requirements for preservative treated or naturally durable wood for protection from decay and termites are addressed elsewhere in the IRC, and those applications will continue to be in effect, including in flood hazard areas.

Cost Impact: No increase in the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

R322.1.8 Flood damage-resistant materials. Building materials and installation methods used for flooring and interior and exterior walls and wall coverings below the elevation required in Section R322.2 (flood hazard areas including A Zones) or R322.3 (coastal high-hazard areas including V Zones) shall be flood damage-resistant materials that conform to the provisions of FEMA TB-2.

Committee Reason: The committee approved this code change proposal because they felt that it clarifies where flood damage-resistant materials are required. The modification added language that specified the affected building components, thereby further clarifying the code.

Assembly Action: **None**

Final Hearing Results

RB183-13	**AM**

Code Change No: RB185-13

Original Proposal

Section(s): R322.1.9

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows:

R322.1.9 Manufactured homes. New or replacement *manufactured homes* shall be elevated in accordance with Section R322.2 (flood hazard areas including A Zones) or Section R322.3 in coastal high-hazard areas (V Zones). The anchor and tie-down requirements of the applicable state or federal requirements ~~Sections AE604 and AE605 of Appendix E~~ shall apply. The foundation and anchorage of *manufactured homes* to be located in identified floodways shall be designed and constructed in accordance with ASCE 24.

Reason: Many states and local jurisdictions do not adopt IRC Appendix E. Rather than point to an appendix that is rarely adopted, this proposal replaces the requirement for anchor and tie-downs with a general reference to state or federal requirements. This permits compliance with state manufactured home installation standards or HUD's installation standards, whichever is required. HUD's regulations at CFR § 3285.302 specifies that "foundations, anchoring, and support systems must be capable of resisting loads associated with design flood and wind events or combined wind and flood events, and homes must be installed on foundation supports that are designed and anchored to prevent floatation, collapse, or lateral movement of the structure."

Cost Impact: None; no change in requirements for anchoring and tie-down, just change to citation to the requirements.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it provides a better reference point since all 50 states do not always agree and compliance under this proposal can be with the applicable state requirements.

Assembly Action: **None**

Final Hearing Results

RB185-13	**AS**

Code Change No: RB186-13

Original Proposal

Section(s): R322.1.9

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows:

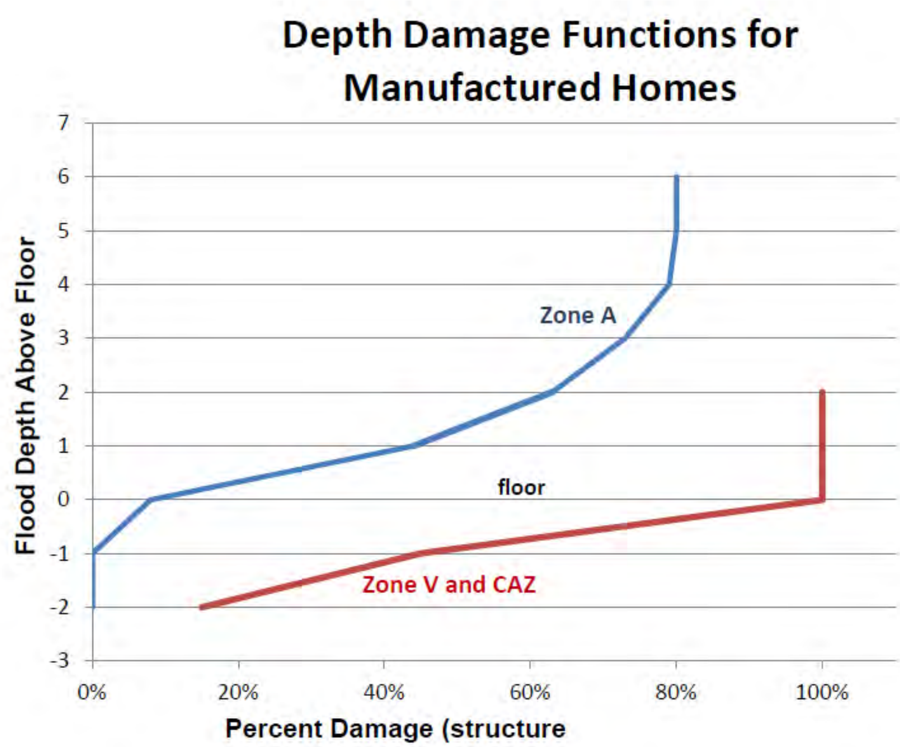
R322.1.9 Manufactured homes. The bottom of the frame of new and ~~New or~~ replacement manufactured homes on foundations that conform to the requirements of Section R322.2 or Section R322.3, as applicable, shall be elevated to or above the elevations specified in ~~accordance with~~ Section R322.2 (flood hazard areas including A Zones) or Section R322.3 in coastal high-hazard areas (V Zones). The anchor and tie-down requirements of Sections AE604 and AE605 of Appendix E shall apply. The foundation and anchorage of manufactured homes to be located in identified floodways shall be designed and constructed in accordance with ASCE 24

Reason: This proposal is based on the fact that manufactured homes are the most vulnerable type of structures in terms of risk of flood damage. The figures below illustrate how damage increases dramatically for just one foot of water above the lowest floor (walking surface). Requiring the bottom of the frame to be the reference point means the homes will be approximately one foot above the base flood elevation. Not only will the homes be less vulnerable to damage, owners will have lower flood insurance premiums.

The figure below is based on the data found in Table B-10 (Coastal A Zones and V Zones) and Table B-17 (all other SFHAs) *FEMA Benefit-Cost Analysis Re-engineering (BCAR), Flood Module Revision: Updates to Residential Depth Damage Functions (DDFs) and Guidance for Coastal Flooding* (January 2011; version 4.5.5). The riverine depth damage function curves for manufactured homes were originally developed by the NFIP many years ago and been used in FEMA's Benefit-Cost Analysis (BCA) software for years. FEMA convened an expert panel in 2010 to develop updated DDFs coastal high hazard areas and Coastal A Zones for various residential structures including manufactured homes.

The depth-damage functions show that a manufactured home in a Zone A will sustain more about 8% structure damage if floodwaters rise just to the elevation of the lowest floor (the walking surface), and more than 40% if water rises one foot higher. By requiring elevation based on the bottom of the frame, virtually no damage would be expected during base flood conditions.

If located in a Zone V or Coastal A Zone, the curve shows that a manufactured home will sustain nearly 100% damage if floodwaters rise to the elevation of the lowest floor. IRC R322.3.2 already references the bottom of the lowest horizontal structural member, which is the bottom of the frame.



Cost Impact: The cost of a foundation in Zone A will be marginally higher because of the approximately one additional foot that will have to be added to the foundation. The requirement to conform to the foundation requirements based on flood zone has always been implicit in the NFIP requirement that manufactured homes be "elevated on a permanent foundation . . . and be securely anchored to an adequately anchored foundation system to resist floatation collapse and lateral movement" (see 44 CFR 60.3(c)(6)).

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it is good guidance for the code official to have and is aligned with NFIP.

Assembly Action: **None**

Final Hearing Results

RB186-13 **AS**

Code Change No: RB188-13

Original Proposal

Section(s): R322.2.1, R322.3.2

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (gregory.p.wilson@dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows:

R322.2.1 Elevation requirements.

1. Buildings and structures in flood hazard areas, including flood hazard areas ~~not~~ designated as Coastal A Zones, shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
~~2. Buildings and structures in flood hazard areas designated as Coastal A Zones shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or to the design flood elevation, whichever is higher.~~
2.~~3~~ In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet (mm) on the FIRM plus 1 foot (305 mm), or at least 3 feet (15 mm) ~~2 feet (610 mm)~~ if a depth number is not specified.
3.~~4~~ Basement floors that are below grade on all sides shall be elevated to or above base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.

   Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R322.2.2.

R322.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high-hazard areas shall be elevated so that the bottom of the lowest ~~portion of all~~ horizontal structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher.
   ~~1.1 Located at or above the design flood elevation, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees (0.35 rad) from the direction of approach, or~~
   ~~1.2 Located at the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees (0.35 rad) from the direction of approach.~~
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

   Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5.

Reason: The purpose of this code change is to reduce flood risks on homes by adding a factor of safety of one-foot of additional height (called freeboard) to the elevation requirements. This proposal will align the IRC with the elevation requirements for Category II buildings (includes Group R), by reference to ASCE 24 which requires elevation to BFE + 1 or DFE, whichever is higher.

This statement identifies several reasons to add just one foot to the elevation requirements to the IRC.

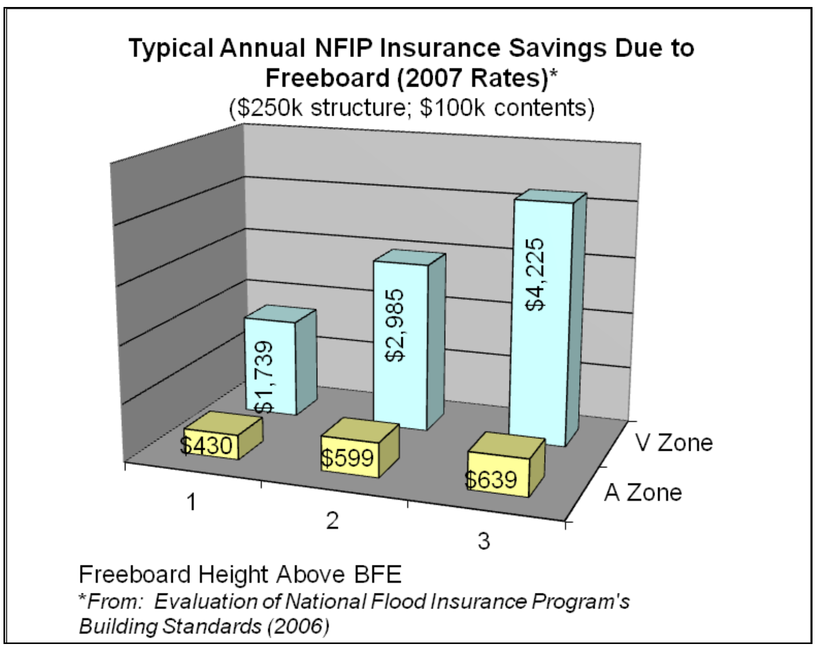
More than 20 states adopt the I-Codes at the state level and mandate local enforcement. Many of those states do not permit communities to modify the code. Some states do not explicitly recognize that communities may have a "stand alone" floodplain management ordinance that includes requirements for buildings, including elevation, and some provide that only the building code governs buildings (which may have the effect of nullifying building requirements in local ordinances). It is no longer valid to argue that the IRC should not provide reasonable protection of just one additional foot of elevation for dwellings based on the assumption that communities can separately adopt higher standards.

In New Jersey and New York, about 43 percent of the areas flooded by Superstorm Sandy had water that rose above the BFE (according to preliminary analyses). Of the land area where flooding exceeded BFE, about half was between BFE and BFE +1, and about a quarter was between BFE + 1 and BFE + 2. Although there isn't a count of the total number of flooded homes in those areas, it's easy to see that if lowest floors had been elevated just one foot higher, the majority would have had considerably less damage. According to a Quinnipiac University Polling poll taken shortly after Superstorm Sandy and cited by Reuters, "Seven in 10 New Jersey voters favored rebuilding the Jersey Shore under stricter building codes, including three-quarters of shore residents."

An independent report prepared for FEMA, *Evaluation of the National Flood Insurance Program's Building Standards* (October 2006), provides clear evidence of the benefits associated with adding freeboard. It documents the added costs (as a percent of the cost of building to the base flood elevation) and the benefits of adding freeboard. Approximately 1,500 combinations of house size, foundation type, flood zone, flood elevation, freeboard added, and discount rate were evaluated. The benefits considered are two-fold: flood damages avoided and flood insurance premium savings.

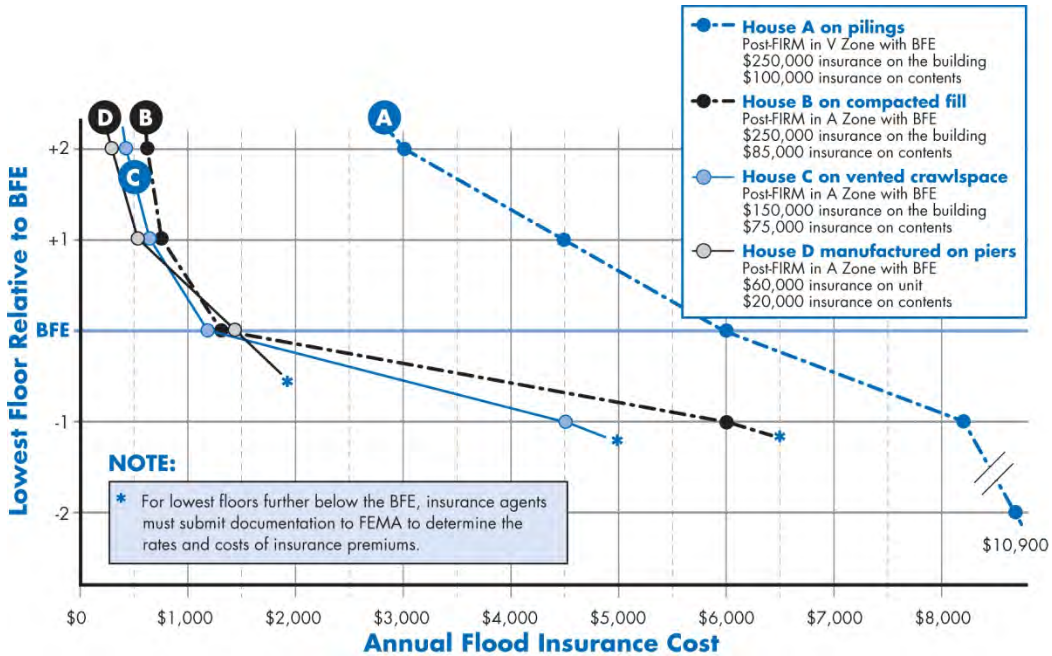
The report concluded that – based on flood damages avoided only -- it is worth spending an additional percentage of the at-BFE building cost to incorporate freeboard, where the percentage generally ranges from less than 1% to 5% for one-foot of freeboard, depending on the flood hazard zone. The cost of adding one-foot of freeboard, on the other hand, ranged from 0.25% to 3% of the at-BFE building cost (see cost statement below) depending on the type of foundation and the flood hazard zone. The flood damage reduction benefits of BFE + 1 ft outweighed the costs of constructing that freeboard in all but a few cases (e.g., where large quantities of fill are already needed to raise a Zone A building to the BFE).

The savings in insurance premium reduction (see graphic), which are realized by every homeowner for the life of the building, are <u>on top of savings</u> associated with avoiding future damage. Flood insurance premium savings alone can recover the added cost of freeboard in just a few years. Importantly, the report acknowledges that the computed benefits "are conservative, and will understate the true benefits" because some avoided costs are not accounted for, including clean-up and demolition costs, debris disposal costs, uninsured losses, displacement and relocation costs, loss of jobs and tax base, etc.



Additional substantiation for the additional elevation requirement is found in the insurance rating structure of the NFIP which bases rates for new buildings as a function of risk. Freeboard reduces risk because the lowest floors of buildings are elevated above the predicted flood levels associated with the base (100-year) flood. This risk reduction is reflected in reduced insurance rates, with reductions of 20% or more for the first foot of freeboard above the base flood elevation. The graphic below shows examples of how the cost of insurance varies as a function of elevation (based on insurance rates in effect in 2009). Note: the graphic illustrates insurance costs for four scenario dwellings with different foundation types and different values of the structure and contents; it should not be used for any purpose other than to illustrate the general variation in costs as a function of elevation. In

Zone V, the annual cost of flood insurance is approximately 25% less if a number is one foot higher than the minimum (House A). In Zone A, the annual cost is approximately 40% less.



Further substantiation for this code change is found in Mitigation Assessment Team reports prepared by teams of experts assembled by FEMA after significant disasters. Reports prepared after hurricanes and flood disasters include recommendations to reduce future damage, including adding at least one-foot of freeboard (see bibliography). Specific recommendations are to adopt freeboard requirements that are consistent with those specified in ASCE 24.

Bibliography:

Mitigation Assessment Team reports published by FEMA, including: FEMA 490 Summary Report on Building Performance: 2004 Hurricane Season 2005); FEMA 549 Mitigation Assessment Team Report: Hurricane Katrina in the Gulf Coast (2006); FEMA P-757 Hurricane Ike in Texas and Louisiana (2009); FEMA P-765 Midwest Floods of 2008 in Iowa and Wisconsin (2009). Available online: http://www.fema.gov/fema-mitigation-assessment-team-reports

American Institutes for Research (October 2006), *Evaluation of the National Flood Insurance Program's Building Standards.* Available online: www.fema.gov/business/nfip/nfipeval.shtm.

Reuters. http://www.reuters.com/article/2012/11/27/us-storm-sandy-newjersey-idUSBRE8AQ0V620121127

Cost Impact: This code change will increase the initial cost of construction. The anticipated damage avoided because of the higher level of protection, other savings realized by owners, and the lower annual cost of federal flood insurance justify the added initial construction costs. Flood insurance premium savings alone can recover the added cost of freeboard in just a few years. As cited in the *Evaluation of the National Flood Insurance Program's Building Standards* (2006), the added cost is a function of the type of foundation. However, estimates of the cost increase over the cost to build a foundation at the base flood elevation range from less than 1% to 3% of to add one foot of freeboard, where the lower range is applicable to pile or masonry pier foundations and the upper end of the range applies to masonry walls with interior piers (crawlspace). The cost increase to add freeboard when placing fill to raise a slab-on-grade foundation is somewhat higher because the fill quantity and therefore costs do not increase linearly with added height. There is no requirement to use fill; lower-cost foundation types can be used.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that the difference of one foot is minor in relation to the safety and long term cost benefits. This proposal increases safety related to flooding and any increased initial costs are offset by lower costs for flood insurance.

Assembly Action: **None**

Final Hearing Results

RB188-13	**AS**

Code Change No: RB189-13

Original Proposal

Section(s): R322.2.2, R322.2.2.1 (New)

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows:

R322.2.2 Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria and are installed in accordance with Section R322.2.2.1:
   - ~~2.1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.~~
   - 2.1. ~~2.2~~ The total net area of all openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area where the enclosed area is measured on the exterior of the enclosure walls, or the openings shall be designed as engineered openings and the construction documents shall include a statement by a registered design professional that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.6.2.2 of ASCE 24.
   - ~~2.3. The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.~~
   - 2.2 ~~2.4~~ Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the all.
   - ~~2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area.~~
   - 2.3 The presence of louvers, blades, screens and faceplates or other covers and devices shall not block or impede the automatic flow of floodwaters into and out of the enclosed areas and shall be accounted for in the determination of the net open area.
   - ~~2.6. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.~~

R322.2.2.1 Installation of openings. The walls of enclosed areas shall have openings installed such that:

1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
2. The bottom of each opening shall be not more than 1 ft (305 mm) above the higher of the final interior grade or floor and the finished exterior grade immediately under each opening.
3. Openings shall be permitted to be installed in doors and windows; doors and windows without installed openings do not meet the requirements of this section.

Reason: The primary purpose of this proposal is to reorganize to put all of the installation requirements in a separate section, separating installation from the requirements that apply to the openings themselves. There are only two minor clarifications in

R322.2.2 about the openings themselves: (1) the square foot area of enclosures is to be measured from the outside; and (2) the net open area calculation has to take into account if there are louvers, blades, screens and faceplates because their presence affects the flow of water.

There is only one clarification in the proposed R322.2.2.1 for installation, and that is to specify that how high openings are installed in walls depends on the higher of the exterior finished grade or the interior grade (crawlspace) or floor (e.g., garage or stairwell). These changes are consistent with FEMA's NFIP Technical Bulletin 1, Openings in Foundation Walls and Walls of Enclosures http://www.fema.gov/plan/prevent/floodplain/techbul.shtm and similar to the provisions of the revised ASCE 24-13 that is a referenced standard in the IBC and IRC.

Cost Impact: There is no cost increase associated with this proposal because it only clarifies the existing requirement by consolidating the installation requirements.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

R322.2.2 Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria and are installed in accordance with Section R322.2.2.1:
   - 2.1. The total net area of ~~all~~ non-engineered openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area where the enclosed area is measured on the exterior of the enclosure walls, or the openings shall be designed as engineered openings and the construction documents shall include a statement by a registered design professional that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.7.2.2 ~~2.6.2.2~~ of ASCE 24.
   - 2.2 Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the all.
   - 2.3 The presence of louvers, blades, screens and faceplates or other covers and devices shall allow ~~not block or impede~~ the automatic flow of floodwaters into and out of the enclosed areas and shall be accounted for in the determination of the net open area.

R322.2.2.1 Installation of openings. The walls of enclosed areas shall have openings installed such that:

1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have ~~openings on exterior walls~~.
2. The bottom of each opening shall be not more than 1 ft (305 mm) above the higher of the final interior grade or floor and the finished exterior grade immediately under each opening.
3. Openings shall be permitted to be installed in doors and windows; doors and windows without installed openings do not meet the requirements of this section.

Committee Reason: The committee approved this code change proposal because they felt that it updates and clarifies the code. The modifications are corrections and clarifications that provide additional guidance.

Assembly Action: **None**

Final Hearing Results

RB189-13 **AM**

Code Change No: RB193-13

Original Proposal

Section(s): R322.2.4 (New), R322.3.7 (New), M2201.6

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Add new text as follows:

R322.2.4 Tanks. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood. Above-ground tanks shall be installed at or above the elevation required in Section R322.2.1 or shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood and shall be protected from impact by floating debris.

R322.3.7 Tanks. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood. Above-ground tanks shall be installed at or above the elevation required in Section R322.3.2. Where elevated on platforms, the platforms shall conform to the foundation requirements of Section R322.3.

Revise as follows:

M2201.6 Flood-resistant installation. In flood hazard areas as established by Table R301.2(1), tanks shall be installed in accordance with Section R322.2.4 (flood hazard areas including Zone A) or Section R322.3.7 (coastal high-hazard areas including Zone V). ~~at or above the elevation required in Section R322.2.1 or R322.3.2 or shall be anchored to prevent flotation, collapse and lateral movement under conditions of the design flood.~~

Reason: This proposal more clearly separates underground tanks from above-ground tanks. Dislodged tanks not only can release contents into floodwaters, but they become battering debris that can contribute to structural damage.

Underground tanks need to be installed in ways that take into consideration the fact that soils may be saturated during flooding, creating conditions that can cause tanks to be dislodged. This occurs after many flood events; most recently, problems with tanks were observed throughout the Hurricane Sandy impact area.

How above-ground tanks that serve dwellings are handled depends on flood zone. In coastal high hazard areas (Zone V) above-ground tanks have to be elevated – they may be elevated on separate platforms or on platforms that are cantilevered from the elevated building/foundation. In other flood hazard areas (Zone A) above-ground tanks may be elevated, or may be below base flood elevation, provided they are adequately anchored.

These same requirements are included in ASCE 24-13. The NFIP considers tanks as structures and structures have always been subject to the general NFIP requirement to be constructed by methods and practices that minimize flood damage and to be stable under flood conditions, both are included in the IRC at R322.1.2 and R322.1.3.

Cost Impact: None. These requirements articulate how the basic NFIP requirements (and the requirements of R322) should have been applied.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because they felt that it contained information that was not appropriate for the International Residential Code. Tanks are typically regulated by the fire code, zoning code, or fuel gas code. The proposal also lacks specificity with regard to the language "protected from impact by floating debris."

Assembly Action: **None**

Public Comments

Public Comment:

Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency; Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R322.2.4 Tanks. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood. Above-ground tanks shall be installed at or above the elevation required in Section R322.2.1 or shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood~~ and shall be protected from impact by floating debris~~.

R322.3.7 Tanks. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood. Above-ground tanks shall be installed at or above the elevation required in Section R322.3.2. Where elevated on platforms, the platforms shall <u>be cantilevered from or knee braced to the building or shall be supported on foundations that</u> conform to the ~~foundation~~ requirements of Section R322.3.

M2201.6 Flood-resistant installation. In flood hazard areas as established by Table R301.2(1), tanks shall be installed in accordance with Section R322.2.4 (flood hazard areas including Zone A) or Section R322.3.7 (coastal high-hazard areas including Zone V).

Commenter's Reason: The committee action on this code change proposal was Disapproval because the committee suggests it is not appropriate for the IRC to have requirements for tanks. However, the IRC does regulate residential oil tanks under M2201 and thus it is appropriate for Section R322 to have specific requirements. In addition, FEMA has received questions about water tanks necessary to meet the IRC fire-suppression requirements in areas without public water supply, which reinforces the value of having requirements in Section R322. The committee also objected to language regarding protection from floating debris, which is removed in this public comment. The original language in R322.3.7 is amended to provide that platforms may either be supported by foundations or be attached to buildings.

Final Hearing Results

RB193-13	**AMPC**

Code Change No: RB195-13

Original Proposal

Section(s): R322.3.2

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows:

R322.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high-hazard areas shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is:
   1.1 Located at or above the design flood elevation, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees (0.35 rad) from the direction of approach, or
   1.2 Located at the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees (0.35 rad) from the direction of approach.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.
5. Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5.

~~**Exception:** Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5.~~

Reason: This is only a format change, so that the provision is part of the requirements and not an exception. Because there are other items in this requirement that are not subject to elevation requirements (see #3 and #4), there is no reason why the requirements for walls should be written as an exception.

Cost Impact: None; no change in requirements.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposal as they felt that it was a minor change that added clarification by relocating existing language.

Assembly Action: **None**

Final Hearing Results

RB195-13	**AS**

Code Change No: RB196-13

Original Proposal

Section(s): R322.3.4

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Add new text as follows:

R322.3.4 Walls below design flood elevation. Walls and partitions are permitted below the elevated floor, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical, and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a design safe loading resistance of not less than 10 (470 Pa) and no more than 20 pounds per square foot (958 Pa); or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), the construction documents shall include documentation prepared and sealed by a registered design professional that:
   4.1. The walls and partitions below the design flood elevation have been designed to collapse from a water load less than that which would occur during the design flood.
   4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on all building components (structural and nonstructural). Water loading values used shall be those associated with the design flood. Wind loading values used shall be those required by this code.
5. Walls intended to break away under flood loads as specified in Items 3 or 4 have flood openings that meet the criteria in Section R322.2.2(2).

Reason: Breakaway walls are intended to fail under wave loads. However, experience shows that walls are breaking away under water depths and wave conditions that are less than the water depths and waves expected during the base flood. Having openings will permit the water level inside to match the water level outside, limiting failure under "shallow" flooding that occurs more frequently than the base (100-year) flood. These same requirements are included in ASCE 24-13.
Homes that are built with enclosures surrounded by breakaway walls with flood openings will sustain damage less frequently, not only to the walls themselves, but the interior of the enclosures won't be exposed to wind-driven rain and sand. In addition, with fewer wall failures there will be less debris added to floodwaters and waves which will reduce damage by battering. FEMA guidance for home builders advises use of flood openings in breakaway walls to relieve flood forces and reduce damage to walls (FEMA P-499, Fact Sheet 8.1).

Cost Impact: The additional cost to install flood openings will be offset by less frequent failure of breakaway walls. NFIP flood insurance policies do not cover claims for damage to the walls, which means owners have to bear the full cost of reconstructing breakaway walls frequently, if the walls fail under less than base flood conditions.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it addressed an undesirable condition and does not provide a solution.

Assembly Action: **None**

Final Hearing Results

RB196-13	**AS**

Code Change No: RB197-13

Original Proposal

Section(s): R322.3.4

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Revise as follows:

R322.3.4 Walls below design flood elevation. Walls and partitions are permitted below the elevated floor, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical, and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a ~~design safe loading~~ resistance of not less than 10 (470 Pa) and no more than 20 pounds per square foot (958 Pa) as determined using allowable stress design; or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa) as determined using allowable stress design, the construction documents shall include documentation prepared and sealed by a registered design professional that:
   4.1. The walls and partitions below the design flood elevation have been designed to collapse from a water load less than that which would occur during the base ~~design~~ flood.
   4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on all building components (structural and nonstructural). Water loading values used shall be those associated with the design flood. Wind loading values used shall be those required by this code.

Reason: This proposal clarifies that the method used to determine breakaway wall resistance is the “allowable stress design,” making it consistent with language used in IBC Sec. 1612.5(2.3) where a design profession is required to certified “breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m^2) determined using allowable stress design.”

Cost Impact: No cost impact.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it adds clarity by referencing the ASD standard.

Assembly Action: **None**

Final Hearing Results

RB197-13 **AS**

Code Change No: RB198-13

Original Proposal

Section(s): R322.3.5.1 (New)

Proponent: Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (Gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Add new text as follows:

R322.3.5.1 Protection of building envelope. An exterior door that meets the requirements of Section R612 shall be installed at the top of stairs that are enclosed with walls designed to break away in accordance with Section R322.3.4.

Reason: Walls below elevated buildings in coastal high hazard areas (Zone V) are permitted if the area enclosed by walls is used for parking of vehicles, building access or storage. If the enclosed area is used for building access, then a stairway provides access to the elevated building. R322.3.4 requires the walls to be designed and constructed to break away under flood loads. Post-disaster investigations have identified increased damage to the interior of elevated buildings because wave splash, wave run-up, and wind-driven rain can enter buildings through the unprotected doorway at the top of the stairs.

Cost Impact: The added cost of an exterior door is offset by reduced damage caused by wave splash, wave run-up, and wind-driven rain, some of which is not covered by NFIP flood insurance.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because they felt that the proposed section requires a door at the top of the stair and makes no provisions for conditions where the stair leads to a deck. It is a good concept but it needs work. In hurricane prone areas, the doors that are being discussed could be interior doors and this could create undue additional costs.

Assembly Action: **None**

Public Comments

Public Comment:

Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency; Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R322.3.5.1 Protection of building envelope. An exterior door that meets the requirements of Section R612 shall be installed at the top of stairs that provide access to the building and that are enclosed with walls designed to break away in accordance with Section R322.3.4.

Commenter's Reason: The committee action on this code change proposal was Disapproval because no provision was made for stairs that lead to decks. Although it would be unusual for stairs that lead to decks to be enclosed by walls, the proposal is modified to clarify that the requirement for an exterior door at the top of stairs applies to stairs that lead to the building and that are also enclosed by breakaway walls. This proposal adds to Section R322.3, which applies in coastal high hazard areas (Zone V) where wave height of greater than 3 feet are expected during the base flood. Walls are permitted to enclose areas below elevated buildings if the walls are designed to break away under flood loads and if the areas are used only for parking, storage and building access (see R322.3.4).

The proposal calls for an exterior door instead of an interior door because the walls enclosing the stairs are designed to break away, thus exposing the door to both wind and water.

Final Hearing Results

RB198-13	**AMPC**

Code Change No: RB203-13

Original Proposal

Section(s): **R202, R301.2.2.3.1, R324 (New)**

Proponent: Maureen Traxler/City of Seattle/Washington Association of Building Officials Technical Code Development Committee (maureen.traxler@seattle.gov)

Revise as follows:

SECTION R202
DEFINITIONS

MEZZANINE~~, LOFT~~. An intermediate level or levels between the floor and ceiling of any *story* ~~with an aggregate floor area of not more than one-third of the area of the room or space in which the level or levels are located~~.

Revise as follows:

R301.2.2.3.1 Height limitations. Wood-framed buildings shall be limited to three stories above *grade* plane or the limits given in Table R602.10.3(3). Cold-formed, steel-framed buildings shall be limited to less than or equal to three stories above *grade* plane in accordance with AISI S230. Mezzanines as defined in Section R202 that comply with Section R324 shall not be considered as stories. Structural insulated panel buildings shall be limited to two stories above *grade* plane.

SECTION R324
MEZZANINES

R324.1 General. *Mezzanines* shall comply with Section R324.

R324.2 Mezzanines. The clear height above and below *mezzanine* floor construction shall be not less than 7 feet (2134 mm).

R324.3 Area limitation. The aggregate area of a *mezzanine or mezzanines* shall be not greater than one-third of the floor area of the room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the *mezzanine* is located.

R324.4 Means of egress. The *means of egress* for *mezzanines* shall comply with the applicable provisions of Section R311.

R324.5 Openness. *Mezzanines* shall be open and unobstructed to the room in which they *are* located except for walls not more than 42 inches (1067 mm) in height, columns and posts.

Exceptions:

1. *Mezzanines* or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the *mezzanine* area.
2. In buildings that are no more than two *stories* above *grade plane* and equipped throughout with an *automatic sprinkler system* in accordance with NFPA 13R, NFPA 13D or Appendix S,

<u>a *mezzanine* having two or more *means of egress* shall not be required to be open to the room in which the *mezzanine* is located.</u>

Reason: The IRC provisions for mezzanines are incomplete. The code provides a definition of "mezzanine, loft" but doesn't include any other provisions to clarify the allowable size or extent of mezzanines. This proposal copies relevant portions of IBC Section 505.2 into the IRC.

Mezzanines are allowed to be considered not to be stories because they are limited in size and because they are subject to provisions that provide protection from fire hazards. Mezzanines are required to be open to the room in which they are located, which provides early warning to occupants should a fire occur in either the mezzanine or in the room. The IBC provisions also include more specific provisions for determining the portion of the room that can be included in the allowable area of the mezzanine.

There is also reason to limit the size of mezzanines. Section R301.2.2.3.1 states that mezzanines are not considered stories in the context of height limitations for buildings in higher seismic design categories. Mezzanines that are large in relation to the size of the story will act more like a story in response to seismic forces and should be treated as stories.

In addition, we are proposing to delete the word "loft" from the definition of mezzanine. The word is not used anywhere in the code, so it is not necessary to define it.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

R324.5 Openness. *Mezzanines* shall be open and unobstructed to the room in which they *are* located except for walls not more than ~~42~~ <u>36</u> inches (1067 mm) in height, columns and posts.

Exceptions:

1. *Mezzanines* or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the *mezzanine* area.
2. In buildings that are no more than two *stories* above *grade plane* and equipped throughout with an *automatic sprinkler system* in accordance with ~~NFPA 13R, NFPA 13D or Appendix S~~ <u>Section R313</u>, a *mezzanine* ~~having two or more *means of egress*~~ shall not be required to be open to the room in which the *mezzanine* is located.

(Portions of proposal not shown to remain as originally proposed.)

Committee Reason: The committee approved this code change proposal because they felt that it appropriately removes requirement s that should be in the body of the code from the definitions section of the code. The term "loft" does not add anything. The modification adds clarity.

Assembly Action: **None**

Final Hearing Results

RB203-13 **AM**

Code Change No: RB208-13

Original Proposal

Section(s): R402.2.1 (New)

Proponent: Stephen S. Szoke, P.E., Portland Cement Association

Add new text as follows:

R402.2.1 Materials for concrete. Materials for concrete shall comply with the requirements of Section R611.5.1.

Reason: This change coordinates sections R402 and R611 to reflect updated standard specifications for Portland Cement, Blended Hydraulic Cement, and Hydraulic Cement referenced for use in concrete. This change directs the user to one section for specific information about the general properties and requirements for concrete.

Cost Impact: This change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee feels this clarifies the concrete requirement for foundations and qualifies the material requirements.

Assembly Action: **None**

Final Hearing Results

RB208-13	**AS**

Code Change No: RB209-13

Original Proposal

Section(s): R402.4 (NEW)

Proponent: Jason Thompson, National Concrete Masonry Association representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

Add new text as follows:

R402.4 Masonry. Masonry systems shall be designed and installed in accordance with this chapter and shall have a minimum specified compressive strength of 1,500 psi (10.3 MPa).

Reason: Section R402 provides charging language for wood foundations (R402.1), concrete (R402.2), and precast concrete (R402.3), but not masonry. This is an inadvertent oversight that is corrected with this code change proposal. The addition of a minimum f'm of 1,500 psi reflects the design assumption upon which the prescriptive masonry foundation tables of Section R404.1.1.1 are based.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides a useful design standard of 1500 psi for masonry system and is needed in the code.

Assembly Action: **None**

Final Hearing Results

RB209-13 **AS**

Code Change No: RB211-13

Original Proposal

Section(s): R403.1.1, Table R403.1(1), Table 403.1(2) (New), Table R403.1(3) (NEW)

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association, (BajnaiC@chesterfield.gov), James R. Baty II, Technical Director of Concrete Foundations Association, and Matthew R. Senecal, Senior Engineer, American Concrete Institute

Revise as follows:

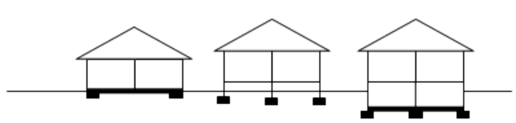
R403.1.1 Minimum size. The minimum ~~sizes~~ width, W, and thickness, T, for concrete ~~and masonry~~ footings shall be ~~as set forth~~ in accordance with Table R403.1(1) through R403.1(3) and Figure R403.1(1). The footing width~~, W,~~ shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. ~~Spread footings shall be at least 6 inches (152 mm) in thickness, T.~~ Footing projections, P, shall be at least 2 inches (51 mm) and shall not exceed the thickness of the footing. Footing thickness and projection for fireplaces shall be in accordance with Section R1001.2. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3).

~~TABLE R403.1~~
~~MINIMUM WIDTH OF CONCRETE PRECAST OR MASONRY FOOTINGS (inches)~~[a]

TABLE R403.1(1)
MINIMUM WIDTH AND THICKNESS FOR CONCRETE FOOTINGS FOR LIGHT FRAME CONSTRUCTION

Snow load or Roof Live Load	Story and Type of Structure with Light Frame	Load-Bearing Value of Soil (psf)					
		1500	2000	2500	3000	3500	4000
20 psf	1 story - slab on grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - slab on grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	16 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - plus basement	22 x 6	16 x 6	13 x 6	12 x 6	12 x 6	12 x 6
	3 story - slab on grade	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	3 story - with crawl space	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	3 story - plus basement	25 x 8	19 x 6	15 x 6	13 x 6	12 x 6	12 x 6
30 psf	1 story - slab on grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	13 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - slab on grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	17 x 6	13 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - plus basement	23 x 6	17 x 6	14 x 6	12 x 6	12 x 6	12 x 6
	3 story - slab on grade	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	3 story - with crawl space	20 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	3 story - plus basement	26 x 8	20 x 6	16 x 6	13 x 6	12 x 6	12 x 6
50 psf	1 story - slab on grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	16 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	21 x 6	16 x 6	13 x 6	12 x 6	12 x 6	12 x 6
	2 story - slab on grade	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - plus basement	25 x 7	19 x 6	15 x 6	12 x 6	12 x 6	12 x 6
	3 story - slab on grade	17 x 6	13 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	3 story - with crawl space	22 x 6	17 x 6	13 x 6	12 x 6	12 x 6	12 x 6
	3 story - plus basement	28 x 9	21 x 6	17 x 6	14 x 6	12 x 6	12 x 6
70 psf	1 story - slab on grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	18 x 6	13 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	24 x 7	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6
	2 story - slab on grade	16 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	21 x 6	16 x 6	13 x 6	12 x 6	12 x 6	12 x 6
	2 story - plus basement	27 x 9	20 x 6	16 x 6	14 x 6	12 x 6	12 x 6
	3 story - slab on grade	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	3 story - with crawl space	25 x 7	18 x 6	15 x 6	12 x 6	12 x 6	12 x 6
	3 story - plus basement	30 x 10	23 x 6	18 x 6	15 x 6	13 x 6	12 x 6

1. Interpolation allowed. Extrapolation is not allowed
2. Based on 32 foot wide house with load bearing center wall that carries half of the tributary attic, and floor framing. For every 2 feet of adjustment to the width of the house add or subtract 2 inches of footing width and 1 inch of footing thickness (but not less than 6 inches thick).



Slab on grade Crawl space Basement

TABLE R403.1(2)
MINIMUM WIDTH AND THICKNESS FOR CONCRETE FOOTINGS FOR CONCRETE FOOTINGS FOR LIGHT FRAME CONSTRUCTION WITH BRICK VENEER

Snow load or Roof Live Load	Story and Type of Structure with Brick Veneer	Load-Bearing Value of Soil (psf)					
		1500	2000	2500	3000	3500	4000
20 psf	1 story - slab on grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	21 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - slab on grade	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	20 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - plus basement	26 x 8	20 x 6	16 x 6	13 x 6	12 x 6	12 x 6
	3 story - slab on grade	20 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	3 story - with crawl space	26 x 8	19 x 6	15 x 6	13 x 6	12 x 6	12 x 6
	3 story - plus basement	32 x 11	24 x 7	19 x 6	16 x 6	14 x 6	12 x 6
30 psf	1 story - slab on grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	16 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	22 x 6	16 x 6	13 x 6	12 x 6	12 x 6	12 x 6
	2 story - slab on grade	16 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	22 x 6	16 x 6	13 x 6	12 x 6	12 x 6	12 x 6
	2 story - plus basement	27 x 9	21 x 6	16 x 6	14 x 6	12 x 6	12 x 6
	3 story - slab on grade	21 x 6	16 x 6	13 x 6	12 x 6	12 x 6	12 x 6
	3 story - with crawl space	27 x 8	20 x 6	16 x 6	13 x 6	12 x 6	12 x 6
	3 story - plus basement	33 x 11	24 x 7	20 x 6	16 x 6	14 x 6	12 x 6
50 psf	1 story - slab on grade	13 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	24 x 7	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6
	2 story - slab on grade	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	24 x 7	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6
	2 story - plus basement	29 x 10	22 x 6	18 x 6	15 x 6	13 x 6	12 x 6
	3 story - slab on grade	24 x 7	18 x 6	13 x 6	12 x 6	12 x 6	12 x 6
	3 story - with crawl space	29 x 9	22 x 6	17 x 6	14 x 6	12 x 6	12 x 6
	3 story - plus basement	35 x 12	26 x 8	21 x 6	17 x 6	15 x 6	13 x 6
70 psf	1 story - slab on grade	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	20 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	26 x 8	20 x 6	16 x 6	13 x 6	12 x 6	12 x 6
	2 story - slab on grade	20 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	26 x 8	19 x 6	15 x 6	13 x 6	12 x 6	12 x 6
	2 story - plus basement	32 x 11	24 x 7	19 x 6	16 x 6	14 x 6	12 x 6
	3 story - slab on grade	26 x 8	19 x 6	15 x 6	13 x 6	12 x 6	12 x 6
	3 story - with crawl space	31 x 11	23 x 7	19 x 6	16 x 6	13 x 6	12 x 6
	3 story - plus basement	37 x 13	28 x 9	22 x 6	18 x 6	16 x 6	14 x 6

1. Interpolation allowed. Extrapolation is not allowed
2. Based on 32 foot wide house with load bearing center wall that carries half of the tributary attic, and floor framing. For every 2 feet of adjustment to the width of the house add or subtract 2 inches of footing width and 1 inch of footing thickness (but not less than 6 inches thick).

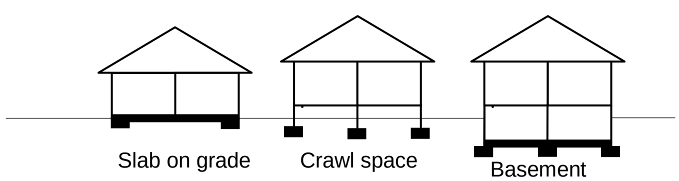
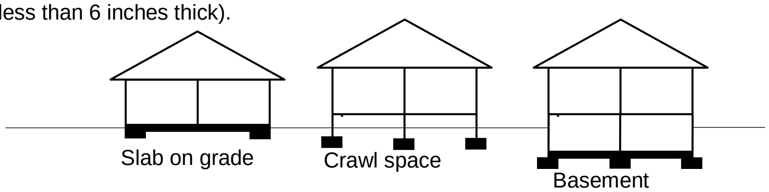


TABLE R403.1(3)
MINIMUM WIDTH AND THICKNESS FOR CONCRETE FOOTINGS WITH CAST-IN-PLACE CONCRETE OR FULL MASONRY WALL CONSTRUCTION

Snow load or Roof Live Load	Story and Type of Structure with CMU	Load-Bearing Value of Soil (psf)					
		1500	2000	2500	3000	3500	4000
20 psf	1 story - slab on grade	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	25 x 8	19 x 6	15 x 6	13 x 6	12 x 6	12 x 6
	2 story - slab on grade	23 x 7	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	29 x 9	22 x 6	17 x 6	14 x 6	12 x 6	12 x 6
	2 story - plus basement	35 x 12	26 x 8	21 x 6	17 x 6	15 x 6	13 x 6
	3 story - slab on grade	32 x 11	24 x 7	19 x 6	16 x 6	14 x 6	12 x 6
	3 story - with crawl space	38 x 14	28 x 9	23 x 6	19 x 6	16 x 6	14 x 6
	3 story - plus basement	43 x 17	33 x 11	26 x 8	22 x 6	19 x 6	16 x 6
30 psf	1 story - slab on grade	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	20 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	26 x 8	20 x 6	16 x 6	13 x 6	12 x 6	12 x 6
	2 story - slab on grade	24 x 7	18 x 6	15 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	30 x 10	22 x 6	18 x 6	15 x 6	13 x 6	12 x 6
	2 story - plus basement	36 x 13	27 x 8	21 x 6	18 x 6	15 x 6	13 x 6
	3 story - slab on grade	33 x 12	25 x 7	20 x 6	17 x 6	14 x 6	12 x 6
	3 story - with crawl space	39 x 14	29 x 9	23 x 7	19 x 6	17 x 6	14 x 6
	3 story - plus basement	44 x 17	33 x 12	27 x 8	22 x 6	19 x 6	17 x 6
50 psf	1 story - slab on grade	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	23 x 7	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6
	2 story - slab on grade	21 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	25 x 8	19 x 6	15 x 6	13 x 6	12 x 6	12 x 6
	2 story - plus basement	30 x 10	23 x 6	18 x 6	15 x 6	13 x 6	12 x 6
	3 story - slab on grade	27 x 8	20 x 6	20 x 6	13 x 6	12 x 6	12 x 6
	3 story - with crawl space	32 x 11	24 x 7	19 x 6	16 x 6	14 x 6	12 x 6
	3 story - plus basement	36 x 13	27 x 9	22 x 6	18 x 6	16 x 6	14 x 6
70 psf	1 story - slab on grade	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	25 x 7	18 x 6	15 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	30 x 10	23 x 6	18 x 6	15 x 6	13 x 6	12 x 6
	2 story - slab on grade	29 x 9	22 x 6	17 x 6	14 x 6	12 x 6	12 x 6
	2 story - with crawl space	34 x 12	26 x 8	21 x 6	17 x 6	15 x 6	13 x 6
	2 story - plus basement	40 x 15	30 x 10	24 x 7	20 x 6	17 x 6	15 x 6
	3 story - slab on grade	38 x 14	28 x 9	23 x 6	19 x 6	16 x 6	14 x 6
	3 story - with crawl space	43 x 16	32 x 11	26 x 8	21 x 6	18 x 6	16 x 6
	3 story - plus basement	49 x 19	37 x 13	29 x 10	24 x 7	21 x 6	18 x 6

1. Interpolation allowed. Extrapolation is not allowed
2. Based on 32 foot wide house with load bearing center wall that carries half of the tributary attic, and floor framing. For every 2 feet of adjustment to the width of the house add or subtract 2 inches of footing width and 1 inch of footing thickness (but not less than 6 inches thick).



Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The existing table was based on:

- a snow load of 50 psf
- 20 feet of tributary roof area
- 16 feet of tributary floor area
- 10 feet first floor height
- 8 feet second and third floor heights

For some parts of the country, the table's assumptions may not "fit" well.

1. These new tables factor in four snow live load conditions that were not previously acknowledged: 20 psf (the minimum allowed per Table R301.6), 30 psf, 50 psf and 70 psf (the maximum to be designed prescriptively by R301.2.3). Between these increments, the table allows for interpolation.
2. The tables account for additional soil bearing conditions. They now provide sizing for 1500 psf, 2000 psf, 2500 psf, and 3000 psf, 3500 psf and 4000psf soil bearing locations.
3. The tables take into consideration the same three framing types as the current table:
    a. Conventional light framing,
    b. Conventional light framing with veneer, and
    c. Cast-in-place concrete or full masonry wall construction.
4. The new tables were expanded to cover more conditions. They now differentiate houses built:
    a. 1, 2 and 3 stories built slab on grade (without a first floor load),
    b. 1, 2 and 3 stories built over a crawl space (with a first floor load and foundation wall/footing),
    c. 1, 2 and 3 stories built with basement (with a first floor load and basement walls. Previously, the table was silent on how to handle the extra load from a masonry or concrete basement wall).
5. The tables also provide the width of the footing based on the loads and the minimum projection – whichever governs. 6" is the minimum thickness already required by Section R403.1.1.
6. The table are based on the loading case of: TL = DL + .75LL
7. General assumptions, formulas and example follow for peer review:

ASSUMPTIONS

House width	32	
Roof ground snow load	varies	psf
Roof dead load	10	psf
Rafter length of house	16	ft
Roof overhang	2	ft
Attic live load	15	psf
Attic dead load	10	psf
Attic tributary width	8	ft
Third floor wall height	8	ft
Third floor wall materials	15	#/ vert ft
Third floor with veneer	45	#/ vert ft
Third floor with cmu wall	100	#/ vert ft
Third floor live load	22.5	psf
Third floor dead load	15	psf
Third floor tributary length	8	ft
Second floor wall height	9	ft
Second floor wall materials	15	#/ vert ft
Second floor with veneer	45	#/ vert ft
Second floor with cmu wall	100	#/ vert ft
Second floor live load	22.5	psf
Second floor dead load	15	psf
Second floor tributary length	8	ft
First floor wall height	10	ft
First floor with light frame	15	#/ vert ft
First floor with veneer	45	#/ vert ft
First floor with cmu wall	100	#/ vert ft
First floor live load	30	psf
First floor dead load	15	psf
First floor tributary length	8	ft
Crawl wall height	3	ft
Basement wall height	10	ft
Wall thickness	10	in
Basement/crawl floor wall materials	125	pcf
Footing width (min)	12	in
Footing thickness (min)	6	in
Concrete weight	150 0.0868	pcf pci

SAMPLE CALCULATION WITH FORMULAS

CMU CONSTRUCTION BASED ON 50 psf SNOW LOAD

DESIGN PARAMETERS	(variables)	1 story slab on grade	1 story with crawl	1 story with basement	2 story slab on grade	2 story with crawl	2 story with basement	3 story slab on grade	3 story with crawl	3 story with basement
Roof load	(Roofspan/2 + Overhangspan) * (Roof-DL + (.75*Roof-LL))	855	855	855	855	855	855	855	855	855
Attic Floor load	Roofspan/4 * (Attic-DL + .75(Attic-LL))	200	200	200	200	200	200	200	200	200
TF Wall load	TFht * Wwt							480	480	480
TF Floor load	Roofspan/4 * (TF-DL + (.75(TF-LL))							300	300	300
SF Wall load	SFht * Wwt				540	540	540	540	540	540
SF Floor load	Roofspan/4 * (SF-DL + (.75(SF-LL))				300	300	300	300	300	300
FF Wall load	FFht * Wwt	600	600	600	600	600	600	600	600	600
FF Floor load	Rspan/4 * (FF-DL + (.75FF-LL))		360	360		360	360		360	360
Crawl Wall load	Cht * Cth / 12 * Cwt		250			250			250	
Basement Wall load	Bth * Bthick / 12 * Bwt			833			833			833
Footing	Footthick / 12 * Footwidth / 12 * Wtcond	75	75	75	75	75	75	75	75	75
CALCULATED LOAD (plf)		1730	2340	2923	2570	3180	3763	3350	3960	4543

Footing width is the greater of:
6" minimum or
(Footing width - wall thickness) / 2

Soil bearing capacity variances (psf)	1 story slab on grade		1 story with crawl		1 story with basement		2 story slab on grade		2 story with crawl		2 story with basement		3 story slab on grade		3 story with crawl		3 story with basement	
1500	14	6	19	6	23	7	21	6	25	8	30	10	27	8	32	11	36	13
2000	10	6	14	6	18	6	15	6	19	6	23	6	20	6	24	7	27	9
2500	8	6	11	6	14	6	12	6	15	6	18	6	16	6	19	6	22	6
3000	7	6	9	6	12	6	10	6	13	6	15	6	13	6	16	6	18	6
3500	6	6	8	6	10	6	9	6	11	6	13	6	11	6	14	6	16	6
4000	5	6	7	6	9	6	8	6	10	6	11	6	10	6	12	6	14	6

Cost Impact: The code change proposal may increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee feels this provides useful tables and provides additional option for builders. This improves the prescribed minimum footing sizes.

Assembly Action: **None**

Public Comments

Public Comment 1:

Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Table R403.1 (3)
MINIMUM WIDTH AND THICKNESS FOR CONCRETE FOOTINGS with CAST-IN-PLACE CONCRETE or FULLY GROUTED MASONONRY WALL CONSTRUCTION

Snow load or Roof Live Load	Story and Type of Structure with CMU	Load-Bearing Value of Soil (psf)					
		1500	2000	2500	3000	3500	4000
20 psf	1 story - slab on grade	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	25 x 8	19 x 6	15 x 6	13 x 6	12 x 6	12 x 6
	2 story - slab on grade	23 x 7	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	29 x 9	22 x 6	17 x 6	14 x 6	12 x 6	12 x 6
	2 story - plus basement	35 x 12	26 x 8	21 x 6	17 x 6	15 x 6	13 x 6
	3 story - slab on grade	32 x 11	24 x 7	19 x 6	16 x 6	14 x 6	12 x 6
	3 story - with crawl space	38 x 14	28 x 9	23 x 6	19 x 6	16 x 6	14 x 6
	3 story - plus basement	43 x 17	33 x 11	26 x 8	22 x 6	19 x 6	16 x 6
30 psf	1 story - slab on grade	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	20 x 6	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	26 x 8	20 x 6	16 x 6	13 x 6	12 x 6	12 x 6
	2 story - slab on grade	24 x 7	18 x 6	15 x 6	12 x 6	12 x 6	12 x 6
	2 story - with crawl space	30 x 10	22 x 6	18 x 6	15 x 6	13 x 6	12 x 6
	2 story - plus basement	36 x 13	27 x 8	21 x 6	18 x 6	15 x 6	13 x 6
	3 story - slab on grade	33 x 12	25 x 7	20 x 6	17 x 6	14 x 6	12 x 6
	3 story - with crawl space	39 x 14	29 x 9	23 x 7	19 x 6	17 x 6	14 x 6
	3 story - plus basement	44 x 17	33 x 12	27 x 8	22 x 6	19 x 6	17 x 6
50 psf	1 story - slab on grade	~~14 X 6~~ 17 x 6	~~12 X 6~~ 13 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	~~19 X 6~~ 22 x 6	~~14 X 6~~ 17 x 6	~~12 X 6~~ 13 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	~~23 X 7~~ 28 x 9	~~18 X 6~~ 21 x 6	~~14 X 6~~ 17 x 6	~~12 X 6~~ 14 x 6	12 x 6	12 x 6

	2 story - slab on grade	~~21 X 6~~ 27 x 8	~~15 X 6~~ 20 x 6	~~12 X 6~~ 16 x 6	~~12 X 6~~ 13 x 6	12 x 6	12 x 6
	2 story - with crawl space	~~25 X 8~~ 32 x 11	~~19 X 6~~ 24 x 7	~~15 X 6~~ 19 x 6	~~13 X 6~~ 16 x 6	~~12 X 6~~ 14 x 6	12 x 6
	2 story - plus basement	~~30 X 10~~ 38 x 14	~~23 X 6~~ 28 x 9	~~18 X 6~~ 23 x 6	~~15 X 6~~ 19 x 6	~~13 X 6~~ 16 x 6	~~12 X 6~~ 14 x 6
	3 story - slab on grade	~~27 X 8~~ 35 x 13	~~20 X 6~~ 27 x 8	~~20 X 6~~ 21 x 6	~~13 X 6~~ 18 x 6	~~12 X 6~~ 15 x 6	~~12 X 6~~ 13 x 6
	3 story - with crawl space	~~32 X 11~~ 41 x 15	~~24 X 7~~ 31 x 10	~~19 X 6~~ 24 x 7	~~16 X 6~~ 20 x 6	~~14 X 6~~ 17 x 6	~~12 X 6~~ 15 x 6
	3 story - plus basement	~~36 X 13~~ 47 x 18	~~27 X 9~~ 35 x 12	~~22 X 6~~ 28 x 9	~~18 X 6~~ 23 x 7	~~16 X 6~~ 20 x 6	~~14 X 6~~ 17 x 6
70 psf	1 story - slab on grade	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6
	1 story - with crawl space	25 x 7	18 x 6	15 x 6	12 x 6	12 x 6	12 x 6
	1 story - plus basement	30 x 10	23 x 6	18 x 6	15 x 6	13 x 6	12 x 6
	2 story - slab on grade	29 x 9	22 x 6	17 x 6	14 x 6	12 x 6	12 x 6
	2 story - with crawl space	34 x 12	26 x 8	21 x 6	17 x 6	15 x 6	13 x 6
	2 story - plus basement	40 x 15	30 x 10	24 x 7	20 x 6	17 x 6	15 x 6
	3 story - slab on grade	38 x 14	28 x 9	23 x 6	19 x 6	16 x 6	14 x 6
	3 story - with crawl space	43 x 16	32 x 11	26 x 8	21 x 6	18 x 6	16 x 6
	3 story - plus basement	49 x 19	37 x 13	29 x 10	24 x 7	21 x 6	18 x 6

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: The ICC Building Code Action Committee (BCAC) is submitting this public comment to address an inconsistency discovered by ICC staff following Dallas. The values were checked and an error was detected in the spreadsheet producing the footing sizes for the third table, which is corrected with this public comment.

Final Hearing Results

RB211-13 **AMPC1**

Code Change No: RB212-13

Original Proposal

Section(s): Figure R403.1(1), Figure R403.1(2), Figure R403.1(3), R403.1.3.2, Figure R403.1.3.2

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaiC@chesterfield.gov)

Revise as follows:

~~FIGURE R403.1(1)~~
~~CONCRETE AND MASONRY FOUNDATION DETAILS~~

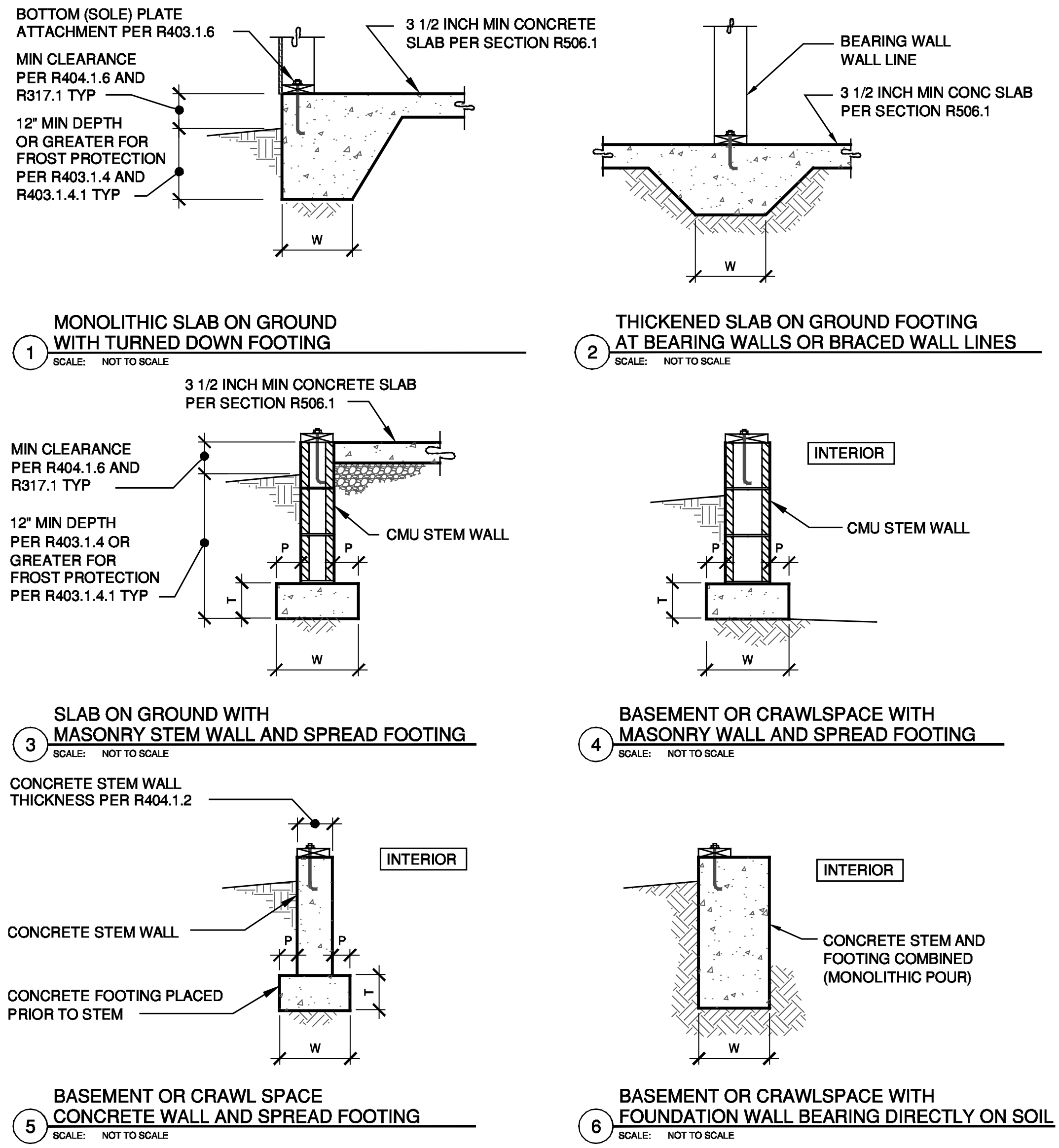


FIGURE R403.1(1)
PLAIN CONCRETE FOOTINGS AND MASONRY AND CONCRETE STEMWALLS IN SDC A, B AND C [a, b, c, d, e, f, g]

W=WIDTH OF FOOTING, T=THICKNESS OF FOOTING AND P=PROJECTION PER SECTION R403.1.1.
a. SEE SECTION R404.3 FOR SILL REQUIREMENTS.
b. SEE SECTION R403.1.6 FOR SILL ATTACHMENT.
c. SEE SECTION R506.2.3 FOR VAPOR BARRIER REQUIREMENTS.
d. SEE SECTION R403.1 FOR BASE
e. SEE FIGURE R403.1(2) FOR ADDITIONAL FOOTING REQUIREMENTS FOR STRUCTURES IN SDC D0, D1 AND D2 AND TOWNHOUSES IN SDC C
f. SEE SECTION R408 FOR UNDERFLOOR VENTILATION AND ACCESS REQUIREMENTS.
g. SEE SECTION R403.1.3.4 FOR REINFORCEMENT REQUIREMENTS.

FIGURE R403.1(1)
PLAN CONCRETE FOOTINGS AND MASONRY AND CONCRETE STEMWALLS OM SDC Do, D_1 AND D_2 [a,b,c,d,e,f,g]

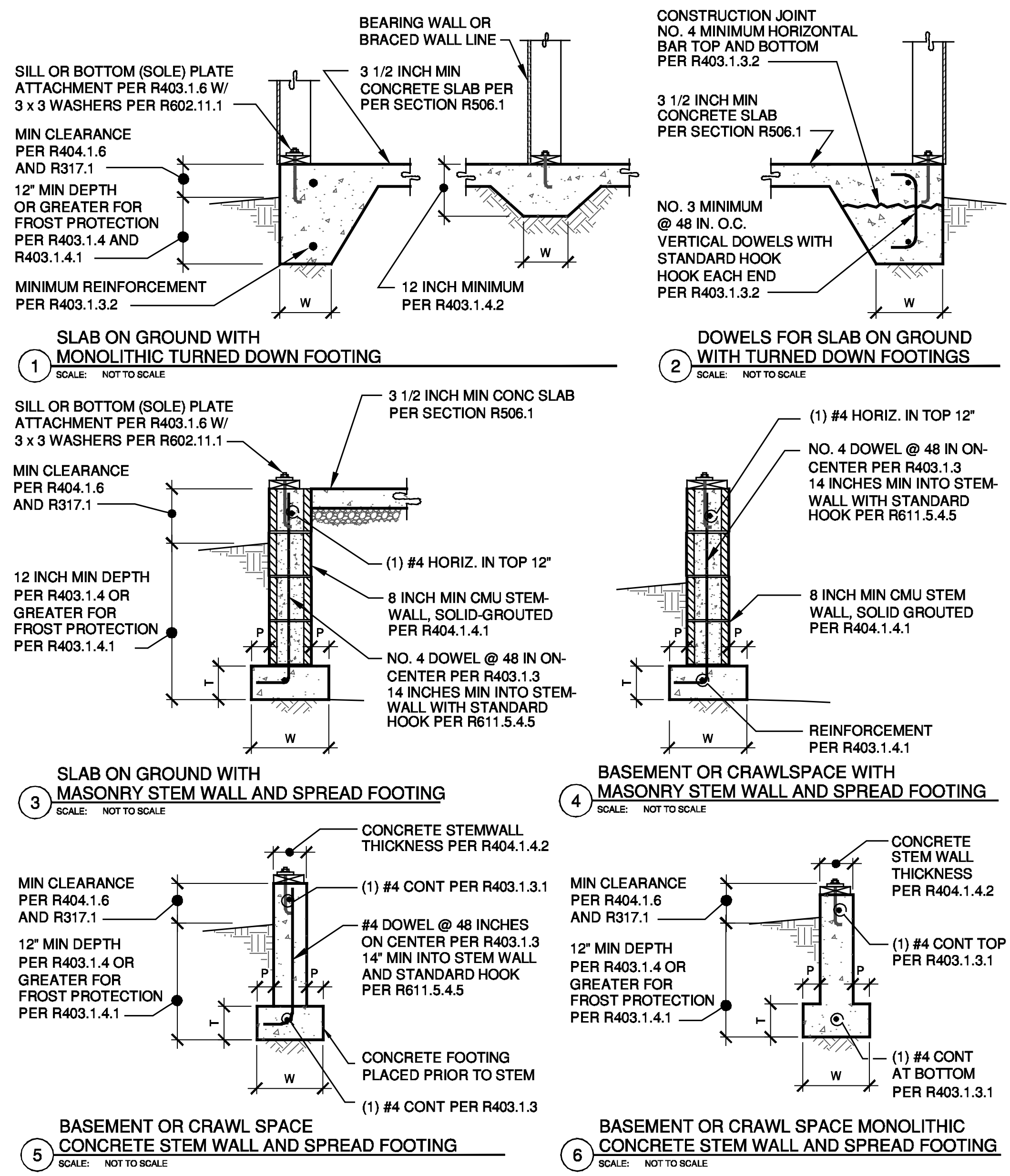


FIGURE R403.1(2)
REINFORCED CONCRETE FOOTINGS AND MASONRY AND CONCRETE STEMWALLS IN SDC D0, D1 AND D2 [a, b, c, d, e, f, g]

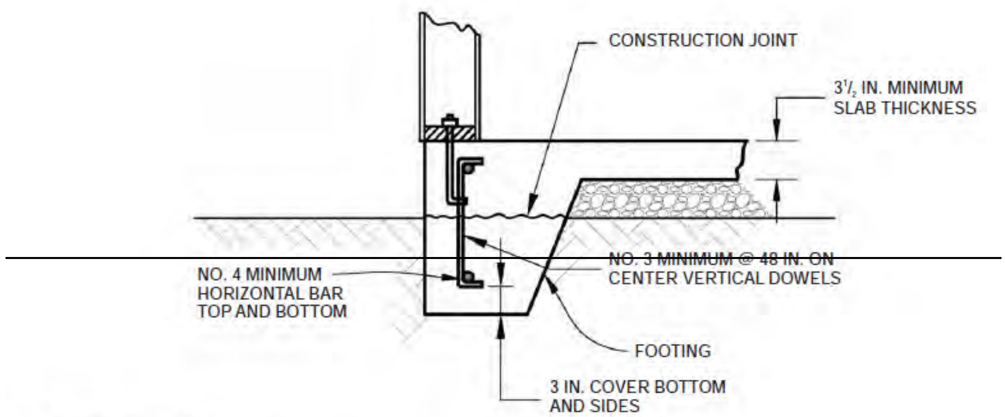
W=WIDTH OF FOOTING, T=THICKNESS OF FOOTING AND P=PROJECTION PER SECTION R403.1.1.
a. SEE SECTION R404.3 FOR SILL REQUIREMENTS.
b. SEE SECTION R403.1.6 FOR SILL ATTACHMENT.
c. SEE SECTION R506.2.3 FOR VAPOR BARRIER REQUIREMENTS.
d. SEE SECTION R403.1 FOR BASE
f. SEE SECTION R408 FOR UNDERFLOOR VENTILATION AND ACCESS REQUIREMENTS.
g. SEE SECTION R403.1.3.4 FOR REINFORCEMENT REQUIREMENTS.

FIGURE R403.1(2)
REINFORCED CONCRETE FOOTINGS AND MASONRY AND CONCRETE STEMWALLS IN SDC D_O, D_1 AND D_2 [a,b,c,d,e,f,g]

FIGURE ~~R403.1(2)~~ R403.1(3)
PERMANENT WOOD FOUNDATION BASEMENT WALL SECTION
FIGURE ~~R403.1(3)~~ R403.1(4)
PERMANENT WOOD FOUNDATION CRAWL SPACE SECTION

R403.1.3.2 Slabs-on-ground with turned-down footings. Slabs on ground with turned down footings shall have a minimum of one No. 4 bar at the top and the bottom of the footing

> **Exception:** For slabs-on-ground cast monolithically with the footing, locating one No. 5 bar or two No. 4 bars in the middle third of the footing depth shall be permitted as an alternative to placement at the footing top and bottom.
>
> Where the slab is not cast monolithically with the footing, No. 3 or larger vertical dowels with standard hooks on each end shall be provided in accordance with Figure ~~R403.1.3.2~~ R403.1(2), detail 2. Standard hooks shall comply with Section R611.5.4.5.



For SI: 1 inch = 25.4 mm.

FIGURE R403.1.3.2
DOWELS FOR SLABS-ON-GROUND WITH TURNED-DOWN FOOTINGS

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

This proposal is to revise and update the existing footing figures in the code. The revised figures improve the graphic quality of the figures and add information that is helpful to the code user. In addition, the current figures do not show, describe or address the specific reinforcement requirements for Seismic Design Categories D0, D1 and D2. Initial attempts to incorporate the SDC reinforcement requirements into the set of figures resulted in overly complex details that would contain information not necessary to code users in lower SDC's. Therefore, the committee decided to generate a second set of figures specifically detailing the reinforcement requirements for the applicable SDC's.

This proposal also moves existing figure R403.1.3.2 to Figure R403.1(2) and changes the reference in section R403.1.3.2. The footnotes were also expanded to alert the code user to other applicable sections relating to foundations but were not necessarily helpful to add to the figures such as vapor barriers and ventilation.

This proposal does not change any requirements in the current code and are a great improvement to the code enabling the code user to visualize the code requirements.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee likes the concept and it would add useful figures to the code. However, there are some inaccuracies in the figures related to reinforcing for high seismic. The proponent should rework this and bring it back.

Assembly Action: **None**

Public Comments

Public Comment:

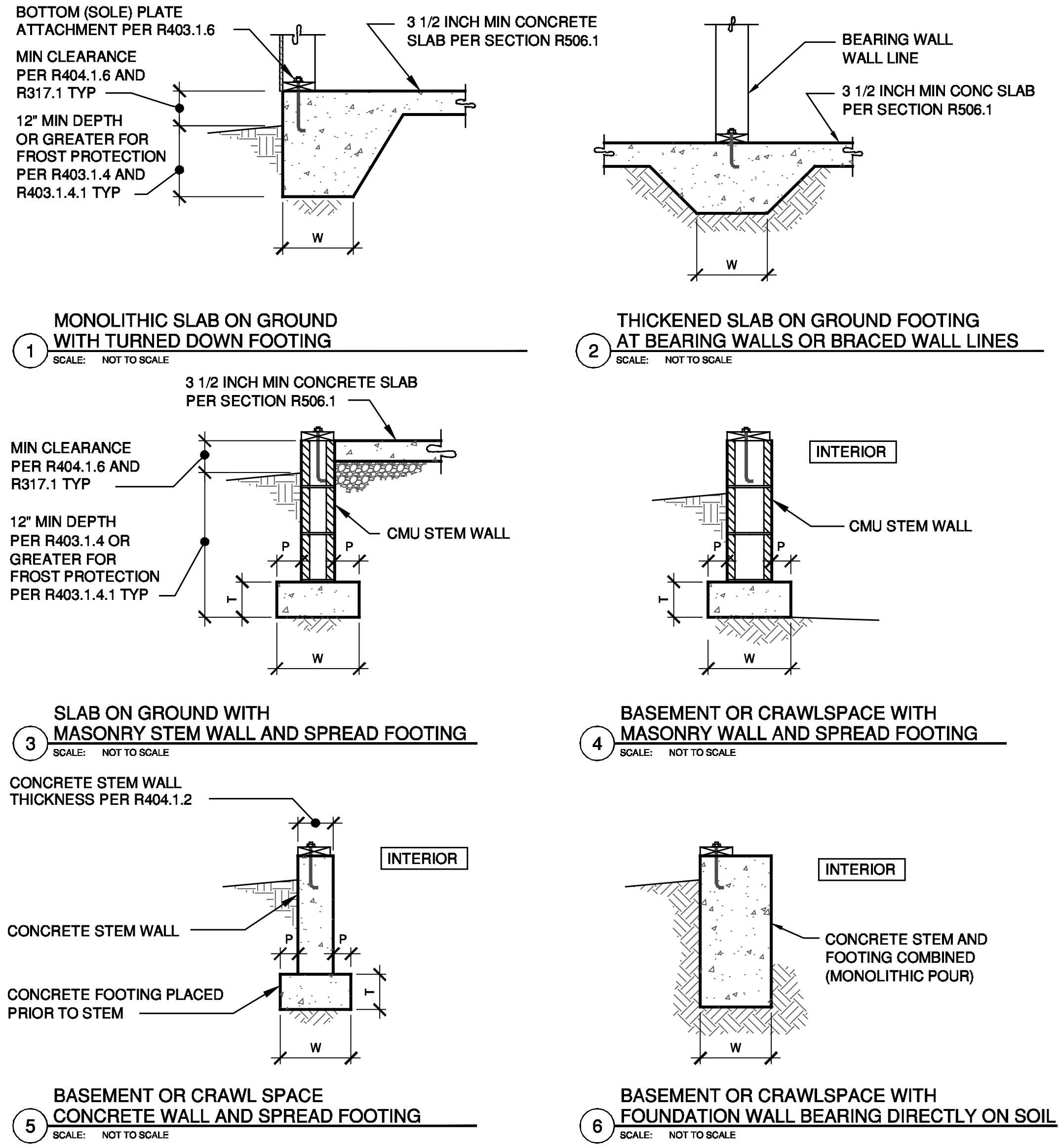
Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R403.1.1 Minimum size. Minimum sizes for concrete and masonry footings shall be as set forth in Table R403.1 and Figure R403.1(1) or Figure R403.1.3, as applicable. The footing width, W, shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Spread footings shall be at least 6 inches (152 mm) in thickness, T. Footing projections, P, shall be at least 2 inches (51 mm) and shall not exceed the thickness of the footing. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3).

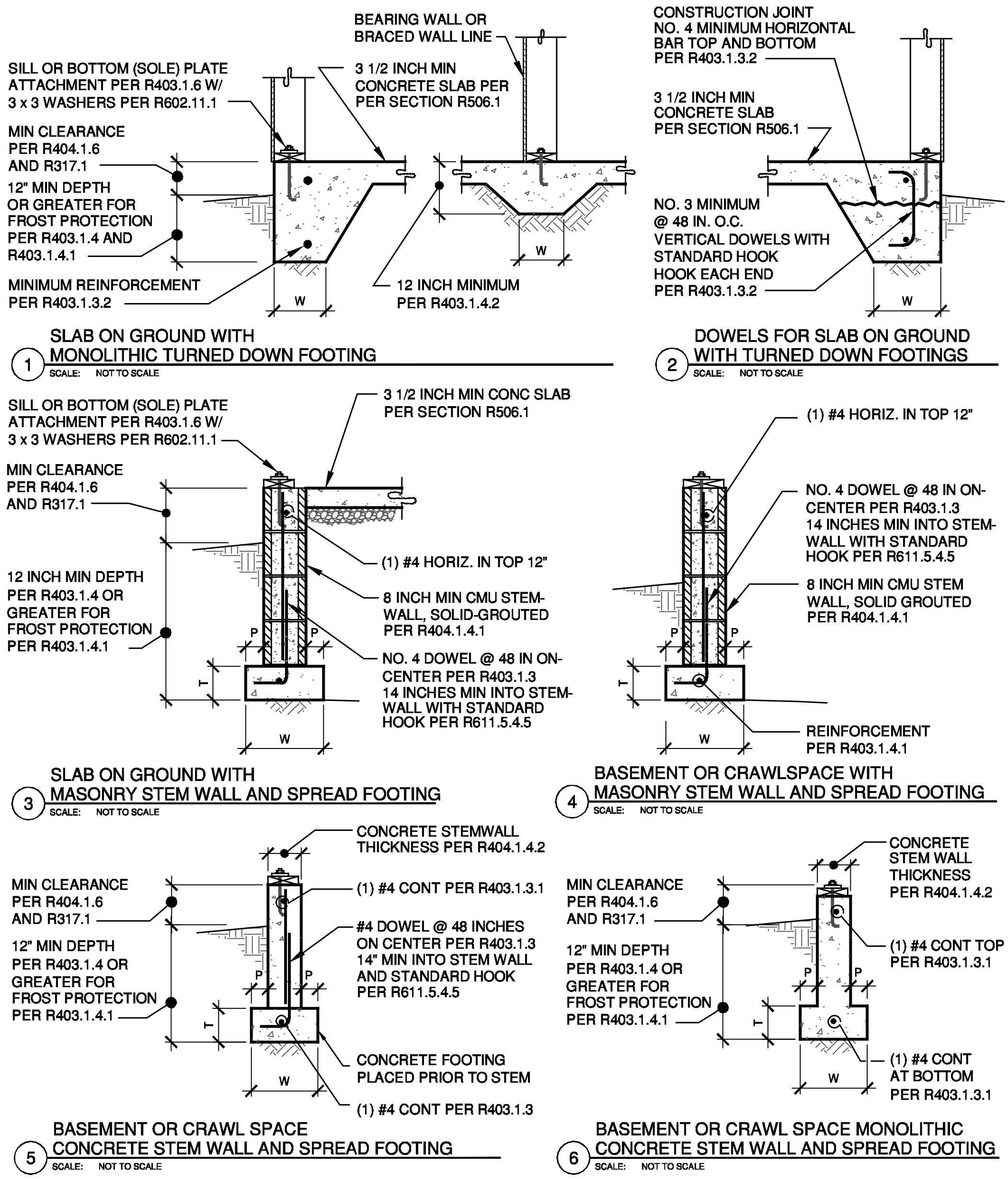
R403.1.3 Seismic reinforcing. Concrete footings located in Seismic Design Categories D0, D1 and D2, as established in Table R301.2(1), shall have minimum reinforcement in accordance with this Section and Figure R403.1.3. Bottom reinforcement shall be located a minimum of 3 inches (76 mm) clear from the bottom of the footing. In Seismic Design Categories D0, D1 and D2 where a construction joint is created between a concrete footing and a stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing, have a standard hook and extend a minimum of 14 inches (357 mm) into the stem wall. In Seismic Design Categories D0, D1 and D2 where a grouted masonry stem wall is supported on a concrete footing and stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing and have a standard hook. In Seismic Design Categories D0, D1 and D2 masonry stem walls without solid grout and vertical reinforcing are not permitted.

Replace Figure R403.1(1) as follows:



W=WIDTH OF FOOTING, T=THICKNESS OF FOOTING AND P=PROJECTION PER SECTION R403.1.1.
a. SEE SECTION R404.3 FOR SILL REQUIREMENTS.
b. SEE SECTION R403.1.6 FOR SILL ATTACHMENT.
c. SEE SECTION R506.2.3 FOR VAPOR BARRIER REQUIREMENTS.
d. SEE SECTION R403.1 FOR BASE
e. SEE FIGURE R403.1(2) FOR ADDITIONAL FOOTING REQUIREMENTS FOR STRUCTURES IN SDC D0, D1 AND D2 AND TOWNHOUSES IN SDC C
f. SEE SECTION R408 FOR UNDERFLOOR VENTILATION AND ACCESS REQUIREMENTS.
g. SEE SECTION R403.1.3.4 FOR REINFORCEMENT REQUIREMENTS.

FIGURE R403.1(1)
PLAIN CONCRETE FOOTINGS AND MASONRY AND CONCRETE STEMWALLS ~~OM~~ IN SDC A, B AND C ~~D_0, D_1 AND D_2~~ [a,b,c,d,e,f,g]



W=WIDTH OF FOOTING, T=THICKNESS OF FOOTING AND P=PROJECTION PER SECTION R403.1.1.
a. SEE SECTION R404.3 FOR SILL REQUIREMENTS.
b. SEE SECTION R403.1.6 FOR SILL ATTACHMENT.
c. SEE SECTION R506.2.3 FOR VAPOR BARRIER REQUIREMENTS.
d. SEE SECTION R403.1 FOR BASE
f. SEE SECTION R408 FOR UNDERFLOOR VENTILATION AND ACCESS REQUIREMENTS.
g. SEE SECTION R403.1.3.4 FOR REINFORCEMENT REQUIREMENTS.

FIGURE R403.1.3 ~~(2)~~
REINFORCED CONCRETE FOOTINGS AND MASONRY AND CONCRETE STEMWALLS IN SDC D_O, D_1 AND D_2 [a,b,c,d,e,f,g]

FIGURE R403.1(2) ~~R403.1(3)~~
PERMANENT WOOD FOUNDATION BASEMENT WALL SECTION

FIGURE R403.1(3) ~~R403.1(4)~~
PERMANENT WOOD FOUNDATION CRAWL SPACE SECTION

R403.1.3.2 Slabs-on-ground with turned-down footings. Slabs on ground with turned down footings shall have a minimum of one No. 4 bar at the top and the bottom of the footing

> **Exception:** For slabs-on-ground cast monolithically with the footing, locating one No. 5 bar or two No. 4 bars in the middle third of the footing depth shall be permitted as an alternative to placement at the footing top and bottom.
>
> Where the slab is not cast monolithically with the footing, No. 3 or larger vertical dowels with standard hooks on each end shall be provided in accordance with Figure R403.1.3 ~~(2)~~, detail 2. Standard hooks shall comply with Section R611.5.4.5.

Commenter's Reason: The ICC Building Code Action Committee (BCAC) is submitting this public comment to address the code development committee's concerns. The code development committee thought the details added a lot of understanding but found a few minor flaws:

1. The title of Figure R403.1(1) was corrected to reflect that the details apply to SDC A,B and C only.
2. The numbering in the second figure was changed to reflect that the details apply to Section R403.1.3 for SDC D_0, D_1 and D_2
3. The appropriate figure references have been provided in Section R403.1.1 and R403.1.3.

Final Hearing Results

RB212-13 **AMPC**

Code Change No: RB213-13

Original Proposal

Section(s): Figure R403.1(2), Figure R403.1(3)

Proponent: Stephen Kerr, S.E., Josephson Werdowatz and Associates Inc., representing self (skerr@jwa-se.com)

Revise as follows:

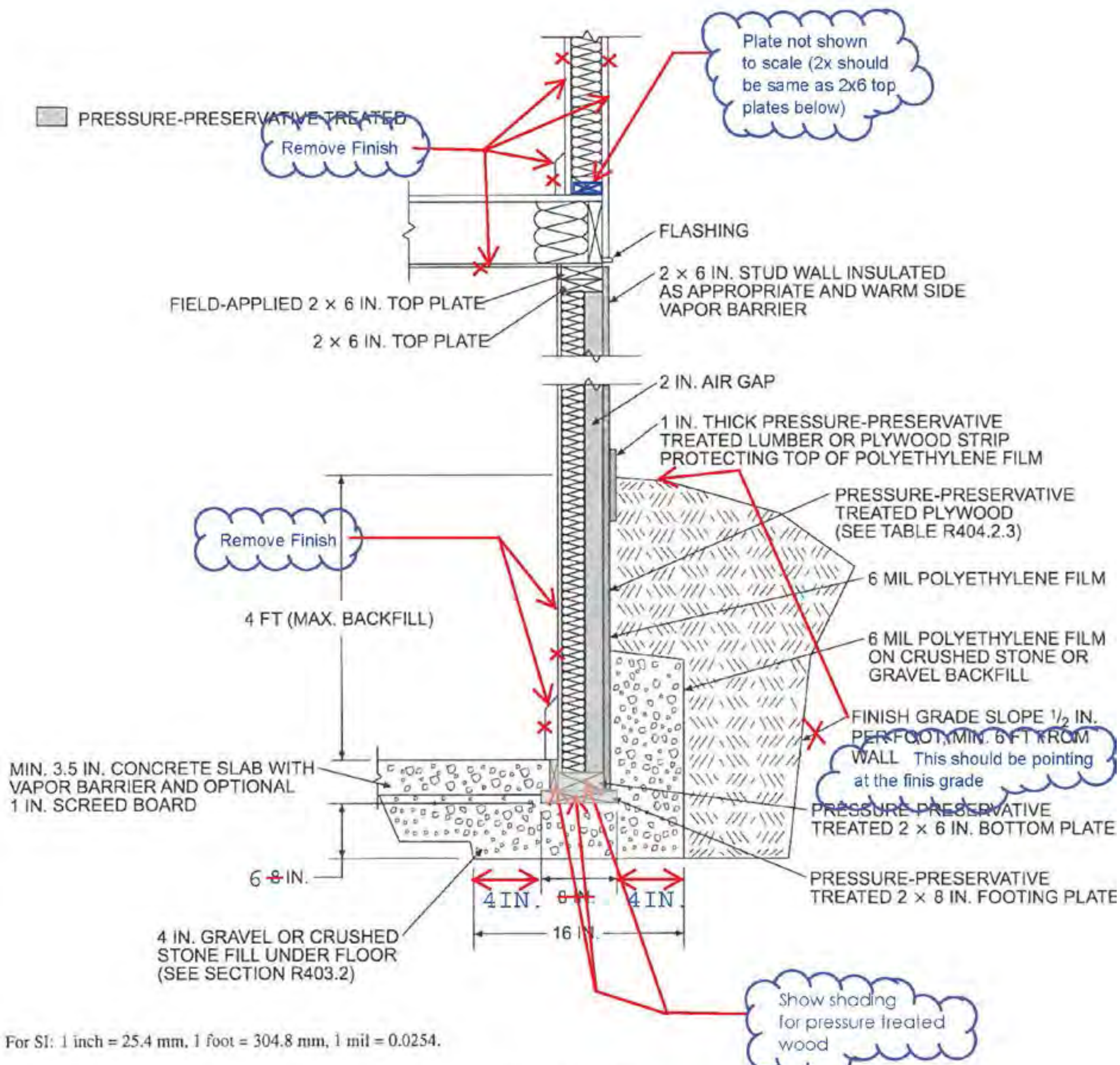
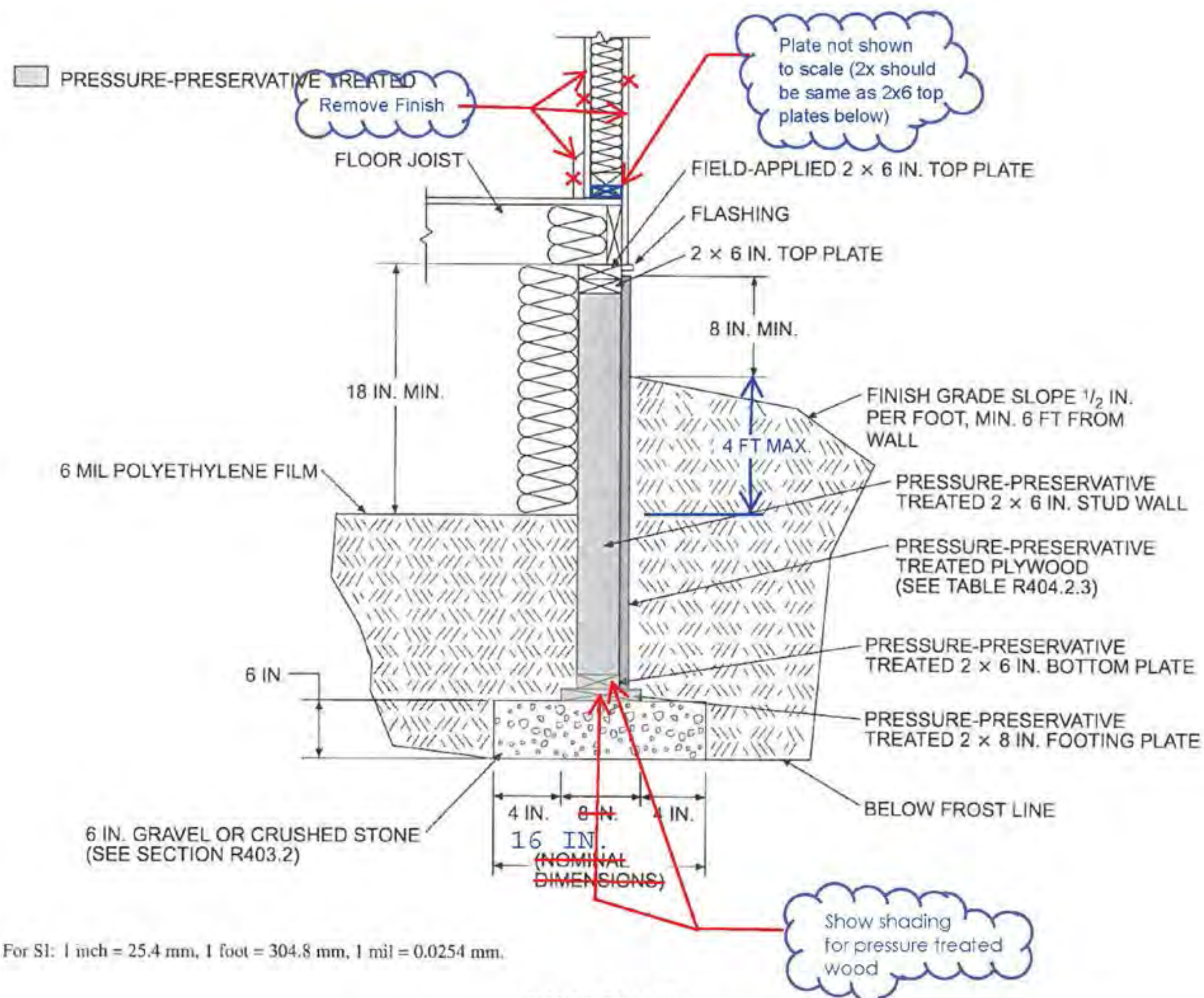


FIGURE R403.1(2)
PERMANENT WOOD FOUNDATION BASEMENT WALL SECTION



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mil = 0.0254 mm.

FIGURE R403.1(3)
PERMANENT WOOD FOUNDATION CRAWL SPACE SECTION

Reason: The proposed changes to the permanent wood foundation contain numerous changes to help clarify and bring conformity to the two figures.

The proposal contains mostly editorial changes, including:

- The removal of the building finishes
- Shading the pressure treated wood bottom and foundation plates
- Making the thickness, width and the dimension callouts of the gravel or crushed stone fill similar in both figures
- Showing the floor sill plate dimensionally accurate
- In figure R403.1(2) for the finish grade callout, change the arrow to point to the actual grade

In Figure R403.1(3) the addition of the 4ft height limitation is to set the upper bound on the height of the wall, similar to the limitation of R403.1(2). With the dimensions as currently shown, there is no upper bound on the unbalanced backfill height.

Cost Impact: This code change proposal will not increase construction cost.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The figure clarifies the requirement for wood foundation and sets the maximum unbalanced backfill height.

Assembly Action: **None**

Final Hearing Results

RB213-13	**AS**

Code Change No: RB214-13

Original Proposal

Section(s): R403.1.2, R602.10.9.1

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R403.1.2 Continuous footing in Seismic Design Categories D_0, D_1 and D_2. The *braced wall panels* at exterior walls of buildings located in Seismic Design Categories D_0, D_1 and D_2 shall be supported by continuous footings. ~~All required interior *braced wall panels* in buildings with plan dimensions greater than 50 feet (15 240 mm) shall also be supported by continuous footings~~. For one-story buildings in Seismic Design Category D_2 and one- and two-story buildings in Seismic Design Categories D_0 and D_1, *braced wall panel*s shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). For two-story buildings in Seismic Design Category D_2, all *braced wall panel*s shall be supported on continuous foundations.

Revise as follows:

R602.10.9.1 Braced wall panel support for Seismic Design ~~Category~~ Categories D_0, D_1 and D_2. ~~In one-story buildings located in Seismic Design Category D2, *braced wall panels* shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). In two-story buildings located in Seismic Design Category D2, all *braced wall panel*s shall be supported on continuous foundations.~~ In Seismic Design Categories D_0, D_1 and D_2 braced wall panel footings shall be as specified in Section R403.1.2.

> ~~**Exception:** Two-story buildings shall be permitted to have interior *braced wall panel*s supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:~~
>
> ~~1. The height of cripple walls does not exceed 4 feet (1219 mm).~~
> ~~2. First-floor *braced wall panel*s are supported on doubled floor joists, continuous blocking or floor beams.~~
> ~~3. The distance between bracing lines does not exceed twice the building width measured parallel to the *braced wall line*.~~

Reason: The intent of this code change proposal is to clarify the foundation requirements under braced wall panels in high seismic areas. The existing provisions in Chapters 4 and 6 are contradictory and incomplete. In addition, there is no specific guidance on what to do in SDCs D_0 and D_1 for interior braced wall panels. Section R602.10.9.1 provides some guidance by inference that it tells you what to do in SDC D_2:

> ***"***In one-story buildings located in Seismic Design Category D2, *braced wall panel*s shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm).*"*

The inference is that in lesser SDCs, both one and two story buildings shall be supported on continuous footings at intervals exceeding 50 feet. This is in line with the existing Section 403.1.2.

In addition, Section R602.10.9.1, as written, provides for the SDC D_2, two story buildings, an exception to the "all braced wall panel" restriction, if all of 3 seemingly arbitrary limitations are met. The benefit of this unlikely exception is far exceeded by the complexity of the existing code with the exception. This proposal removed this unlikely exception and reformats the Section R602.10.9.1 information and moves it to the foundation chapter in Section R403.1.2.

Note that the exception is removed, making the code more stringent or removing a loophole, depending on your perspective. There is little doubt that it strengthens the foundation requirements for two-story buildings in SDC D_2. It certainly reduced a loop hole that weakens the code requirements for the most vulnerable of structures in a very limited area in the US.

Cost Impact: The code change proposal will increase the cost of construction in that it will eliminate the unlikely exception permitting two story structures in SDC D_2 to have minimal *braced wall panel* support.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R403.1.2 Continuous footing in Seismic Design Categories D_0, D_1 and D_2. The *braced wall panels* at exterior walls of buildings located in Seismic Design Categories D_0, D_1 and D_2 shall be supported by continuous footings. <u>All required interior *braced wall panels* in buildings with plan dimensions greater than 50 feet (15 240 mm) shall also be supported by continuous footings, except for two-story buildings in Seismic Design Category D_2, in which all *braced wall panels*, interior and exterior, shall be supported on continuous foundations.</u> ~~For one-story buildings in Seismic Design Category D_2 and one- and two-story buildings in Seismic Design Categories D_0 and D_1, *braced wall panels* shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). For two-story buildings in Seismic Design Category D_2, all *braced wall panels* shall be supported on continuous foundations.~~

<u>**Exception:** Two-story buildings shall be permitted to have interior *braced wall panels* supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:</u>

1. <u>The height of cripple walls does not exceed 4 feet (1219 mm).</u>
2. <u>First-floor *braced wall panels* are supported on doubled floor joists, continuous blocking or floor beams.</u>
3. <u>The distance between bracing lines does not exceed twice the building width measured parallel to the *braced wall line*.</u>

(Portions of code change not shown remain unchanged)

Committee Reason: This change clarifies the foundation requirements for braced wall panels in high seismic areas and moves all the requirements into Chapter 4. The modifications clarifies the foundation requirements for interior and exterior braced wall panels and retains the exception to allow first floor interior based wall panels to be supported by floor framing.

Assembly Action: **None**

Final Hearing Results

RB214-13 **AM**

Code Change No: RB215-13

Original Proposal

Section(s): R403.1.2, R403.1.4.2

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee (BajnaiC@chesterfield.gov)

Revise as follows:

R403.1.2 Continuous footing in Seismic Design Categories D_0, D_1 and D_2. ~~The *braced wall panels* at~~ exterior walls of buildings located in Seismic Design Categories D_0, D_1 and D_2 shall be supported by continuous solid or fully grouted masonry or concrete footings. Other footing materials or systems shall be designed in accordance with accepted engineering practice. All required interior *braced wall panels* in buildings located in Seismic Design Categories D_0, D_1 and D_2 with plan dimensions greater than 50 feet (15 240 mm) shall also be supported by continuous solid or fully grouted masonry or concrete footings~~.~~ in accordance with Section R403.1.4.2.

R403.1.4.2 Bearing and braced wall panel support in Seismic Design Categories D_0, D_1 and D_2. ~~**Seismic conditions**~~ In Seismic Design Categories D_0, D_1 and D_2, interior footings supporting bearing walls or *braced wall panels,* ~~bracing walls~~ and cast monolithically with a slab on *grade*, shall extend to a depth of not less than 12 inches (305 mm) below the top of the slab.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The International Code Council's Building Code Action Committee identified several items in Chapter 4, "Foundations", that are in conflict with other provisions of the code or lack clarity. This proposal specifically addresses conflicts and confusing language.

In the current code, section R403.1 states,

*"**R403.1 General.** All exterior walls shall be supported on continuous solid or fully grouted masonry or concrete footings, crushed stone footings, wood foundations, or other approved structural systems which shall be of sufficient design to accommodate all loads according to Section R301 and to transmit the resulting loads to the soil within the limitations as determined from the character of the soil."*

Then, for Seismic Design Categories D_0, D_1 and D_2 specifically, R403.1.2 repeats that requirement by specifying that the braced wall panels in exterior walls in Seismic Design Categories D_0, D_1 and D_2 are required to be supported by continuous footings. That portion of R403.1.2 is redundant and actually implies a conflict with other sections of code. The existing language is also in conflict with section R301.2.2.5 that allows braced wall panels supported on cantilevered floor framing.

As shown above, the general requirements of Section R403.1 refers to, "crushed stone footings and wood foundations". However, per sections R401.1 and R403.4.1, wood foundations and crushed stone footings are limited to use in Seismic Design Categories A, B and C. Section R403.1.2 is specifically addressing Seismic Design Categories D_0, D_1 and D_2 where they are not allowed without being designed. That clarification is made with this proposal.

This proposal is to change the first sentence to refer specifically to the requirement for Seismic Design Categories D_0, D_1 and D_2 and to note the limitations of wood and crushed stone footings.

The second sentence of R403.1.2 specifies another requirement of Seismic Design Categories D_0, D_1 and D_2.. The second sentence requires that interior braced wall panels are required to be supported by continuous footings at not greater than 50 intervals. That requirement is unchanged in this proposal but is clarified to specify continuous solid or fully-grouted masonry or concrete footings. Terminology is also changed in section R403.1.2 to correlate with current language in the wall bracing requirements of Chapter 6.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent’s published reason.

Assembly Action: **None**

Final Hearing Results

RB215-13	**AS**

Code Change No: RB216-13

Original Proposal

Section(s): R403.1.3, R403.1.3.1, R403.1.3.2, R403.1.3.5 (NEW), R403.1.3.5.1 (NEW), R403.1.3.5.2 (NEW), R403.1.3.5.3 (NEW), R403.1.3.5.4 (NEW), R403.1.3.6 (NEW), R403.1.4.2

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee (BajnaiC@chesterfield.gov)

Revise as follows:

R403.1.3 ~~Seismic reinforcing~~ Footing and stem wall reinforcing in Seismic Design Categories D_0, D_1 and D_2. Concrete footings located in Seismic Design Categories D_0, D_1 and D_2, as established in Table R301.2(1), shall have minimum reinforcement in accordance with this section. ~~Bottom r~~Reinforcement shall be ~~located~~ installed in accordance with Section R403.1.3.5. ~~a minimum of 3 inches (76 mm) clear from the bottom of the footing.~~

~~In Seismic Design Categories D_0, D_1 and D_2 where a construction joint is created between a concrete footing and a stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing have a standard hook and extend a minimum of 14 inches (357 mm) into the stem wall.~~

~~In Seismic Design Categories D_0, D_1 and D_2 where a grouted masonry stem wall is supported on a concrete footing and stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing and have a standard hook. In Seismic Design Categories D_0, D_1 and D_2 masonry stem walls without solid grout and vertical reinforcing are not permitted.~~

> ~~**Exception:** In detached one- and two-family *dwellings* which are three stories or less in height and constructed with stud bearing walls, isolated plain concrete footings, supporting columns or pedestals are permitted.~~

~~**R403.1.3.1 Foundations with stemwalls.** Foundations with stem walls shall have installed a minimum of one No. 4 bar within 12 inches (305 mm) of the top of the wall and one No. 4 bar located 3 inches (76 mm) to 4 inches (102 mm) from the bottom of the footing.~~

R403.1.3.1 Concrete stem walls with concrete footings. In Seismic Design Categories D_0, D_1 and D_2 where a construction joint is created between a concrete footing and a concrete stem wall, a minimum of one No. 4 vertical bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to the bottom of the footing and shall have a standard hook and extend a minimum of 14 inches (357 mm) into the stem wall. Standard hooks shall comply with Section R611.5.4.5. A minimum of one No. 4 horizontal bar shall be installed within 12 inches (305 mm) of the top of the stem wall and one No. 4 horizontal bar shall be located three to four inches from the bottom of the footing.

R403.1.3.2 Masonry stem walls with concrete footings. In Seismic Design Categories D_0, D_1 and D_2 where a masonry stem wall is supported on a concrete footing, a minimum of one No. 4 vertical bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to the bottom of the footing and have a standard hook and extend a minimum of 14 inches (357 mm) into the stem wall. Standard hooks shall comply with Section R611.5.4.5. A minimum of one No. 4 horizontal bar shall be installed within 12 inches (305 mm) of the top of the wall and one No. 4 horizontal bar shall be located three to four inches from the bottom of the footing. Masonry stem walls shall be solid grouted.

~~R403.1.3.2~~ **R403.1.3.3 Slabs-on-ground with turned-down footings.** In Seismic Design Categories D_0, D_1 and D_2, Slabs on ground cast monolithically with turned down footings shall have a minimum of one No. 4 bar at the top and the bottom of the footing or one No. 5 bar or two No. 4 bars in the middle third of the footing depth..

~~**Exception:** For slabs-on-ground cast monolithically with the footing, locating one No. 5 bar or two No. 4 bars in the middle third of the footing depth shall be permitted as an alternative to placement at the footing top and bottom.~~

Where the slab is not cast monolithically with the footing~~,~~ one No. 3 or larger vertical dowels with standard hooks on each end shall be ~~provided~~ installed at not more than 4 feet (1219 mm) on center in accordance with Figure R403.1.3.2 . Standard hooks shall comply with Section R611.5.4.5.

~~**R403.1.4.2 Seismic conditions**~~ **R403.1.3.4 Interior bearing and braced wall panel footings in Seismic Design Categories D_0, D_1 and D_2.** In Seismic Design Categories D_0, D_1 and D_2, interior footings supporting bearing walls or *braced wall panels,* ~~bracing walls~~ and cast monolithically with a slab on *grade*, shall extend to a depth of not less than 12 inches (305 mm) below the top of the slab.

R403.1.3.5 Reinforcement. Footing and stem wall reinforcement shall comply with Sections R403.1.3.5.1 through R403.1.3.5.4.

R403.1.3.5.1 Steel reinforcement. Steel reinforcement shall comply with the requirements of ASTM A 615, A 706, or A 996. ASTM A 996 bars produced from rail steel shall be Type R. In buildings assigned to Seismic Design Category A, B or C, the minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa). In buildings assigned to Seismic Design Category D0, D1 or D2, reinforcing steel shall comply with the requirements of ASTM A 706 for low-alloy steel with a minimum yield strength of 60,000 psi (Grade 60) (414 MPa).

R403.1.3.5.2 Location of reinforcement in wall. The center of vertical reinforcement in stem walls shall be located at the centerline of the wall. Horizontal and vertical reinforcement shall be located in footings and stem walls to provide the minimum cover required by Section R403.1.3.5.3.

R403.1.3.5.3 Support and cover. Reinforcement shall be secured in the proper location in the forms with tie wire or other bar support system to prevent displacement during the concrete placement operation. Steel reinforcement in concrete cast against the earth shall have a minimum cover of 3 inches (75 mm). Minimum cover for reinforcement in concrete cast in removable forms that will be exposed to the earth or weather shall be 1-1/2 inches (38 mm) for No. 5 bars and smaller, and 2 inches (50 mm) for No. 6 bars and larger. For concrete cast in removable forms that will not be exposed to the earth or weather, and for concrete cast in stay-in-place forms, minimum cover shall be 3/4 inch (19 mm). The minus tolerance for cover shall not exceed the smaller of one-third the required cover or 3/8 inch (10 mm).

R403.1.3.5.4 Lap splices. Vertical and horizontal reinforcement shall be the longest lengths practical. Where splices are necessary in reinforcement, the length of lap splice shall be in accordance with Table R611.5.4.(1) and Figure R611.5.4(1). The maximum gap between noncontact parallel bars at a lap splice shall not exceed the smaller of one-fifth the required lap length and 6 inches (152 mm). See Figure R611.5.4(1).

R403.1.3.6 Isolated concrete footings. In detached one- and two-family *dwellings* which are three stories or less in height and constructed with stud bearing walls, isolated plain concrete footings, supporting columns or pedestals are permitted.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the

BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The International Code Council's Building Code Action Committee identified several items in Chapter 4, "Foundations", that are in conflict with other provisions of the code or lack clarity. This proposal specifically addresses conflicts and confusing language in the current sections of code that address reinforcement required for Seismic Design Categories D0, D1 and D2.

The title and language in section R403.1.3 is changed for clarity. Additionally, a note is added that references a new section, R403.1.3.4, that defines the installation requirements for the reinforcement.

The existing language describing concrete stem walls and masonry stem walls on concrete footings are separated into two sections, "Concrete stem walls" and "Masonry stem walls" respectively.

Section R403.1.3.1 describes the existing requirements for the horizontal reinforcement at the top of the stem wall and the bottom of the footing. This proposal deletes that section and incorporates the language into the two sections describing the requirements for the stem wall, R403.1.3.1 and R403.1.3.2 respectively.

The language in the existing section R403.1.3.2 for slabs on ground is changed to clarify that this section is addressing turned down footings cast monolithically with the slab since there are new provisions in the code to allow turned down footings that are not cast monolithically with the slab. Also, the existing exception for the reinforcement to be installed in the middle third of the footing have been moved into the section instead of being an exception.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal needs additional work and brought back. An inappropriate standard, ASTM A706 is referenced in R403.1.3.5.1. Sections R403.1.3.1 and R403.1.3.2 require vertical bars to extend to the bottom of the footing and no clearance is specified.

Assembly Action: **None**

Public Comments

Public Comment:

Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R403.1.3 Footing and stem wall reinforcing in Seismic Design Categories D_0, D_1 and D_2 . Concrete footings located in Seismic Design Categories D_0, D_1 and D_2, as established in Table R301.2(1), shall have minimum reinforcement in accordance with this section. Reinforcement shall be installed with support and cover in accordance with Section R403.1.3.5.

R403.1.3.1 Concrete stem walls with concrete footings. In Seismic Design Categories D_0, D_1 and D_2 where a construction joint is created between a concrete footing and a concrete stem wall, a minimum of one No. 4 vertical bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall have a standard hook and extend to the bottom of the footing and shall have support and cover as specified in Section R403.1.3.5.3. ~~a standard hook~~ and extend a minimum of 14 inches (357 mm) into the stem wall. Standard hooks shall comply with Section R611.5.4.5. A minimum of one No. 4 horizontal bar shall be installed within 12 inches (305 mm) of the top of the stem wall and one No. 4 horizontal bar shall be located at the bottom of the footing.

R403.1.3.2 Masonry stem walls with concrete footings. In Seismic Design Categories D_0, D_1 and D_2 where a masonry stem wall is supported on a concrete footing, a minimum of one No. 4 vertical bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall have a standard hook and extend to the bottom of the footing and shall have support and cover as specified in Section R403.1.3.5.3.~~and have a standard hook.~~ and extend a minimum of 14 inches (357 mm) into the stem wall. Standard hooks shall comply with Section R611.5.4.5. A minimum of one No. 4 horizontal bar shall be installed within 12 inches (305 mm) of the top of the wall and one No. 4 horizontal bar shall be at the bottom of the footing. Masonry stem walls shall be solid grouted.

R403.1.3.3 Slabs-on-ground with turned-down footings. In Seismic Design Categories D_0, D_1 and D_2, Slabs on ground cast monolithically with turned down footings shall have a minimum of one No. 4 bar at the top and the bottom of the footing or one No. 5 bar or two No. 4 bars in the middle third of the footing depth.

Where the slab is not cast monolithically with the footing, one No. 3 or larger vertical dowels with standard hooks on each end shall be installed at not more than 4 feet (1219 mm) on center in accordance with Figure R403.1(1). Standard hooks shall comply with Section R611.5.4.5.

R403.1.3.4 Interior bearing and braced wall panel footings in Seismic Design Categories D_0, D_1 and D_2. In Seismic Design Categories D0, D1 and D2, interior footings supporting bearing walls or *braced wall panels* and cast monolithically with a slab on *grade* shall extend to a depth of not less than 12 inches (305 mm) below the top of the slab.

R403.1.3.5 Reinforcement. Footing and stem wall reinforcement shall comply with Sections R403.1.3.5.1 through R403.1.3.5.4

R403.1.3.5.1 Steel reinforcement. Steel reinforcement shall comply with the requirements of ASTM A 615, A 706, or A 996. ASTM A 996 bars produced from rail steel shall be Type R~~. In buildings assigned to Seismic Design Category A, B or C, t~~The minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa). ~~In buildings assigned to Seismic Design Category D0, D1 or D2, reinforcing steel shall comply with the requirements of ASTM A 706 for low-alloy steel with a minimum yield strength of 60,000 psi (Grade 60) (414 MPa).~~

R403.1.3.5.2 Location of reinforcement in wall. The center of vertical reinforcement in stem walls shall be located at the centerline of the wall. Horizontal and vertical reinforcement shall be located in footings and stem walls to provide the minimum cover required by Section R403.1.3.5.3.

R403.1.3.5.3 Support and cover. Reinforcement shall be secured in the proper location in the forms with tie wire or other bar support system to prevent displacement during the concrete placement operation. Steel reinforcement in concrete cast against the earth shall have a minimum cover of 3 inches (75 mm). Minimum cover for reinforcement in concrete cast in removable forms that will be exposed to the earth or weather shall be 1-1/2 inches (38 mm) for No. 5 bars and smaller, and 2 inches (50 mm) for No. 6 bars and larger. For concrete cast in removable forms that will not be exposed to the earth or weather, and for concrete cast in stay-in-place forms, minimum cover shall be 3/4 inch (19 mm). ~~The minus tolerance for cover shall not exceed the smaller of one-third the required cover or 3/8 inch (10 mm).~~

R403.1.3.5.4 Lap splices. Vertical and horizontal reinforcement shall be the longest lengths practical. Where splices are necessary in reinforcement, the length of lap splice shall be in accordance with Table R611.5.4(1) and Figure R611.5.4(1). The maximum gap between noncontact parallel bars at a lap splice shall not exceed the smaller of one-fifth the required lap length and 6 inches (152 mm). See Figure R611.5.4(1).

R403.1.3.5 Isolated concrete footings. In detached one- and two-family *dwellings* which are three stories or less in height and constructed with stud bearing walls, isolated plain concrete footings, supporting columns or pedestals are permitted.

Commenter's Reason: The ICC Building Code Action Committee (BCAC) identified several items in Chapter 4, "Foundations", that are in conflict with other provisions of the code or lack clarity. The original proposal specifically addressed conflicts and confusing language in the current sections of code that address reinforcement required for Seismic Design Categories D0, D1 and D2. The items that were intended to be addressed are listed in the original reason statement.

There were some items about the original proposal that were brought up at the Committee Action Hearings and this public comment addresses those items.

1. There was an inaccurate reference to ASTM A706 standard in R403.1.3.5.1. This language is not new in the code. The new section (R403.1.3.5.1) in the proposal specifying the reinforcement materials was copied from the existing section R404.1.2.3.7. The portions of the section that are deleted from R403.1.3.5.1 in this public comment should not have been copied over.
2. The Report of Hearings also stated that in Sections R403.1.3.1 and R403.1.3.2 the proposed language merely specified that ***"…the vertical bars to extend to the bottom of the footing and no clearance is specified."*** This was intentional in the original proposal. The original language in this section specified that*, "The vertical bar shall extend to 3 inches (76mm) clear of the bottom of the footing…"* In section R403.1.3.1 it stated that footings shall have *"…one No. 4 bar located 3 inches (76mm) to 4 inches (102mm) from the bottom of the footing."* There were no other clearances specified such as to the formwork or where the concrete will not be exposed to earth or weather. These clearances are defined in ACI standards and also currently exist in R404.1.2.3.7.4. The original proposal removed the one specific clearance requirement and added a new section, copied from R404.1.2.3.7.4, to cover all clearances and support. This new section is referenced in the charging statement in R403.1.3 and applies to all the sections that follow.

Final Hearing Results

RB216-13	**AMPC**

Code Change No: RB217-13

Original Proposal

Section(s): R403.1.6

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org); Bonnie E. Manley, P.E., American Iron and Steel Institute

Revise as follows:

R403.1.6 Foundation anchorage. Wood sill plates and wood walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.

Cold-formed steel framing shall be anchored directly to the foundation or fastened to wood sill plates anchored to the foundation. Anchorage of cold-formed steel framing and sill plates supporting cold-formed steel framing shall be in accordance with this section and Sections R505.3.1 or R603.3.1.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of braced wall panels at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet (1829 mm) on center. Bolts shall be at least 1/2 inch (12.7 mm) in diameter and shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a braced wall panel shall be positively anchored with approved fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. ~~Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.~~

Reason: The purpose of this proposal is to clarify the foundation anchorage requirements for cold-formed steel framing systems. Currently, the anchorage requirements for cold-formed steel are part of a larger paragraph mostly concerning wood framing. This proposal moves the cold-formed steel requirements to a separate paragraph. This paragraph becomes “charging language” which points the user to the appropriate CFS provisions in Chapters 5 and 6. In addition, the language is revised to clarify that both the provisions of Section R403.1.6 and the applicable provisions of Section R505.3.1 (for cold-formed steel floor framing) and Section R603.3.1 (for cold-formed steel wall framing) need to be followed. This is to insure that anchor bolt spacing and embedment requirements specific to cold-formed steel and detailed in Sections R505.3.1 and R603.3.1 are not overlooked or inadvertently overridden.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent’s published reason.

Assembly Action: **None**

Final Hearing Results

RB217-13 **AS**

Code Change No: RB218-13

Original Proposal

Section(s): R403.1.6

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahg.org)

Revise as follows:

R403.1.6 Foundation anchorage. Sill plates and walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of braced wall panels at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with minimum 1/2 inch (12.7 mm) diameter anchor bolts spaced a maximum of 6 feet (1829 mm) on center or *approved* anchors or anchor straps spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts. Bolts shall ~~be at least 1/2 inch (12.7 mm) in diameter and shall~~ extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a braced wall panel shall be positively anchored with approved fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.

Exceptions:

~~1. Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch-diameter (13 mm) anchor bolts.~~

~~2~~1. Walls 24 inches (610 mm) total length or shorter connecting offset braced wall panels shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent braced wall panels at corners as shown in item 8 of Table R602.3(1).

~~3~~2. Connection of walls 12 inches (305 mm) total length or shorter connecting offset braced wall panels to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent braced wall panels at corners as shown in item 8 of Table R602.3(1).

Reason: The purpose of this proposal is to clarify the foundation anchorage requirements by moving the current exception for alternate foundation anchor systems providing equivalent capacity to ½" anchor bolts spaced at 6'-0" (or as otherwise required by the code or design) into the main text of R403.1.6. The revised language is similar to 2012 IBC Section 2308.6. This will place the use of wedge anchors, expansion anchors, adhesive anchors, mudsill anchors and other alternatives approved by the building official on an equal level with cast-in-place anchor bolts.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB218-13	**AS**

Code Change No: RB219-13

Original Proposal

Section(s): R403.1.6

Proponent: Hope Medina, Colorado Code Consulting, representing Colorado Chapter of ICC (hmedina@coloradocode.net)

Revise as follows:

R403.1.6 Foundation anchorage. Sill plates and walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of braced wall panels at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet (1829 mm) on center. Bolts shall be at least 1/2 inch (12.7 mm) in diameter and shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. <u>The bolts shall be located a minimum 1 ¾" from the plate's edge or in the middle third of the plate's edge.</u> A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a braced wall panel shall be positively anchored with approved fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.

Exceptions:

1. Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts.
2. Walls 24 inches (610 mm) total length or shorter connecting offset *braced wall panels* shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent *braced wall panels* at corners as shown in item 8 of Table R602.3(1).
3. Connection of walls 12 inches (305 mm) total length or shorter connecting offset *braced wall panels* to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent *braced wall panels* at corners as shown in item 8 of Table R602.3(1).

Reason: It has become a common occurrence to see an anchor bolt placed at the edge of the sole plate, and on many occasions the threads of the bolt are visible. The "practicing industry standard" is for the bolt to be located at least two bolt diameters from the plate's edge, but there is nothing in the IRC to govern this. We require two bolts per plate, within 12" of a break, and spaced no more than 6 feet apart, but nothing plainly referencing it's placement from the plates edge. Having a specified placement of the bolt in the bottom plate allows for proper enforcement while still giving some flexibility to the contractors.
Simpson Strong Tie has performed tests demonstrating that the bolt lost the expected anchoring capacity when placed closer than 1 ¾" from the plate's edge.

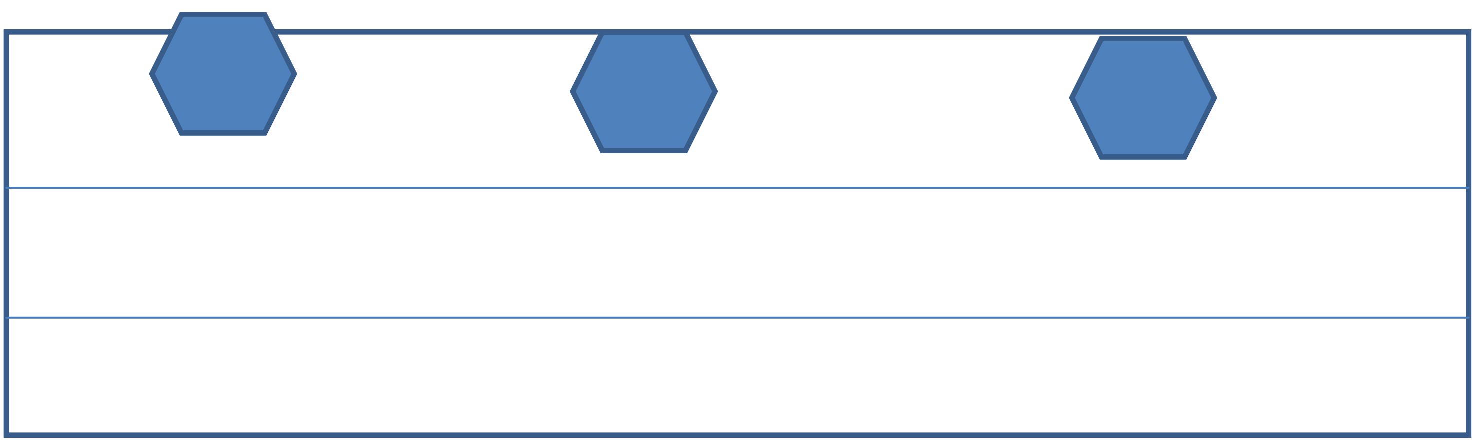
Both the Simpson Strong Tie Wood Construction Connectors 2011-2012 edition and the USP Structural Connectors state that their connectors must have a minimum placement of 1 ¾ inches from the edge.
The IRC reference the NDS for wood design for items not covered in the code like wood edge and end distances. The 2012 NDS has edge distance of ¾" for shear and 2" for wind loads (Table 11.5.1C). So if the edge distance is 1-1/8" you would need to reduce the anchor capacity with an 0.56 allowable load adjustment factor (1.125/2) when resisting wind loads. So you can space in the middle 1/3 of plate, but you may need to increase the number of bolts for wind.

In chapter 7 of the National Design Specifications for wood construction reference of anchor bolt placement.

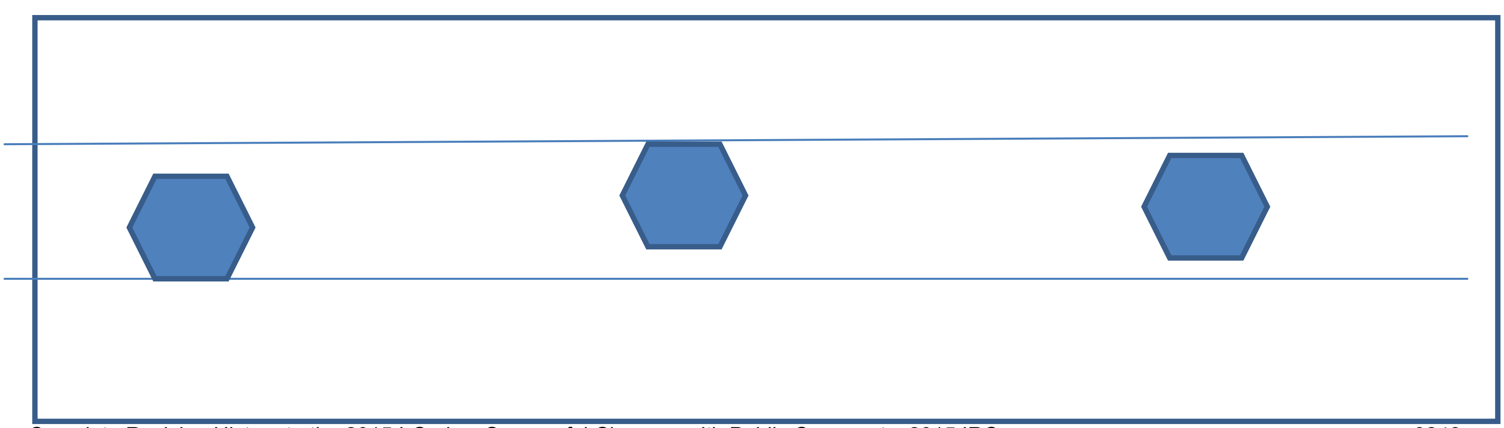
Spacing, Edge, and End Distance

The center-to-center distance along the grain should be at least four times the bolt diameter for parallel-to-grain loading. The minimum center-to-center spacing of bolts in the across-the-grain direction for loads acting through metal side plates and parallel to the grain need only be sufficient to permit the tightening of the nuts. For wood side plates, the spacing is controlled by the rules applying to loads acting parallel to grain if the design load approaches the bolt-bearing capacity of the side plates. When the design load is less than the bolt-bearing capacity of the side plates, the spacing may be reduced below that required to develop their maximum capacity.

COMMON PLACEMENT OF BOLTS IN THE FIELD



PROPER PLACEMENT OF BOLTS WITH CODE CHANGE



Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R403.1.6 Foundation anchorage. Sill plates and walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of braced wall panels at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet (1829 mm) on center. Bolts shall be at least 1/2 inch (12.7 mm) in diameter and shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. The bolts shall be located ~~a minimum 1 ¾" from the plate's edge or~~ in the middle third of the plate~~'s edge~~. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a braced wall panel shall be positively anchored with approved fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.

(Portions of code change not shown remain unchanged)

Committee Reason: Approval was based upon the proponent's published reason. The modification clarifies the location of the anchor bolt relative to the middle third of the plate.

Assembly Action: **None**

Public Comments

Public Comment:

Hope Medina, Cherry Hills Village, representing Colorado Code Consulting, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R403.1.6 Foundation anchorage. Sill plates and walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of braced wall panels at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet (1829 mm) on center. Bolts shall be at least 1/2 inch (12.7 mm) in diameter and shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. The bolts shall be located in the middle third of the width of the plate. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a braced wall panel shall be positively anchored with approved fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.

Exceptions:

1. Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts.
2. Walls 24 inches (610 mm) total length or shorter connecting offset *braced wall panels* shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent *braced wall panels* at corners as shown in item 8 of Table R602.3(1).
3. Connection of walls 12 inches (305 mm) total length or shorter connecting offset *braced wall panels* to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent *braced wall panels* at corners as shown in item 8 of Table R602.3(1).

Commenter's Reason: The addition of the word width was added to circumvent any misunderstandings of where the middle third of the plate is located

Final Hearing Results

RB219-13	**AMPC**

Code Change No: RB221-13

Original Proposal

Section(s): Table R403.3(1)

Proponent: Betsy Steiner, EPS Molders Association (emsteiner@epsindustry.org)

Revise as follows:

TABLE R403.3(1)
MINIMUM FOOTING DEPTH AND INSULATION REQUIREMENTS FOR FROST-PROTECTED FOOTINGS IN HEATED BUILDINGS[a]

e. Horizontal insulation shall be expanded polystyrene insulation or extruded polystyrene insulation.

(Portions of Table not shown remain unchanged)

Reason: Expanded polystyrene is widely recognized for use in below grade applications, specifically geofoam installments (as recognized by the Federal Highway Administration) as a means to achieve slope stabilization, bridge abutments and other seismic loading functions in all climate zones, including those experiencing severe freeze-thaw cycling. The National Association of Home Builders Research Center also recognizes expanded polystyrene as suitable for horizontal applications in its publication "Revised Builder's Guide To Frost Protected Shallow Foundations," September 2004.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change adds an alternate product for horizontal insulation for frost protection footings.

Assembly Action: **None**

Final Hearing Results

RB221-13 **AS**

Code Change No: RB222-13

Original Proposal

Section(s): Figure R403.4(1), Table R403.4

Proponent: Paul Edward Helderman Jr., Codes and Standards Manager, Superior Walls of America, Ltd., representing Lancaster County Code Officials (LANCODE)

Revise as follows:

TABLE R403.4
MINIMUM DEPTH OF CRUSHED STONE FOOTINGS (D), (inches)

Number of Stories	Uniform Wall Load	Load Bearing Value of Soil (psf)															
		1500				2000				3000				4000			
		MH,CH,CL,ML				SC,GC,SM,GM,SP,SW				GP,GW							
		Wall width (inches)				Wall width (inches)				Wall width (inches)				Wall width (inches)			
		6	8	10	12	6	8	10	12	6	8	10	12	6	8	10	12
Conventional light-frame construction																	
1-Story	(1100plf)	6	4	4	4	6	4	4	4	6	4	4	4	6	4	4	4
2-Story	(1800plf)	8	6	4	4	6	4	4	4	6	4	4	4	6	4	4	4
3-Story	(2900plf)	16	14	12	10	10	8	6	6	6	4	4	4	6	4	4	4
4-inch brick veneer over light-frame or 8-inch hollow concrete masonry																	
1-Story	(1500plf)	6	4	4	4	6	4	4	4	6	4	4	4	6	4	4	4
2-Story	(2700plf)	14	12	10	8	10	8	6	4	6	4	4	4	6	4	4	4
3-Story	(4000plf)	22	22	20	18	16	14	12	10	10	8	6	4	6	4	4	4
8-inch solid or fully grouted masonry																	
1-Story	(2000plf)	10	8	6	4	6	4	4	4	6	4	4	4	6	4	4	4
2-Story	(3600plf)	20	18	16	16	14	12	10	8	8	6	4	4	6	4	4	4
3-Story	(5300plf)	32	30	28	26	22	22	20	18	10	12	10	8	10	8	6	4

For SI: 1 inch =25.4 mm, ~~1 pound per square inch = 6.89 pounds per linear foot,~~ 1 plf = ~~2.44~~14.6 N/m, 1 pounds per square foot = 47.9 N/m^2

Notes:

1. Linear interpolation of stone depth between wall widths is permitted within each Load Bearing Value of Soil (psf)

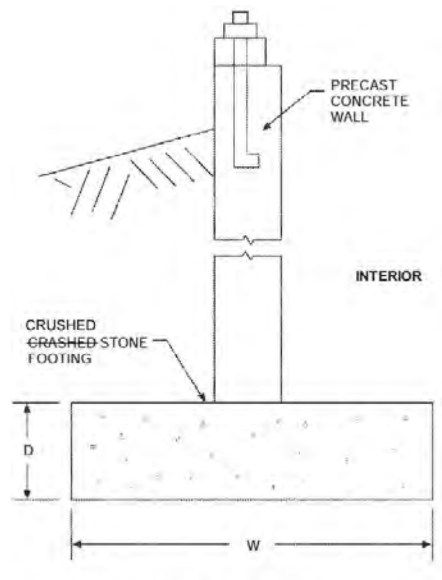


FIGURE R403.4(1)
BASEMENT OR CRAWL SPACE WITH PRECAST
FOUNDATION WALL BEARING ON CRUSHED STONE

Reason: This table is already in the code and it shows a code official a simple way to estimate the crushed stone depth for any precast foundation wall between 6 inches to 12 inches in width. The reason for this proposal is to add headings column 1 and 2 for clarification. The conversion information at the bottom of the table was incorrect and has already been identified by the technical staff of the ICC and will be published as an erratum and corrected in the next printing of the 2012 IRC and the 2009 IRC.

A note has been added pointing out that linear interpolation may be used to determine stone depth for wall widths not shown on the table if those wall widths are between 6 and 12 inches.

For example: An 11 inch precast foundation wall is setting on 1500 psf soil and it will be carrying a uniform wall load of 4000plf because the house will be a 3-story 4-inch brick veneer over light-frame construction. To calculate the minimum depth of the crushed stone footing required by the table you must interpolate between 18 inches of stone for a 12 inch wall width, and 20 inches of stone for a 10 inch wall width. This gives you an interpolated value of 19 inches minimum depth of crushed stone for a 3 story home with 4-inches of brick veneer over light-frame construction (4000plf) for an 11 inch wall width setting on 1500 psf soil. Note: You cannot interpolate between two different soil bearing values of soil.

Example: Answer = **19 inches** - based on interpolation (3 story home, 11 inch precast foundation wall width, on 1500 psf soil.)

TABLE R403.4
MINIMUM DEPTH OF CRUSHED STONE FOOTINGS (D), (inches)

Number of Stories	Uniform Wall Load	Load Bearing Value of Soil (psf)															
		1500				2000				3000				4000			
		MH,CH,CL,ML				SC,GC,SM,GM,SP,SW				GP,GW							
		Wall width (inches)				Wall width (inches)				Wall width (inches)				Wall width (inches)			
		6	8	10	12	6	8	10	12	6	8	10	12	6	8	10	12
Conventional light-frame construction																	
1-Story	(1100plf)	6	4	4	4	6	4	4	4	6	4	4	4	6	4	4	4
2-Story	(1800plf)	8	6	4	4	6	4	4	4	6	4	4	4	6	4	4	4
3-Story	(2900plf)	16	14	12	10	10	8	6	6	6	4	4	4	6	4	4	4
4-inch brick veneer over light-frame or 8-inch hollow concrete masonry																	
1-Story	(1500plf)	6	4	4	4	6	4	4	4	6	4	4	4	6	4	4	4
2-Story	(2700plf)	14	12	10	8	10	8	6	4	6	4	4	4	6	4	4	4
3-Story	(4000plf)	22	22	20	18	16	14	12	10	10	8	6	4	6	4	4	4
8-inch solid or fully grouted masonry																	
1-Story	(2000plf)	10	8	6	4	6	4	4	4	6	4	4	4	6	4	4	4
2-Story	(3600plf)	20	18	16	16	14	12	10	8	8	6	4	4	6	4	4	4
3-Story	(5300plf)	32	30	28	26	22	22	20	18	10	12	10	8	10	8	6	4

No other changes were made to the table, but for clarification, please note that calculations will show that the plf values for the Uniform Wall Loads shown in the table were directly determined from the loads and footing widths found in IRC Table R403.1, and thereby the crushed stone depths are calculated to approximate the same load bearing widths on the soil as the concrete footings found in Table R403.1 assuming a load spread at a conservative angle of 60 degrees from vertical.

The word “CRUSHED” is misspelled as “CRASHED” in Figure R403.4 (1). The spelling is corrected in this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB222-13	**AS**

Code Change No: RB223-13

Original Proposal

Section(s): R404.1.1

Proponent: Matthew L. Mlakar, Barrish Pelham & Associates, Inc., representing Structural Engineers Association of California

Revise as follows:

R404.1.1 Design of masonry foundation walls. Masonry foundation walls shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of ACI530/ASCE 5/TMS 402 ~~or NCMA TR68-A~~. When ACI530/ASCE 5/TMS 402~~, NCMA TR68-A~~ or the provisions of this section are used to design masonry foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the jurisdiction having authority.

Reason: The referenced standard, NCMA TR-68-A-75 is out of date, and no longer available. Under ICC CP#28 policy section 3.6.3.2 the referenced standards shall be developed and maintained through a consensus process such as ASTM or ANSI. While NCMA TR68 was not developed through the ANSI consensus process during the adoption of the 2000 IRC, it was grandfathered into the code. However since the inception of the code, the referenced standard has not been maintained and is no longer in publication. The referenced standard should be removed at this time.

There are several other methods for the design of plain and reinforced masonry walls, so the removal of the standard will not prevent the use of masonry foundation walls.

Cost Impact: The proposal will not change the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB223-13	**AS**

Code Change No: RB224-13

Original Proposal

Section(s): Table R404.1.1(1)

Proponent: Stephen Kerr, S.E., Josephson Werdowatz and Associates, Inc., representing self (skerr@jwa-se.com)

Revise as follows:

**TABLE R404.1.1(1)
PLAIN MASONRY FOUNDATION WALLS**

MAXIMUM WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[c] (feet)	PLAIN MASONRY[a] MINIMUM NOMINAL WALL THICKNESS (inches)		
		Soil classes[b]		
		GW, GP, SW and SP	GM, GC, SM, SM-SC and ML	SC, MH, ML-CL and inorganic CL
5	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	8
6	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
	6	8	10	12
7	4	6 solid[d] or 8	8	8
	5	6 solid[d] or 8	10	10
	6	10	12	10 solid[d]
	7	12	10 solid[d]	12 solid[d]
8	4	6 solid[d] or 8	6 solid[d] or 8	8
	5	6 solid[d] or 8	10	12
	6	10	12	12 solid[d]
	7	12	12 solid[d]	Footnote e
	8	10 ~~solid~~grout[d]	12 ~~solid~~ grout[d]	Footnote e
9	4	6 ~~solid~~grout[d] or 8 solid[d] or 12	6 ~~solid~~grout[d] or 8 solid[d]	8 grout[d] or 10 solid[d]
	5	~~8~~ 6 grout[d] or 10 solid[d]	~~10~~8 grout[d] or 12 solid[d]	~~12~~8 grout[d]
	6	~~10~~ 8 grout[d] or 12 solid[d]	~~12~~10 grout[d]	~~12 solid~~10 grout[d]
	7	~~12~~ 10 grout[d]	~~12 solid~~10 grout[d]	12 grout~~Footnote e~~
	8	~~12 solid~~10 grout[d]	12 grout~~Footnote e~~	Footnote e
	9	12 grout~~Footnote e~~	Footnote e	Footnote e

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 Pa.

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Ungrouted hollow masonry units are permitted except where otherwise indicated.
b. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.
c. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.
d. Solid indicates solid masonry unit, grout indicates grouted hollow units~~ or solid masonry units~~.
e. Wall construction shall be in accordance with either Table R404.1.1(2), Table R404.1.1(3), Table 404.1.1(4), or a design shall be provided.

Reason: For plain masonry walls with a maximum height of 9 ft., all backfill depths, and 8ft. tall walls with 8ft. of backfill, the wall construction limitations of Table R404.1.1 (1) exceed the prescriptive requirements of TMS 402/ACI 530/ASCE 5 section 5.6.3 and Table 5.6.3.1. For these specific walls, when analyzed in accordance with TMS 402/ACI 530/ASCE 5, using the allowable flexural tensile stresses in Table 2.2.3.2, the values shown in Table R404.1.1 (1) cannot be justified. The proposed change is to make the values shown in Table R404.1.1 (1) compliant with the prescriptive and analytical requirements of TMS 402/ACI 530/ASCE 5.

It should be noted that in Table R404.1.1 (1) footnote d currently lumps solid grouted hollow units with solid masonry units. However, in both TMS 402/ACI 530/ASCE 5 Tables 5.6.3.1 and 2.2.3.2 the limitations of solid units are less than those of solid grouted hollow units. Depending on the type of mortar, the capacity from Table 2.2.3.2 for solid units is either 62% or 40% the capacity of solid grouted hollow units.

With this proposal the IRC table for plain masonry wall will meet the requirements found in the referenced standard.

Cost Impact: The cost of construction for 8ft and 9ft tall plain masonry walls will slightly increase. The cost increase will primarily only impact the 8ft and 9ft walls where solid masonry units are currently specified.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: There was no technical justification provided that there have been any wide spread failures of 8 ft or 9 ft hollow masonry walls.

Assembly Action: **None**

Final Hearing Results

RB224-13 **AS**

Code Change No: RB225-13

Original Proposal

Section(s): Table R404.1.1(1), Table R404.1.1(2), Table R404.1.1(3), Table R404.1.1(4) and Tables R404.1.2(2) thru R404.1.2(8)

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association (BajnaiC@chesterfield.gov)

Revise as follows:

TABLE R404.1.1(1)
PLAIN MASONRY FOUNDATION WALLS[f]

MAXIMUM WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[c] (feet)	PLAIN MASONRY[a] MINIMUM NOMINAL WALL THICKNESS (inches)		
		Soil classes[b]		
		GW, GP, SW and SP	GM, GC, SM, SM-SC and ML	SC, ~~MH~~, ML-CL and inorganic CL

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.1(2)
8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d > 5 INCHES[a, c, f]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.1(3)
10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d > 6.75 INCHES[a, c, f]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.1(4)
12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d > 8.75 INCHES[a, c, f]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.2(2)
MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, g, h, i, j, k]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.2(3)
MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH (203 mm) NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, l, j]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.2(4)
MINIMUM VERTICAL REINFORCEMENT FOR 10-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, l, j]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.2(5)
MINIMUM VERTICAL WALL REINFORCEMENT FOR 6-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, f, h, l, j]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.2(6)
MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, f, h, i, j, k]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.2(7)
MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH (152 mm) SCREEN-GRID BASEMENT WALLS[b, c, d, e, g, h, l, j]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

TABLE R404.1.2(8)
MINIMUM VERTICAL REINFORCEMENT FOR 6-, 8-, 10-INCH AND 12-INCH NOMINAL FLAT BASEMENT WALLS[b, c, d, e, f, h, i, k, n, o]

f. The use of this table shall be prohibited for soil classifications not shown.

(Portions of Table not shown remain unchanged)

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The table specifically says that the wall design is a function of a maximum of 60 psf hydraulic pressure. Soils with CH, MH, OL, OH and Pt have higher hydraulic pressures and therefore should not be allowed for backfilling purposes unless the wall is designed by a registered design professional.

Cost Impact: The code change proposal could increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change adds a needed footnote and deletes the use of soil class MH in Table R404.1.1(1).

Assembly Action: **None**

Final Hearing Results

RB225-13	**AS**

Code Change No: RB226-13

Original Proposal

Section(s): R404.1.4.1, Table R404.1.1(2), Table R404.1.1(3), Table R404.1.1(4)

Proponent: Stephen Kerr, S.E., Josephson Werdowatz and Associates Inc., representing self (skerr@jwa-se.com)

Revise as follows:

R404.1.4.1 Masonry foundation walls. In ~~addition to the requirements of Table R404.1.1(1) plain masonry foundation walls in~~ buildings assigned to Seismic Design Category D_0, D_1 or D_2, as established in Table R301.2(1), masonry foundation walls shall comply with this section. In addition to the requirements of Table R404.1.1(1), plain masonry foundation walls shall comply with the following.

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum nominal thickness for plain masonry foundation walls shall be 8 inches (203 mm).
4. Masonry stem walls shall have a minimum vertical reinforcement of one No. ~~3~~ 4 (No. ~~10~~ 13) bar located a maximum of 4 feet (1219 mm) on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings.

Foundation walls ~~in buildings assigned to Seismic Design Category D_0, D_1 or D_2, as established in Table R301.2(1)~~, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be constructed in accordance with Table R404.1.1(2), R404.1.1(3) or R404.1.1(4). Masonry foundation walls shall have two No. 4 (No. 13) horizontal bars located in the upper 12 inches (305 mm) of the wall.

TABLE R404.1.1(2)
8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ~~>~~ ≥ 5 INCHES[a, c]

WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c] Soil classes and lateral soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less) 5 feet 6 feet 8 inches	#4 at 48 #4 at 48 #4 at 48	#4 at 48 #4 at 48 #5 at 48	#4 at 48 #4 at 48 #6 at 48
7 feet 4 inches	4 feet (or less) 5 feet 6 feet 7 feet 4 inches	#4 at 48 #4 at 48 #4 at 48 #5 at 48	#4 at 48 #4 at 48 #5 at 48 #6 at 48	#4 at 48 #4 at 48 #5 at 48 #6 at 40
8 feet	4 feet (or less) 5 feet 6 feet 7 feet 8 feet	#4 at 48 #4 at 48 #4 at 48 #5 at 48 #5 at 48	#4 at 48 #4 at 48 #5 at 48 #6 at 48 #6 at 48	#4 at 48 #4 at 48 #5 at 48 #6 at 40 #6 at 32

8 feet 8 inches	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 8 inches	#4 at 48 #4 at 48 #4 at 48 #5 at 48 #6 at 48	#4 at 48 #4 at 48 #5 at 48 #6 at 48 #6 at 32	#4 at 48 #5 at 48 #6 at 48 #6 at 40 #6 at 24
9 feet 4 inches	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 9 feet 4 inches	#4 at 48 #4 at 48 #4 at 48 #5 at 48 #6 at 48 #6 at 40	#4 at 48 #4 at 48 #5 at 48 #6 at 48 #6 at 40 #6 at 24	#4 at 48 #5 at 48 #6 at 48 #6 at 40 #6 at 24 #6 at 16
10 feet	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 9 feet 10 feet	#4 at 48 #4 at 48 #4 at 48 #5 at 48 #6 at 48 #6 at 40 #6 at 32	#4 at 48 #4 at 48 #5 at 48 #6 at 48 #6 at 32 #6 at 24 #6 at 16	#4 at 48 #5 at 48 #6 at 48 #6 at 32 #6 at 24 #6 at 16 #6 at 16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B, and C and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be at least 5 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

TABLE R404.1.1(3)
10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d > ≥ 6.75 INCHES[a, c]

WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c]		
		Soil classes and later soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less) 5 feet 6 feet 8 inches	#4 at 56 #4 at 56 #4 at 56	#4 at 56 #4 at 56 #5 at 56	#4 at 56 #4 at 56 #5 at 56
7 feet 4 inches	4 feet (or less) 5 feet 6 feet 7 feet 4 inches	#4 at 56 #4 at 56 #4 at 56 #4 at 56	#4 at 56 #4 at 56 #4 at 56 #5 at 56	#4 at 56 #4 at 56 #5 at 56 #6 at 56
8 feet	4 feet (or less) 5 feet 6 feet 7 feet 8 feet	#4 at 56 #4 at 56 #4 at 56 #4 at 56 #5 at 56	#4 at 56 #4 at 56 #4 at 56 #5 at 56 #6 at 56	#4 at 56 #4 at 56 #5 at 56 #6 at 56 #6 at 48
8 feet 8 inches	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 8 inches	#4 at 56 #4 at 56 #4 at 56 #4 at 56 #5 at 56	#4 at 56 #4 at 56 #4 at 56 #5 at 56 #6 at 48	#4 at 56 #4 at 56 #5 at 56 #6 at 56 #6 at 32

9 feet 4 inches	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 9 feet 4 inches	#4 at 56 #4 at 56 #4 at 56 #4 at 56 #5 at 56 #6 at 56	#4 at 56 #4 at 56 #5 at 56 #5 at 56 #6 at 56 #6 at 40	#4 at 56 #4 at 56 #5 at 56 #6 at 56 #6 at 40 #6 at 24
10 feet	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 9 feet 10 feet	#4 at 56 #4 at 56 #4 at 56 #5 at 56 #5 at 56 #6 at 56 #6 at 48	#4 at 56 #4 at 56 #5 at 56 #6 at 56 #6 at 48 #6 at 40 #6 at 32	#4 at 56 #4 at 56 #5 at 56 #6 at 48 #6 at 40 #6 at 24 #6 at 24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B, and C and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be at least 6.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

TABLE R404.1.1(4)
12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ~~>~~ ≥ 8.75 INCHES[a, c]

WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c]		
		Soil classes and lateral soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less) 5 feet 6 feet 8 inches	#4 at 72 #4 at 72 #4 at 72	#4 at 72 #4 at 72 #4 at 72	#4 at 72 #4 at 72 #5 at 72
7 feet 4 inches	4 feet (or less) 5 feet 6 feet 7 feet 4 inches	#4 at 72 #4 at 72 #4 at 72 #4 at 72	#4 at 72 #4 at 72 #4 at 72 #5 at 72	#4 at 72 #4 at 72 #5 at 72 #6 at 72
8 feet	4 feet (or less) 5 feet 6 feet 7 feet 8 feet	#4 at 72 #4 at 72 #4 at 72 #4 at 72 #5 at 72	#4 at 72 #4 at 72 #4 at 72 #5 at 72 #6 at 72	#4 at 72 #4 at 72 #5 at 72 #6 at 72 #6 at 64
8 feet 8 inches	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 8 inches	#4 at 72 #4 at 72 #4 at 72 #4 at 72 #5 at 72	#4 at 72 #4 at 72 #4 at 72 #5 at 72 #7 at 72	#4 at 72 #4 at 72 #5 at 72 #6 at 72 #6 at 48

9 feet 4 inches	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 9 feet 4 inches	#4 at 72 #4 at 72 #4 at 72 #4 at 72 #5 at 72 #6 at 72	#4 at 72 #4 at 72 #5 at 72 #5 at 72 #6 at 72 #6 at 48	#4 at 72 #4 at 72 #5 at 72 #6 at 72 #6 at 56 #6 at 40
10 feet	4 feet (or less) 5 feet 6 feet 7 feet 8 feet 9 feet 10 feet	#4 at 72 #4 at 72 #4 at 72 #4 at 72 #5 at 72 #6 at 72 #6 at 64	#4 at 72 #4 at 72 #5 at 72 #6 at 72 #6 at 72 #6 at 56 #6 at 40	#4 at 72 #4 at 72 #5 at 72 #6 at 72 #6 at 48 #6 at 40 #6 at 32

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B, and C and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be at least 8.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground levels. Where an interior concrete slab-on-grade is provided and in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height is permitted to be measured from the exterior finish ground level to the top of the interior concrete slab is permitted.

Reason: There are two parts to this proposal which are attempting to bring conformity within the IRC and with the requirements of the referenced standard.

The first sentence is changed so that the requirements for masonry and concrete foundation walls follow the same format. This should provide clarity and make it easier for the users of the IRC to utilize both materials. As part of this change, the repeated language referencing Table R301.2(1) in the last paragraph is redundant and removed.

The second item addressed by this proposal is the change from No. 3 bars to No. 4 bars for seismic reinforcement in SDC D_0, D_1 and D_2. TMS 402/ACI 530/ASCE 5, the adopted standard for masonry design, section 1.18.4.4.1 requires vertical reinforcement to be a minimum diameter of No. 4 bar spaced at a maximum of 48 inches. Footnote b in Tables R404.1.1(2), R404.1.1(3) and R404.1.1(4), are modified to reflect the maximum spacing limitation. In addition to the modification to footnote b, an editorial change is made to the titles, changing the greater than symbol (>) to a greater than or equal symbol (≥) in order to reflect the distance *d* as specified in footnote c. Under ICC CP#28 policy section 1.3.1 the provisions of all codes shall be consistent with one another so that conflicts between codes do not occur. The change in bar size and spacing will bring the minimum requirements of the referenced standard into the IRC.

Cost Impact: The code change proposal will slightly increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB226-13 **AS**

Code Change No: RB227-13

Original Proposal

Section(s): R403.3.4, R404.1.2.3.6.1

Proponent: Stephen Kerr, S.E., Josephson Werdowatz and Associates Inc., representing self (skerr@jwa.se.com)

Revise as follows:

R403.3.4 Termite protection ~~damage~~. The use of foam plastic in areas of "very heavy" termite infestation probability shall be in accordance with Section R318.4.

R404.1.2.3.6.1 Stay-in-place forms Stay-in-place concrete forms shall comply with this section.

1. Surface burning characteristics. The flame-spread index and smoke-developed index of forming material, other than foam plastic, left exposed on the interior shall comply with Section R302. The surface burning characteristics of foam plastic used in insulating concrete forms shall comply with Section R316.3.
2. Interior covering. Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the building as required by Section R316. Where gypsum board is used to protect the foam plastic, it shall be installed with a mechanical fastening system. Use of adhesives in addition to mechanical fasteners is permitted.
3. Exterior wall covering. Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an *approved* exterior wall covering complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.
4. Termite protection ~~hazards~~. In areas where the probability of termite infestation ~~hazard of termite damage~~ is "very heavy" as indicated by Table R301.2(1) or ~~in accordance with~~ Figure R301.2(6), foam plastic insulation shall be permitted below *grade* on foundation walls in accordance with section R318.4.~~one of the following conditions:~~
   ~~4.1. Where in addition to the requirements in Section R318.1, an *approved* method of protecting the foam plastic and structure from subterranean termite damage is provided.~~
   ~~4.2. The structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-preservative-treated wood.~~
   ~~4.3. On the interior side of *basement* walls.~~
5. Flat ICF wall system forms shall conform to ASTM E 2634.

Reason: The three methods of foam plastic insulation protection listed in items 4.1, 4.2 and 4.3 are already covered in section R318.4. Instead of repeating these items, this proposal will place a pointer directly to section R318 Protection Against Subterranean Termites. If the methods of foam plastic protection change in the future, then the removal of the duplicative provisions may save a possible conflict in the code.

For reference: Item 4.1 is a repeat of the R318.4 exception 2
Item 4.2 is a repeat of the R318.4 exception 1
Item 4.3 is a repeat of the R318.4 exception 3

The wording of item 4 is also changed so that this section (R404.1.2.3.6.1) uses the same vernacular as the other sections in the code (R318.4). A similar change is proposed for section R403.3.4 changing "damage" to "protection". This will help bring uniformity to the IRC, improving the code.

Cost Impact: The code change proposal will not increase construction cost.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB227-13	**AS**

Code Change No: RB228-13

Original Proposal

Section(s): R202, R404.1.3, R404.4

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee (BajnaiC@chesterfield.gov)

Revise as follows:

R404.1.3 Design required. Concrete or masonry foundation walls shall be designed in accordance with accepted engineering practice when either of the following conditions exists:

1. Walls are subject to hydrostatic pressure from groundwater.
2. Walls supporting more than 48 inches (1219 mm) of unbalanced backfill that do not have permanent lateral support at the top ~~or~~ and bottom.

R404.4 Retaining walls. Retaining walls that are not laterally supported at the top and that retain in excess of ~~24~~ 48 inches (610 mm) of unbalanced fill, or retaining walls exceeding 24 inches in height that resist lateral loads in addition to soil, shall be designed in accordance with accepted engineering practice to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning

Revise definition as follows:

WALL, RETAINING. A wall not laterally supported at the top, that resists only lateral ~~soil~~ load. ~~and other imposed loads.~~

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The International Code Council's Building Code Action Committee identified several items in Chapter 4, "Foundations", that are in conflict with other provisions of the code or lack clarity. This proposal specifically addresses conflicts and confusing language for when a design is required in Section R404.1.3 and retaining walls in Section R404.4.

Section R404.1.3 specifically requires that walls supporting more than 48 inches of unbalanced fill and not laterally supported require an engineered design. Section R404.4 addresses the same walls where they are not supported at the top but states that a design is required when the height of the unbalanced fill exceeds 24 inches. The two sections are in direct conflict. This proposal changes the trigger height in R404.4 to 48 inches to be consistent with other sections of the code.

In addition, this proposal clarifies, in R404.1.3 that the lateral support is required at the top **and** bottom. The definition of "WALL, RETAINING" is modified to be consistent with the intent of section R404.4. The type of wall addressed in R404.4 is a self-standing retaining wall that is not supported at the top and is laterally supported at the bottom against sliding and overturning by a factor of 1.5. This type of wall would typically be a site retaining wall where it is primarily resisting only lateral soil loads. The definition is modified to clarify that this type of wall is not intended to support structural loads. A similar wall that does support structural loads would be addressed by other sections.

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: It is unclear whether the change would prohibit temporary bracing. There are inconsistencies within the text. The committee prefers the current definition of retaining wall.

Assembly Action: **None**

Public Comments

Public Comment:

Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

R404.4 Retaining walls. Retaining walls that are not laterally supported at the top and that retain in excess of ~~24~~ 48 inches (610 mm) of unbalanced fill, or retaining walls exceeding 24 inches in height that resist lateral loads in addition to soil, shall be designed in accordance with accepted engineering practice to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning. This section shall not apply to foundation walls supporting buildings.

Commenter's Reason: The International Code Council's Building Code Action Committee identified several items in Chapter 4, "Foundations", that are in conflict with other provisions of the code or lack clarity. The original proposal specifically addressed conflicts and confusing language for when a design is required in Section R404.1.3 and retaining walls in Section R404.4.

Based on comments received, the proposed change to the language in section R404.1.3 may, in some cases, cause further confusion and misapplication. This public comment removes the proposed changes to that section and it will remain as it currently is in the 2012 code. This public comment replaces the original proposal and only modifies section R404.4 to be consistent with other provisions in the code that allow a concrete or masonry wall supporting not more than 48 inches of backfill to be constructed without an engineered design . If the wall resists lateral loads in addition to soil, such as vehicle surcharges and fences built on top of the wall that are subject to wind loads, the height of the unbalanced fill is then limited to 24 inches as currently stated in the code.

Also, in the original proposal there was a proposed modification to the definition of RETAINING WALL. This public comment removes the suggested change and leaves the definition as it currently exists.

At the Committee Action Hearings, there was a question raised about this proposal prohibiting temporary bracing. The concern is not germane to the proposed code revision. The code does not specify requirements or limitations on how structures are braced or supported during construction. Those specifications and requirement are specified and regulated by agencies or organizations whose specific purpose is for construction site and worker safety such as OSHA. Nothing is specified requiring or prohibiting temporary bracing or shoring during construction.

Final Hearing Results

RB228-13	**AMPC**

Code Change No: RB230-13

Original Proposal

Section(s): R405.1

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R405.1 Concrete or masonry foundations. Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade. Drainage tiles, gravel or crushed stone drains, perforated pipe or other approved systems or materials shall be installed at or below the area to be protected and shall discharge by gravity or mechanical means into an approved drainage system. Gravel or crushed stone drains shall extend at least 1 foot (305 mm) beyond the outside edge of the footing and 6 inches (152 mm) above the top of the footing and be covered with an approved filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper. Except where otherwise recommended by the drain manufacturer, perforated drains shall be surrounded with an approved filter membrane or the filter membrane shall cover the washed gravel or crushed rock covering the drain. Drainage tiles or perforated pipe shall be placed on a minimum of 2 inches (51 mm) of washed gravel or crushed rock at least one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches (152 mm) of the same material.

> **Exception:** A drainage system is not required when the foundation is installed on well-drained ground or sand-gravel mixture soils according to the Unified Soil Classification System, Group I Soils, as detailed in Table R405.1.

Reason: The purpose of this code change proposal is to add an exception to the requirement for filter fabric over gravel, crushed stone or perforated pipe drains. The Metropolitan Kansas Chapter of ICC introduced this requirement last cycle in proposal RB82-09/10 to provide additional direction for the installation of filter fabric. The intent was to improve the performance of foundation drains by insuring proper installation of the filter fabric, which keeps fines from clogging the drains. Since that time, it has come to light that some waterproofing manufacturers recommend against using filter fabric over the gravel or perforated pipe when the foundation drain is installed in “heavy” soils (certains clays and loams) as the fabric will inhibit water from entering the pipe. Therefore, some manufacturers will not warrant their product when a filter fabric is used in such conditions. This revision will provide an exception to the filter fabric requirement if the drain manufacturer’s installation instructions recommend against using the filter fabric.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent’s published reason.

Assembly Action: **None**

Final Hearing Results

RB230-13 **AS**

Code Change No: RB233-13

Original Proposal

Section(s): R406.1, R406.2

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R406.1 Concrete and masonry foundation dampproofing. Except where required by Section R406.2 to be waterproofed, foundation walls that retain earth and enclose interior spaces and floors below *grade* shall be dampproofed from the higher of (a) the top of the footing or (b) 6 inches below the top of the basement floor, to the finished *grade.* Masonry walls shall have not less than 3/8 inch (9.5 mm) portland cement parging applied to the exterior of the wall. The parging shall be dampproofed in accordance with one of the following:

1. Bituminous coating.
2. Three pounds per square yard (1.63 kg/m^2) of acrylic modified cement.
3. One-eighth inch (3.2 mm) coat of surface-bonding cement complying with ASTM C 887.
4. Any material permitted for waterproofing in Section R406.2.
5. Other appmved methods or materials.

Exception: Parging of unit masonry walls is not required where a material is *approved* for direct application to the masonry.

Concrete walls shall be dampproofed by applying any one of the above listed dampproofing materials or any one of the waterproofing materials listed in Section R406.2 to the exterior of the wall.

R406.2 Concrete and masonry foundation waterproofing. In areas where a high water table or other severe soil-water conditions are known to exist, exterior foundation walls that retain earth and enclose interior spaces and floors below *grade* shall be waterproofed from the higher of (a) the top of the footing or (b) 6 inches below the top of the basement floor, to the finished *grade.* Walls shall be waterproofed in accordance with one of the following:

1. Two-ply hot-mopped felts.
2. Fifty-five-pound (25 kg) roll roofing.
3. Six-mil (0.15 mm) polyvinyl chloride.
4. Six-mil (0.15 mm) polyethylene.
5. Forty-mil (1 mm) polymer-modified asphalt.
6. Sixty-mil (1.5 mm) flexible polymer cement.
7. One-eighth-inch (3 mm) cement-based, fiber-reinforced, waterproof coating.
8. Sixty-mil (0.22 mm) solvent-free liquid-applied synthetic rubber.

Exception: Organic-solvent-based products such as hydrocarbons, chlorinated hydrocarbons, ketones and esters shall not be used for ICF walls with expanded polystyrene form material. Use of plastic roofing cements, acrylic coatings, latex coatings, mortars and pargings to seal ICF walls is permitted. Cold-setting asphalt or hot asphalt shall conform to type C of ASTM D 449. Hot asphalt shall be applied at a temperature of less than 200°F (93°C).

All joints in membrane waterproofing shall be lapped and sealed with an adhesive compatible with the membrane.

Reason: The purpose of this code change is to amend the requirements for dampproofing and waterproofing of concrete and masonry foundation walls. The change eliminates unnecessary dampproofing or waterproofing on wall areas that do not affect the livability of interior spaces and floors below grade. These wall areas include areas where the footings area stepped down below the basement floor level for required frost protection depth or to place footings on undisturbed natural soils or engineered fills. This will reduce the cost of construction where the footings described in the reason statement are present. The 6 inch cut-off comes from the IBC Section 1805.1.3 requirements for a ground water control system.

It is noted that this code change does not prohibit a builder from providing waterproofing all the way down to the top of footings that are lower than 6" below the basement floor level if desired due to ease of installation of drainage boards or other panel waterproofing products, or if required by the manufacturer's installation instructions or details for a particular waterproofing product.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB233-13 **AS**

Code Change No: RB234-13

Original Proposal

Section(s): R501.3

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

~~R501.3~~ R302.13 **Fire protection of floors.** Floor assemblies, not required elsewhere in this code to be fire-resistance rated, shall be provided with a 1/2-inch (12.7 mm) gypsum wallboard membrane, 5/8-inch (16 mm) wood structural panel membrane, or equivalent on the underside of the floor framing member.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   3.1. The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   3.2. Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance

Reason: During the last cycle the IRC Committee endorsed a move to place all fire resistive requirements in the same section. This proposal simply relocates existing text in accordance with that goal.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB234-13 **AS**

Code Change No: RB235-13

Original Proposal

Section(s): R501.3

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire-resistance rated, shall be provided with a 1/2-inch (12.7 mm) gypsum wallboard membrane, 5/8-inch (16 mm) wood structural panel membrane, or equivalent on the underside of the floor framing member. <u>Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaries, wires, speakers, drainage, piping, and similar openings or penetrations shall be permitted.</u>

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   3.1. The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   3.2. Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance.

Reason: There needs to be direction in the code relative to common openings and penetrations in these membranes. Where these membranes protect the underside of floors exposed to the weather, openings for drainage must be provided.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Penetrations need to be addressed and this change provides a needed list of penetrations that are allowed.

Assembly Action: **None**

Final Hearing Results

RB235-13 **AS**

Code Change No: RB241-13

Original Proposal

Section(s): R502.1 (NEW), R502.1.1, R502.1.1.1, R502.1.2, R502.2.2 (NEW)

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

R502.1 General. Wood and wood-based products used for load-supporting purposes shall conform to the applicable provisions of this section.

~~R502.1~~ R502.1.1 ~~Identification~~. Sawn Lumber. ~~Load-bearing dimension~~ Sawn lumber ~~for joists, beams and girders~~ shall be identified by a grade *mark* of ~~a~~ an accredited lumber grading or inspection agency ~~that has been *approved* by~~ and have design values certified by an accreditation body that complies with DOC PS 20. In lieu of a grade *mark*, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.

~~R502.1.1~~ R502.1.1.1 Preservative-treated lumber. Preservative treated dimension lumber shall also be identified as required by Section R317.2.

~~**R502.1.2 Blocking and subflooring.** Blocking shall be a minimum of utility grade lumber. Subflooring may be a minimum of utility grade lumber or No. 4 common grade boards.~~

R502.2.2 Blocking and subflooring. Blocking for fastening panel edges or fixures shall be a minimum of utility grade lumber. Subflooring shall be a minimum of utility grade lumber or No. 4 common grade boards. Fireblocking shall be of any grade lumber.

Reason: The change is intended to clarify the process by which lumber design values are certified and recognized in the code. The current process, which has been used since 1970, relies on the internationally recognized U.S. Department of Commerce Voluntary Product Standard PS20. Because the current format of the section can be incorrectly interpreted to place a number of wood products under the identification requirements of PS20, a new format is proposed that clearly states this standard is only for sawn lumber. The format proposed is nearly identical to what is used in Section 2302 of the International Building Code. Wood products other than sawn lumber have unique manufacturing standards, design value development, and quality control criteria. This new format clarifies that these other wood products must comply with specific product standards.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that proposed Section R502.2.2 would prohibit WSP for subflooring.

Assembly Action: **None**

Public Comments

Public Comment:

Dennis Pitts, American Wood Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION R502
WOOD FLOOR FRAMING

R502.1 General. Wood and wood-based products used for load-supporting purposes shall conform to the applicable provisions of this section.

R502.1.1 Sawn Lumber. Sawn lumber shall be identified by a grade *mark* of an accredited lumber grading or inspection agency and have design values certified by an accreditation body that complies with DOC PS 20. In lieu of a grade *mark*, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.

R502.1.1.1 Preservative-treated lumber. Preservative treated dimension lumber shall also be identified as required by Section R317.2.

~~R502.1.3~~ R502.1.1.2 End-jointed lumber. *Approved* end-jointed lumber identified by a grade *mark* conforming to Section R502.1 may be used interchangeably with solid-sawn members of the same species and grade. End-jointed lumber used in an assembly required elsewhere in this code to have a fire-resistance rating shall have the designation “Heat Resistant Adhesive” or “HRA” included in its grade mark.

~~R502.1.4~~ R502.1.2 Prefabricated wood I-joists. Structural capacities and design provisions for prefabricated wood I-joists shall be established and monitored in accordance with ASTM D 5055.

~~R502.1.5~~ R502.1.3 Structural glued laminated timbers. Glued laminated timbers shall be manufactured and identified as required in ANSI/AITC A190.1 and ASTM D 3737.

~~R502.1.6~~ R502.1.4 Structural log members. Stress grading of structural log members of nonrectangular shape, as typically used in log buildings, shall be in accordance with ASTM D 3957. Such structural log members shall be identified by the grade *mark* of an *approved* lumber grading or inspection agency. In lieu of a grade *mark* on the material, a certificate of inspection as to species and grade issued by a lumber-grading or inspection agency meeting the requirements of this section shall be permitted to be accepted.

~~R502.1.7~~ R502.1.5 Structural composite lumber. Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D 5456.

RELOCATE THE FOLLOWING SECTION:

R502.2.2 Blocking and subflooring. Blocking for fastening panel edges or fixtures shall be a minimum of utility grade lumber. Subflooring shall be a minimum of utility grade lumber, ~~or~~ No. 4 common grade boards, or wood structural panels as specified in Section R503.2. Fireblocking shall be of any grade lumber.

Commenter’s Reason: RB241-13 was one of three proposals intended to be format changes to clarify the application of DOC PS20, and there was no intent to make technical changes in any of them. The other two proposals – RB269-13 and RB393-13 – were recommended for approval as submitted. However, the IRC Committee felt that the relocated Sec. R502.2.2 in RB241 ignored the use of wood structural panels for subflooring and recommended disapproval for that reason. The use of wood structural panels in subflooring is addressed in Sec. R503.2, and the text being relocated in our original proposal exists in the code today. However, to address the committee’s concern and to avoid possible conflict, this public comment adds a reference to R503.2. It also corrects a typo in the word “fixtures.”

Final Hearing Results

RB241-13	AMPC

Code Change No: RB242-13

Original Proposal

Section(s): R502.1.6, R602.1.3, R802.1.5

Proponent: Rob Pickett, RobPickett & Associates, LLC, representing Log Homes Council (robpickett@vermontel.net)

Revise as follows:

R502.1.6 Structural log members. ~~Stress grading of structural log members of nonrectangular shape, as typically used in log buildings, shall be in accordance with ASTM D 3957. Such structural log members shall be identified by the grade mark of an approved lumber grading or inspection agency. In lieu of a grade mark on the material, a certificate of inspection as to species and grade issued by a lumber grading or inspection agency meeting the requirements of this section shall be permitted to be accepted.~~ <u>Structural log members shall comply with the provisions of ICC-400.</u>

Revise as follows:

R602.1.3 Structural log members. ~~Stress grading of structural log members of nonrectangular shape, as typically used in log buildings, shall be in accordance with ASTM D 3957. Such structural log members shall be identified by the grade mark of an approved lumber grading or inspection agency. In lieu of a grade mark on the material, a certificate of inspection as to species and grade issued by a lumber grading or inspection agency meeting the requirements of this section shall be permitted to be accepted.~~ <u>Structural log members shall comply with the provisions of ICC-400.</u>

Revise as follows:

R802.1.5 Structural log members. ~~Stress grading of structural log members of nonrectangular shape, as typically used in log buildings, shall be in accordance with ASTM D 3957. Such structural log members shall be identified by the grade mark of an approved lumber grading or inspection agency. In lieu of a grade mark on the material, a certificate of inspection as to species and grade issued by a lumber grading or inspection agency meeting the requirements of this section shall be permitted to be accepted.~~ <u>Structural log members shall comply with the provisions of ICC-400.</u>

Reason: The intent of this section is maintained and improved by referring to ICC400 where Section 302.2.1 covers stress grading of logs. ICC400 Section 302.2 provides additional information regarding moisture content, design stress values, section properties and presents design stress value tables for logs per visual stress grading rules written by approved log grading agencies in accordance with ASTM D 3957.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides an appropriate reference to ICC 400 as stated in the proponents published reason.

Assembly Action: **None**

Final Hearing Results

RB242-13	**AS**

Code Change No: RB243-13

Original Proposal

Section(s): R202 (NEW), R502.1.8 (NEW), R502.8.2, R602.1.5 (NEW), R802.1.6 (NEW), R802.7.2, Chapter 44

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

R502.1.8 Cross-laminated timber. Cross-laminated timber shall be manufactured and identified as required by ANSI/APA PRG 320.

R502.8.2 Engineered wood products. Cuts, notches and holes bored in trusses, structural composite lumber, structural glue-laminated members, cross-laminated timber members, or I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a *registered design professional*.

Revise as follows:

R602.1.5 Cross-laminated timber. Cross-laminated timber shall be manufactured and identified as required by ANSI/APA PRG 320.

Revise as follows:

R802.1.6 Cross-laminated timber. Cross-laminated timber shall be manufactured and identified as required by ANSI/APA PRG 320.

R802.7.2 Engineered wood products. Cuts, notches and holes bored in trusses, structural composite lumber, structural glue-laminated members, cross-laminated timber members, or I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such *alterations* are specifically considered in the design of the member by a *registered design professional*.

Add new definition as follows:

CROSS-LAMINATED TIMBER. A prefabricated engineered wood product consisting of at least three layers of solid-sawn lumber or *structural composite lumber* where the adjacent layers are cross-oriented and bonded with structural adhesive to form a solid wood element.

Add new standard to Chapter 44 as follows:

APA

ANSI/APA PRG 320-2012 Standard for Performance-Rated Cross-Laminated Timber

Reason: During the Group A hearings, code changes S250-12 and G142-12 were approved as submitted which added cross-laminated timber (CLT) methodology to the IBC. Although it's envisioned that the primary use for CLT construction will be for non-residential construction, it's currently being used in some residential applications. This proposal recognizes CLT by defining it and mandates compliance with the CLT product standard. Like some of the other engineered wood products that are recognized in the IRC, such as structural composite lumber, details of use aren't provided.

Cost Impact: This code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ANSI/APA PRG 320 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ANSI/APA PRG 320-2012 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB243-13 **AS**

Code Change No: RB244-13

Original Proposal

Section(s): R202 (NEW), R502.1.8 (NEW), R602.1.5 (NEW), R802.1.7 (NEW), Chapter 44

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Add new text as follows:

R502.1.8 Engineered wood rim board. Engineered wood rim boards shall conform to ANSI/APA PRR 410 or shall be evaluated in accordance with ASTM D 7672. Structural capacities shall be in accordance with ANSI/APA PRR 410 or established in accordance with ASTM D 7672. Rim boards conforming to ANSI/APA PRR 410 shall be marked in accordance with that standard.

Add new text as follows:

R602.1.5 Engineered wood rim board. Engineered wood rim boards shall conform to ANSI/APA PRR 410 or shall be evaluated in accordance with ASTM D 7672. Structural capacities shall be in accordance with ANSI/APA PRR 410 or established in accordance with ASTM D 7672. Rim boards conforming to ANSI/APA PRR 410 shall be marked in accordance with that standard.

Add new text as follows:

R802.1.7 Engineered wood rim board. Engineered wood rim boards shall conform to ANSI/APA PRR 410 or shall be evaluated in accordance with ASTM D 7672. Structural capacities shall be in accordance with ANSI/APA PRR 410 or established in accordance with ASTM D 7672. Rim boards conforming to ANSI/APA PRR 410 shall be marked in accordance with that standard.

Add new definition as follows:

ENGINEERED WOOD RIM BOARD. A full-depth structural composite lumber, wood structural panel, structural glued laminated timber, or pre-fabricated wood I-joist member designed to transfer horizontal (shear) and vertical (compression) loads, provide attachment for diaphragm sheathing, siding and exterior deck ledgers, and provide lateral support at the ends of floor or roof joists or rafters.

Add new standards to Chapter 44 as follows:

ANSI

ANSI/APA PRR 410-2011 Standard for Performance-Rated Engineered Wood Rim Boards

ASTM

ASTM D 7672-2012 Standard Specifications for Evaluating Structural Capacities of Rim Board Products and Assemblies

Reason: This proposal is intended for consistency with the IBC. S248-12 was approved which added this definition and text to the IBC. Engineered rim board is a key structural element in many engineered wood floor applications where both structural load path through the perimeter member and dimensional change compatibility are design considerations. Two new consensus standards address products intended for engineered wood rim board applications. While both ANSI/APA PRR 410 and ASTM D7672 standards address the fundamental requirements for testing and evaluation of engineered rim board, PRR 410 also includes performance categories for engineered wood products used in engineered rim board applications. Under PRR 410, products are assigned a grade based on performance category (e.g. categories based on structural capacity) and will bear a mark in accordance with the grade. In contrast, ASTM D7672 is applicable for determination of product specific rim board performance (i.e. structural capacities) for engineered wood products that may be recognized in manufacturer's literature or product evaluation reports.

Cost Impact: The code change will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ANSI/APA PRR 410 and ASTM D 7672 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ANSI/APA PRG 410-2011 and ASTM D7672-2012 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB244-13 **AS**

Code Change No: RB247-13

Original Proposal

Section(s): Table R502.3.3(1), Table R502.3.3(2)

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (ehrlich@nahb.org)

Revise as follows:

TABLE R502.3.3(1)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING LIGHT-FRAME EXTERIOR BEARING WALL AND ROOF ONLY[a, b, c, f, g, h]
(Floor Live Load ≤ 40 psf, Roof Live Load ≤ 20 psf)

Member & Spacing	Maximum Cantilever Span (Uplift Force at Backspan Support in Lbs.)[d, e]											
	Ground Snow Load											
	≤ 20 psf			30 psf			50 psf			70 psf		
	Roof Width			Roof Width			Roof Width			Roof Width		
	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft
2 × 8 @ 12″	20″ (177)	15″ (227)	—	18″ (209)	—	—	—	—	—	—	—	—
2 × 10 @ 16″	29″ (228)	21″ (297)	16″ (364)	26″ (271)	18″ (354)	—	20″ (375)	—	—	—	—	—
2 × 10 @ 12″	36″ (166)	26″ (219)	20″ (270)	34″ (198)	22″ (263)	16″ (324)	26″ (277)	—	—	19″ (356)	—	—
2 × 12 @ 16″	—	32″ (287)	25″ (356)	36″ (263)	29″ (345)	21″ (428)	29″ (367)	20″ (484)	—	23″ (471)	—	—
2 × 12 @ 12″	—	42″ (209)	31″ (263)	—	37″ (253)	27″ (317)	36″ (271)	27″ (358)	17″ (447)	31″ (348)	19″ (462)	—
2 × 12 @ 8″	—	48″ (136)	45″ (169)	—	48″ (164)	38″ (206)	—	40″ (233)	26″ (294)	36″ (230)	29″ (304)	18″ (379)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Tabulated values are for clear-span roof supported solely by exterior bearing walls.

b. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir for repetitive (three or more) members.

c. Ratio of backspan to cantilever span shall be at least 3:1.

d. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.

e. Uplift force is for a backspan to cantilever span ratio of 3:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 3 divided by the actual backspan ratio provided (3/backspan ratio).

f. See Section R301.2.2.2.5, Item 1, for additional limitations on cantilevered floor joists for detached one- and two-family dwellings in Seismic Design Category D_0, D_1, or D_2 and townhouses in Seismic Design Category C, D_0, D_1 or D_2.

g. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches (610 mm) or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the supported end shall not be required.

h. Linear interpolation shall be permitted for building widths and ground snow loads other than shown.

TABLE R502.3.3(2)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING EXTERIOR BALCONY[a, b, e, f]

Member Size	Spacing	Maximum Cantilever Span (Uplift Force at Backspan Support in lb)[c, d]		
		Ground Snow Load		
		≤ 30 psf	50 psf	70 psf
2 × 8	12″	42″ (139)	39″ (156)	34″ (165)
2 × 8	16″	36″ (151)	34″ (171)	29″ (180)
2 × 10	12″	61″ (164)	57″ (189)	49″ (201)
2 × 10	16″	53″ (180)	49″ (208)	42″ (220)
2 × 10	24″	43″ (212)	40″ (241)	34″ (255)
2 × 12	16″	72″ (228)	67″ (260)	57″ (268)
2 × 12	24″	58″ (279)	54″ (319)	47″ (330)

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir for repetitive (three or more) members.

b. Ratio of backspan to cantilever span shall be at least 2:1.

c. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.

d. Uplift force is for a backspan to cantilever span ratio of 2:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 2 divided by the actual backspan ratio provided (2/backspan ratio).

e. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches (610 mm) or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the supported end shall not be required.

f. Linear interpolation shall be permitted for ground snow loads other than shown.

Reason: The purpose of this code change proposal is to restore an exception to the requirement for full-depth blocking at the supported end of cantilever for low-seismic areas and short cantilevers. This exception was originally proposed by the Virginia Building and Code Officials Association as part of a revision to 2006 IRC Section R602.10.8 (RB225-06/07) and approved for the 2009 IRC (see 2009 IRC Section 602.10.7, Item #1). The provision made sense as the full-depth rim joist is close enough to the cantilever support (24" or less) to provide the rotational restraint that would otherwise be provided by the blocking at the support. There is no need for two closely-spaced sets of full-depth blocking in the specified case.

During the ICC Ad-Hoc Wall Bracing Committee's work on the "Mothership" proposal (RB105-09/10), it was realized the provision in R602.10 conflicted with existing footnotes in Tables R502.3.3(1) and R502.3.3.(2). The Ad-Hoc Committee opted to remove the exception rather than attempting to fix the conflict, leaving just a pointer allowing cantilevered floor joists complying with Section R502.3.3 to support braced wall panels. This proposal restores the original intent of the 2006/2007 VBCOA proposal by adding the exception to the two footnotes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE R502.3.3(1)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING LIGHT-FRAME EXTERIOR BEARING WALL AND ROOF ONLY[a, b, c, f, g, h]
(Floor Live Load ≤ 40 psf, Roof Live Load ≤ 20 psf)

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Tabulated values are for clear-span roof supported solely by exterior bearing walls.

b. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir for repetitive (three or more) members.

c. Ratio of backspan to cantilever span shall be at least 3:1.
d. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.
e. Uplift force is for a backspan to cantilever span ratio of 3:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 3 divided by the actual backspan ratio provided (3/backspan ratio).
f. See Section R301.2.2.2.5, Item 1, for additional limitations on cantilevered floor joists for detached one- and two-family dwellings in Seismic Design Category D_0, D_1, or D_2 and townhouses in Seismic Design Category C, D_0, D_1 or D_2.
g. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches (610 mm) or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the ~~supported end~~ support for the cantilever shall not be required.
h. Linear interpolation shall be permitted for building widths and ground snow loads other than shown

TABLE R502.3.3(2)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING EXTERIOR BALCONY[a, b, e, f]

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.
a. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir for repetitive (three or more) members.
b. Ratio of backspan to cantilever span shall be at least 2:1.
c. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.
d. Uplift force is for a backspan to cantilever span ratio of 2:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 2 divided by the actual backspan ratio provided (2/backspan ratio).
e. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches (610 mm) or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the ~~supported end~~ support for the cantilever shall not be required.
f. Linear interpolation shall be permitted for ground snow loads other than shown.

Committee Reason: Approval was based upon the proponent's published reason. The modification clarifies where the solid blocking is not required.

Assembly Action: None

Final Hearing Results

RB247-13 AM

Code Change No: RB248-13

Original Proposal

Section(s): Table R502.3.1(1), Table R502.3.1(2), Table 802.4(1), Table R802.4(2), Table R802.5.1(1) through Table R802.5.1(8)

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

TABLE R502.3.1(1)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential sleeping areas, live load = 30 psf, L/Δ = 360)[a]

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 X 6	2 X 8	2 X 10	2 X 12	2 X 6	2 X 8	2 X 10	2 X 12
			Maximum floor joist spans							
			(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)
12	Douglas fir-larch	#2	11-10	15-7	19-10	~~23-0~~ 23-4	~~11-6~~ 11-8	~~14-7~~ 14-9	~~17-9~~ 18-0	~~20-7~~ 20-11
	Douglas fir-larch	#3	~~9-8~~ 9-11	~~12-4~~ 12-7	~~15-0~~ 15-5	~~17-5~~ 17-10	~~8-8~~ 8-11	~~11-0~~ 11-3	~~13-5~~ 13-9	~~15-7~~ 16-0
	Hem-Fir	#1	11-7	15-3	19-5	23-7	11-7	~~15-2~~ 15-3	~~18-6~~ 18-9	~~21-6~~ 21-9
16	Douglas fir-larch	SS	11-4	15-0	19-1	23-3	11-4	15-0	19-1	~~23-0~~ 23-3
	Douglas fir-larch	#2	10-9	~~14-1~~ 14-2	~~17-2~~ 17-5	~~19-11~~ 20-3	~~9-11~~ 10-1	~~12-7~~ 12-9	~~15-5~~ 15-7	~~17-10~~ 18-1
	Douglas fir-larch	#3	~~8-5~~ 8-7	~~10-8~~ 10-11	~~13-0~~ 13-4	~~15-1~~ 15-5	~~7-6~~ 7-8	~~9-6~~ 9-9	~~11-8~~ 11-11	~~13-6~~ 13-10
	Hem-Fir	#1	10-6	13-10	17-8	~~20-9~~ 21-1	~~10-4~~ 10-6	~~13-1~~ 13-4	~~16-0~~ 16-3	~~18-7~~ 18-10
19.2	Douglas fir-larch	SS	10-8	14-1	18-0	21-10	10-8	14-1	18-0	~~21-0~~ 21-4
	Douglas fir-larch	#2	10-1	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-3~~ 18-6	~~9-1~~ 9-3	~~11-6~~ 11-8	~~14-1~~ 14-3	~~16-3~~ 16-6
	Douglas fir-larch	#3	~~7-8~~ 7-10	~~9-9~~ 10-0	~~11-10~~ 12-2	~~13-9~~ 14-1	~~6-10~~ 7-0	~~8-8~~ 8-11	~~10-7~~ 10-11	~~12-4~~ 12-7
	Hem-Fir	#1	9-10	13-0	~~16-4~~ 16-7	~~19-0~~ 19-3	~~9-6~~ 9-7	~~12-0~~ 12-2	~~14-8~~ 14-10	~~17-0~~ 17-2
24	Douglas fir-larch	SS	9-11	13-1	16-8	20-3	9-11	13-1	~~16-2~~ 16-5	~~18-9~~ 19-1
	Douglas fir-larch	#2	~~9-1~~ 9-3	~~11-6~~ 11-8	~~14-1~~ 14-3	~~16-3~~ 16-6	~~8-1~~ 8-3	~~10-3~~ 10-5	~~12-7~~ 12-9	~~14-7~~ 14-9
	Douglas fir-larch	#3	~~6-10~~ 7-0	~~8-8~~ 8-11	~~10-7~~ 10-11	~~12-4~~ 12-7	~~6-2~~ 6-3	~~7-9~~ 8-0	~~9-6~~ 9-9	~~11-0~~ 11-3
	Hem-Fir	#1	9-2	~~12-0~~ 12-1	~~14-8~~ 14-10	~~17-0~~ 17-2	~~8-6~~ 8-7	~~10-9~~ 10-10	~~13-1~~ 13-3	~~15-2~~ 15-5

(Portions of Table not shown remain unchanged)

TABLE R502.3.1(2)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential living areas, live load = 40 psf, L/Δ = 360)[b]

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 X 6	2 X 8	2 X 10	2 X 12	2 X 6	2 X 8	2 X 10	2 X 12
			Maximum floor joist spans							
			(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)
12	Douglas fir-larch	#2	10-9	14.2	~~17-9~~ 18-0	~~20-7~~ 20-11	~~10-6~~ 10-8	~~13-3~~ 13-6	~~16-3~~ 16-5	~~18-10~~ 19-1
	Douglas fir-larch	#3	~~8-8~~ 8-11	~~11-0~~ 11-3	~~13-5~~ 13-9	~~15-7~~ 16-0	~~7-11~~ 8-1	~~10-0~~ 10-3	~~12-3~~ 12-7	~~14-3~~ 14-7
	Hem-Fir	#1	10-6	13-10	17-8	21-6	10-6	13-10	~~16-11~~ 17-1	~~19-7~~ 19-10
16	Douglas fir-larch	SS	10-4	13-7	17-4	21-1	10-4	13-7	17-4	~~21-0~~ 21-1
	Douglas fir-larch	#2	9-9	~~12-7~~ 12-9	~~15-5~~ 15-7	~~17-10~~ 18-1	~~9-1~~ 9-3	~~11-6~~ 11-8	~~14-1~~ 14-3	~~16-3~~ 16-6
	Douglas fir-larch	#3	~~7-6~~ 7-8	~~9-6~~ 9-9	~~11-8~~ 11-11	~~13-6~~ 13-10	~~6-10~~ 7-0	~~8-8~~ 8-11	~~10-7~~ 10-11	~~12-4~~ 12-7
	Hem-Fir	#1	9-6	12-7	16-0	~~18-7~~ 18-10	9-6	~~12-0~~ 12-2	~~14-8~~ 14-10	~~17-0~~ 17-2
19.2	Douglas fir-larch	SS	9-8	12-10	16-4	19-10	9-8	12-10	16-4	~~19-2~~ 19-6
	Douglas fir-larch	#2	~~9-1~~ 9-2	~~11-6~~ 11-8	~~14-1~~ 14-3	~~16-3~~ 16-6	~~8-3~~ 8-5	~~10-6~~ 10-8	~~12-10~~ 13-0	~~14-10~~ 15-1
	Douglas fir-larch	#3	~~6-10~~ 7-0	~~8-8~~ 8-11	~~10-7~~ 10-11	~~12-4~~ 12-7	~~6-3~~ 6-5	~~7-11~~ 8-2	~~9-8~~ 9-11	~~11-3~~ 11-6
	Hem-Fir	#1	9-0	11-10	~~14-8~~ 14-10	~~17-0~~ 17-2	~~8-8~~ 8-9	~~10-11~~ 11-1	~~13-4~~ 13-6	~~15-6~~ 15-8
24	Douglas fir-larch	SS	9-0	11-11	15-2	18-5	9-0	11-11	~~14-9~~ 15-0	~~17-1~~ 17-5
	Douglas fir-larch	#2	~~8-1~~ 8-3	~~10-3~~ 10-5	~~12-7~~ 12-9	~~14-7~~ 14-9	~~7-5~~ 7-6	~~9-5~~ 9-6	~~11-6~~ 11-8	~~13-4~~ 13-6
	Douglas fir-larch	#3	~~6-2~~ 6-3	~~7-9~~ 8-0	~~9-6~~ 9-9	~~11-0~~ 11-3	~~5-7~~ 5-9	~~7-1~~ 7-3	~~8-8~~ 8-11	~~10-1~~ 10-4
	Hem-Fir	#1	8-4	~~10-9~~ 10-10	~~13-1~~ 13-3	~~15-2~~ 15-5	~~7-9~~ 7-10	~~9-9~~ 9-11	~~11-11~~ 12-1	~~13-10~~ 14-0

(Portions of Table not shown remain unchanged)

Revise as follows:

TABLE R802.4(1)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics without storage, live load = 10 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 5 psf			
			2x4	2x6	2x8	2x10
			Maximum ceiling joist spans			
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir – larch	#3	~~10-10~~ 11-1	~~15-10~~ 16-3	~~20-1~~ 20-7	~~24-6~~ 25-2
16	Douglas fir – larch	#2	11-3	17-8	~~23-0~~ 23-4	Note a
	Douglas fir – larch	#3	~~9-5~~ 9-7	~~13-9~~ 14-1	~~17-5~~ 17-10	~~21-3~~ 21-9
	Southern Pine	#1	11-16	18-1	~~23-1~~ 23-10	Note a
19.2	Douglas fir – larch	#2	10-7	~~16-7~~	~~21-0~~	~~25-~~

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 5 psf			
			2x4	2x6	2x8	2x10
			Maximum ceiling joist spans			
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
				16-8	21-4	26-0
	Douglas fir – larch	#3	~~8-7~~ 8-9	~~12-6~~ 12-10	~~15-10~~ 16-3	~~19-5~~ 19-10
24	Douglas fir – larch	#2	9-10	~~14-10~~ 15-0	~~18-9~~ 19-1	~~22-11~~ 23-3
	Douglas fir – larch	#3	~~7-8~~ 7-10	~~11-2~~ 11-6	~~14-2~~ 14-7	~~17-4~~ 17-9
	Hem-Fir	#1	9-8	15.2	~~19-7~~ 19-10	~~23-11~~ 24-3

(Portions of Table not shown remain unchanged)

TABLE R802.4(2)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics without storage, live load = 20 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf			
			2x4	2x6	2x8	2x10
			Maximum ceiling joist spans			
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir – larch	#2	9-10	~~14-10~~ 15-0	~~18-9~~ 19-1	~~22-11~~ 23-3
	Douglas fir – larch	#3	~~7-8~~ 7-10	~~11-2~~ 11-6	~~14-2~~ 14-7	~~17-4~~ 17-9
	Hem-Fir	#1	9-8	15-2	~~19-7~~ 19-10	~~23-11~~ 24-3
16	Douglas fir – larch	#2	~~8-9~~ 8-11	~~12-10~~ 13-0	~~16-3~~ 16-6	~~19-10~~ 20-2
	Douglas fir – larch	#3	~~6-8~~ 6-10	~~9-8~~ 9-11	~~12-4~~ 12-7	~~15-0~~ 15-5
	Hem-Fir	#1	8-9	~~13-5~~ 13-7	~~16-10~~ 17-2	~~20-8~~ 21-0
19.2	Douglas fir – larch	SS	8-11	14-0	18-5	~~23-4~~ 23-7
	Douglas fir – larch	#2	~~8-0~~ 8-2	~~11-09~~ 11-11	~~14-10~~ 15-1	~~18-2~~ 18-5
	Douglas fir – larch	#3	~~6-1~~ 6-2	~~8-10~~ 9-1	~~11-3~~ 11-6	~~13-8~~ 14-1
	Hem-Fir	#1	8-3	~~12-3~~ 12-4	~~15-6~~ 15-8	~~18-11~~ 19-2
24	Douglas fir – larch	SS	8-3	13-0	~~17-1~~ 17-2	~~20-11~~ 21-3
	Douglas fir – larch	#2	~~7-2~~ 7-3	~~10-6~~ 10-8	~~13-3~~ 13-6	~~16-3~~ 16-5
	Douglas fir – larch	#3	~~5-5~~ 5-7	~~7-11~~ 8-1	~~10-0~~ 10-3	~~12-3~~ 12-
	Hem-Fir	#1	~~7-6~~ 7-7	~~10-11~~ 11-1	~~13-10~~ 14-0	~~16-11~~ 17-1

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(1)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Roof live load = 20 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Douglas fir-larch SS	11-6	18-0	23-9	Note b	Note b	11-6	18-0	~~23-5~~ 23-9	Note b	Note b
	Douglas fir-larch #2	10-10	~~16-7~~ 16-10	~~21-0~~ 21-4	~~25-8~~ 26-0	Note b	~~9-10~~ 10-0	~~14-4~~ 14-7	~~18-2~~ 18-5	~~22-3~~ 22-6	~~25-9~~ 26-0
	Douglas fir-larch #3	~~8-7~~ 8-9	~~12-6~~ 12-10	~~15-10~~ 16-3	~~19-5~~ 19-10	~~22-6~~ 23-0	~~7-5~~ 7-7	~~10-10~~ 11-1	~~13-9~~ 14-1	~~16-9~~ 17-2	~~19-6~~ 19-11
	Hem-Fir #1	10-7	16-8	~~21-10~~ 22-0	Note b	Note b	~~10-3~~ 10-4	~~14-11~~ 15-2	~~18-11~~ 19-2	~~23-2~~ 23-5	Note b
16	Douglas fir-larch SS	10-5	16-4	21-7	Note b	Note b	10-5	~~16-0~~ 16-3	~~20-3~~ 20-7	~~24-9~~ 25-2	Note b
	Douglas fir-larch #2	9-10	~~14-4~~ 14-7	~~18-2~~ 18-5	~~22-3~~ 22-6	~~25-9~~ 26-0	~~8-6~~ 8-7	~~12-5~~ 12-7	~~15-9~~ 16-0	~~19-3~~ 19-6	~~22-4~~ 22-7
	Douglas fir-larch #3	~~7-5~~ 7-7	~~10-10~~ 11-1	~~13-9~~ 14-1	~~16-9~~ 17-2	~~19-6~~ 19-11	~~6-5~~ 6-7	~~9-5~~ 9-8	~~11-11~~ 12-12	~~14-6~~ 14-11	~~16-10~~ 17-3
	Hem-Fir #1	9-8	~~14-11~~ 15-2	~~18-11~~ 19-2	~~23-2~~ 23-5	Note b	~~8-10~~ 9-0	~~12-11~~ 13-1	~~16-5~~ 16-7	~~20-0~~ 20-4	~~23-3~~ 23-7
19.2	Douglas fir-larch SS	9-10	15-5	20-4	24.11	Note b	9-10	~~14-7~~ 14-10	~~18-6~~ 18-10	~~22-7~~ 23-0	Note b
	Douglas fir-larch #2	~~8-11~~ 9-1	~~13-1~~ 13-3	~~16-7~~ 16-10	~~20-3~~ 20-7	~~23-6~~ 23-10	~~7-9~~ 7-10	~~11-4~~ 11-6	~~14-4~~ 14-7	~~17-7~~ 17-10	~~20-4~~ 20-8
	Douglas fir-larch #3	~~6-9~~ 6-11	~~9-11~~ 10-2	~~12-7~~ 12-10	~~15-4~~ 15-8	~~17-9~~ 18-3	~~5-10~~ 6-0	~~8-7~~ 8-9	~~10-10~~ 11-2	~~13-3~~ 13-7	~~15-5~~ 15-9
	Hem-Fir #1	~~9-1~~	~~13-8~~ 13-10	~~17-4~~ 17-6	~~21-1~~ 21-5	~~24-6~~ 24-10	~~8-1~~ 8-2	~~11-10~~ 12-0	~~15-0~~ 15-2	~~18-4~~ 18-6	~~21-3~~ 21-6
24	Douglas fir-larch SS	9-1	14-4	18-0	~~23-4~~ 23-9	Note b	~~8-11~~ 9-1	~~13-1~~ 13-3	~~16-7~~ 16-10	~~20-3~~ 20-7	~~23-5~~ 23-10
	Douglas fir-larch #2	~~8-0~~ 8-2	~~11-9~~ 11-11	~~14-10~~ 15-1	~~18-2~~ 18-5	~~21-0~~ 21-4	~~6-11~~ 7-0	~~10-2~~ 10-4	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-3~~ 18-6
	Douglas fir-larch #3	~~6-1~~ 6-2	~~8-10~~ 9-1	~~11-3~~ 11-6	~~13-8~~ 14-1	~~15-11~~ 16-3	~~5-3~~ 5-4	~~7-8~~ 7-10	~~9-9~~ 10-0	~~11-10~~ 12-2	~~13-9~~ 14-1
	Hem-Fir #1	~~8-4~~ 8-5	~~12-3~~ 12-4	~~15-6~~ 15-8	~~18-11~~ 19-2	~~21-11~~ 22-2	~~7-3~~ 7-4	~~10-7~~ 10-9	~~13-5~~ 13-7	~~16-4~~ 16-7	~~19-0~~ 19-3

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(2)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Roof live load = 20 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Douglas fir-larch #2	9-10	15-6	20-5	~~25-8~~ 26-0	Note b	9-10	~~14-4~~ 14-7	~~18-2~~ 18-5	~~22-3~~ 22-6	~~25-9~~ 26-0
	Douglas fir-larch #3	~~8-7~~ 8-9	~~12-6~~ 12-10	~~15-10~~ 16-3	~~19-5~~ 19-10	~~22-6~~ 23-0	~~7-5~~ 7-7	~~10-10~~ 11-1	~~13-9~~ 14-1	~~16-9~~ 17-2	~~19-6~~ 19-11
	Hem-Fir #1	9-8	15-2	19-11	25-5	Note b	9-8	~~14-11~~ 15-2	~~18-11~~ 19-2	~~23-2~~ 23-5	Note b
16	Douglas fir-larch SS	9-6	14-11	19-7	25-0	Note b	9-6	14-11	19-7	~~24-9~~ 25-0	Note b
	Douglas fir-larch #2	8-11	14-1	~~18-2~~ 18-5	~~22-3~~ 22-6	~~25-9~~ 26.0	~~8-6~~ 8-7	~~12-5~~ 12-7	~~15-9~~ 16-0	~~19-3~~ 19-6	~~22-4~~ 22-7

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
	Douglas fir-larch	#3	~~7-5~~ 7-7	~~10-10~~ 11-1	~~13-9~~ 14-1	~~16-9~~ 17-2	~~19-6~~ 19-11	~~6-5~~ 6-7	~~9-5~~ 9-8	~~11-11~~ 12-2	~~14-6~~ 14-11	~~16-10~~ 17-3
	Hem-Fir	#1	8-9	13-9	18-1	23-1	Note b	8-9	~~12-11~~ 13-1	~~16-5~~ 16-7	~~20-0~~ 20-4	~~23-3~~ 23-7
19.2	Douglas fir-larch	SS	18-11	14-0	18-5	23-7	Note b	8-11	14-0	18-5	~~22-7~~ 23-0	Note b
	Douglas fir-larch	#2	8-5	~~13-1~~ 13-3	~~16-7~~ 16-10	~~20-3~~ 20-7	~~23-6~~ 23-10	~~7-9~~ 7-10	~~11-4~~ 11-6	~~14-4~~ 14-7	~~17-7~~ 17-10	~~20-4~~ 20-8
	Douglas fir-larch	#3	~~6-9~~ 6-11	~~9-11~~ 10-2	~~12-7~~ 12-10	~~15-4~~ 15-8	~~17-9~~ 18-3	~~5-10~~ 6-0	~~8-7~~ 8-9	~~10-10~~ 11-2	~~13-3~~ 13-7	~~15-5~~ 15-9
	Hem-Fir	#1	8-3	12-11	17-1	~~21-1~~ 21-5	~~24-6~~ 24-10	~~8-1~~ 8-2	~~11-10~~ 12-0	~~15-0~~ 15-2	~~18-4~~ 18-6	~~21-3~~ 21-6
24	Douglas fir-larch	SS	8-3	13-0	17-2	21-10	Note b	8-3	13-0	~~16-7~~ 16-10	~~20-3~~ 20-7	~~23-5~~ 23-10
	Douglas fir-larch	#2	7-10	~~11-9~~ 11-11	~~14-10~~ 15-1	~~18-2~~ 18-5	~~21-0~~ 21-4	~~6-11~~ 7-0	~~10-2~~ 10-4	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-3~~ 18-6
	Douglas fir-larch	#3	~~6-1~~ 6-2	~~8-10~~ 9-1	~~11-3~~ 11-6	~~13-8~~ 14-1	~~15-11~~ 16-3	~~5-3~~ 5-4	~~7-8~~ 7-10	~~9-9~~ 10-0	~~11-10~~ 12-2	~~13-9~~ 14-1
	Hem-Fir	#1	7-8	12-10	~~15-6~~ 15-8	~~18-11~~ 19-2	~~21-11~~ 22-2	~~7-3~~ 7-4	~~10-7~~ 10-9	~~13-5~~ 13-7	~~16-4~~ 16-7	~~19-0~~ 19-3

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(3)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load = 30 psf, ceiling not attached to rafters, L/∆ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Douglas fir-larch	SS	10-0	15-9	20-9	Note b	Note b	10-0	15-9	~~20-1~~ 20-5	~~24-6~~ 24-11	Note b
	Douglas fir-larch	#2	~~9-5~~ 9-6	~~13-9~~ 14-0	~~17-5~~ 17-8	~~21-4~~ 21-7	~~24-8~~ 25-1	~~8-5~~ 8-6	~~12-4~~ 12-6	~~15-7~~ 15-10	~~19-1~~ 19-4	~~22-1~~ 22-5
	Douglas fir-larch	#3	~~7-1~~ 7-3	~~10-5~~ 10-8	~~13-2~~ 13-6	~~16-1~~ 16-6	~~18-8~~ 19-2	~~6-4~~ 6-6	~~9-4~~ 9-6	~~11-9~~ 12-1	~~14-5~~ 14-9	~~16-8~~ 17-1
	Hem-Fir	#1	9-3	~~14-4~~ 14-6	~~18-2~~ 18-5	~~22-2~~ 22-6	~~25-9~~ 26-0	~~8-9~~ 8-11	~~12-10~~ 13-0	~~16-3~~ 16-6	~~19-10~~ 20-1	~~23-0~~ 23-4
16	Douglas fir-larch	SS	9-1	14-4	18-10	~~23-9~~ 24-1	Note b	9-1	~~13-9~~ 14-0	~~17-5~~ 17-8	~~21-3~~ 21-7	~~24-8~~ 25-1
	Douglas fir-larch	#2	~~8-2~~ 8-3	~~11-11~~ 12-1	~~15-1~~ 15-4	~~18-5~~ 18-9	~~21-5~~ 21-8	~~7-3~~ 7-5	~~10-8~~ 10-10	~~13-6~~ 13-8	~~16-6~~ 16-9	~~19-2~~ 19-5
	Douglas fir-larch	#3	~~6-2~~ 6-4	~~9-0~~ 9-3	~~11-5~~ 11-8	~~13-11~~ 14-3	~~16-2~~ 16-7	~~5-6~~ 5-8	~~8-1~~ 8-3	~~10-3~~ 10-6	~~12-6~~ 12-9	~~14-6~~ 14-10
	Hem-Fir	#1	8-5	~~12-5~~ 12-7	~~15-9~~ 15-11	~~19-3~~ 19-6	~~22-3~~ 22-7	~~7-7~~ 7-8	~~11-1~~ 11-3	~~14-1~~ 14-3	~~17-2~~ 17-5	~~19-11~~ 20-2
19.2	Douglas fir-larch	SS	8-7	13-6	17-9	~~21-8~~ 22-1	~~25-2~~ 25-7	8-7	~~12-6~~ 12-9	~~15-10~~ 16-2	~~19-5~~ 19-9	~~22-6~~ 22-10
	Douglas fir-larch	#2	~~7-5~~ 7-7	~~10-11~~ 11-0	~~13-9~~ 14-0	~~16-10~~ 17-1	~~19-6~~ 19-10	~~6-8~~ 6-9	~~9-9~~ 9-10	~~12-4~~ 12-6	~~15-1~~ 15-3	~~17-6~~ 17-9

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
	Douglas fir-larch	#3	~~5-7~~ 5-9	~~8-3~~ 8-5	~~10-5~~ 10-8	~~12-9~~ 13-1	~~14-9~~ 15-2	~~5-0~~ 5-2	~~7-4~~ 7-7	~~9-4~~ 9-7	~~11-5~~ 11-8	~~13-2~~ 13-6
	Hem-Fir	#1	~~7-9~~ 7-10	~~11-4~~ 11-6	~~14-4~~ 14-7	~~17-7~~ 17-9	~~20-4~~ 20-7	~~6-11~~ 7-0	~~10-2~~ 10-3	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-2~~ 18-5
24	Douglas fir-larch	SS	~~7-11~~ 8-0	12-6	~~15-10~~ 16-2	~~19-5~~ 19-9	~~22-6~~ 22-10	~~7-8~~ 7-10	~~11-3~~ 11-5	~~14-2~~ 14-5	~~17-4~~ 17-8	~~20-1~~ 20-5
	Douglas fir-larch	#2	~~6-8~~ 6-9	~~9-9~~ 9-10	~~12-4~~ 12-6	~~15-1~~ 15-3	~~17-6~~ 17-9	~~5-11~~ 6-0	~~8-8~~ 8-10	~~11-0~~ 11-2	~~13-6~~ 13-8	~~15-7~~ 15-10
	Douglas fir-larch	#3	~~5-0~~ 5-2	~~7-4~~ 7-7	~~9-4~~ 9-7	~~11-5~~ 11-8	~~13-2~~ 13-6	~~4-6~~ 4-7	~~6-7~~ 6-9	~~8-4~~ 8-7	~~10-2~~ 10-5	~~11-10~~ 12-1
	Hem-Fir	#1	~~6-11~~ 7-0	~~10-2~~ 10-3	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-2~~ 18-5	~~6-2~~ 6-3	~~9-1~~ 9-2	~~11-6~~ 11-8	~~14-0~~ 14-3	~~16-3~~ 16-6

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(4)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load = 50 psf, ceiling not attached to rafters, $L/\Delta = 180$)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Douglas fir-larch	SS	8-5	13-3	17-6	22-4	26-0	8-5	13-3	~~17-0~~ 17-3	~~20-9~~ 21-1	~~24-0~~ 24-5
	Douglas fir-larch	#2	~~7-8~~ 7-10	~~11-3~~ 11-5	~~14-3~~ 14-5	~~17-5~~ 17-8	~~20-2~~ 20-5	~~7-1~~ 7-3	~~10-5~~ 10-7	~~13-2~~ 13-4	~~16-1~~ 16-4	~~18-8~~ 18-11
	Douglas fir-larch	#3	~~5-10~~ 6-0	~~8-6~~ 8-9	~~10-9~~ 11-0	~~13-2~~ 13-6	~~15-3~~ 15-7	~~5-5~~ 5-6	~~7-10~~ 8-1	~~10-0~~ 10-3	~~12-2~~ 12-6	~~14-1~~ 14-6
	Hem-Fir	#1	7-10	~~11-9~~ 11-10	~~14-10~~ 15-0	~~18-1~~ 18-4	~~21-0~~ 21-3	~~7-5~~ 7-6	~~10-10~~ 11-0	~~13-9~~ 13-11	~~16-9~~ 17-0	~~19-5~~ 19-9
16	Douglas fir-larch	SS	7-8	12-1	~~15-10~~ 15-11	~~19-5~~ 19-9	~~22-6~~ 22-10	7-8	~~11-7~~ 11-10	~~14-8~~ 14-11	~~17-11~~ 18-3	~~20-10~~ 21-2
	Douglas fir-larch	#2	~~6-8~~ 6-9	~~9-9~~ 9-10	~~12-4~~ 12-6	~~15-1~~ 15-3	~~17-6~~ 17-9	~~6-2~~ 6-3	~~9-0~~ 9-2	~~11-5~~ 11-7	~~13-11~~ 14-2	~~16-2~~ 16-5
	Douglas fir-larch	#3	~~5-0~~ 5-2	~~7-4~~ 7-7	~~9-4~~ 9-7	~~11-5~~ 11-8	~~13-2~~ 13-6	~~4-8~~ 4-9	~~6-10~~ 7-0	~~8-8~~ 8-10	~~10-6~~ 10-10	~~12-3~~ 12-6
	Hem-Fir	#1	~~6-11~~ 7-0	~~10-2~~ 10-3	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-2~~ 18-5	~~6-5~~ 6-6	~~9-5~~ 9-6	~~11-11~~ 12-1	~~14-6~~ 14-9	~~16-10~~ 17-1
19.2	Douglas fir-larch	SS	7-3	11-4	~~14-6~~ 14-9	~~17-8~~ 18-0	~~20-6~~ 20-11	7-3	~~10-7~~ 10-9	~~13-5~~ 13-8	~~16-5~~ 16-8	~~19-0~~ 19-4
	Douglas fir-larch	#2	~~6-1~~ 6-2	~~8-11~~ 9-0	~~11-3~~ 11-5	~~13-9~~ 13-11	~~15-11~~ 16-2	~~5-7~~ 5-8	~~8-3~~ 8-4	~~10-5~~ 10-7	~~12-9~~ 12-11	~~14-9~~ 15-0
	Douglas fir-larch	#3	~~4-7~~ 4-8	~~6-9~~ 6-11	~~8-6~~ 8-9	~~10-5~~ 10-8	~~12-1~~ 12-4	~~4-3~~ 4-4	~~6-3~~ 6-4	~~7-11~~ 8-1	~~9-7~~ 9-10	~~11-2~~ 11-5
	Hem-Fir	#1	~~6-4~~ 6-5	~~9-3~~ 9-5	~~11-9~~ 11-11	~~14-4~~ 14-6	~~16-7~~ 16-10	~~5-10~~ 8-11	~~8-7~~ 8-8	~~10-10~~ 11-0	~~13-3~~ 13-5	~~15-5~~ 15-7
24	Douglas fir-larch	SS	6-8	~~10-~~ 10-5	~~13-0~~ 13-2	~~15-10~~ 16-1	~~18-4~~ 18-8	~~6-6~~ 6-7	~~9-6~~ 9-8	~~12-0~~ 12-2	~~14-8~~ 14-11	~~17-0~~ 17-3

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
	Douglas fir-larch	#2	~~5-5~~ 5-6	~~7-11~~ 8-1	~~10-1~~ 10-3	~~12-4~~ 12-6	~~14-3~~ 14-6	~~5-0~~ 5-1	~~7-4~~ 7-6	~~9-4~~ 9-5	~~11-5~~ 11-7	~~13-2~~ 13-5
	Douglas fir-larch	#3	~~4-1~~ 4-3	~~6-0~~ 6-2	~~7-7~~ 7-10	~~9-4~~ 9-6	~~10-9~~ 11-1	~~3-10~~ 3-11	~~5-7~~ 5-8	~~7-1~~ 7-3	~~8-7~~ 8-10	~~10-0~~ 10-3
	Hem-Fir	#1	~~5-8~~ 5-9	~~8-3~~ 8-5	~~10-6~~ 10-8	~~12-10~~ 13-0	~~14-10~~ 15-1	~~5-3~~ 8-4	~~7-8~~ 7-9	~~9-9~~ 9-10	~~11-10~~ 12-0	~~13-9~~ 13-11

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(5)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load = 30 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Douglas fir-larch	#2	8-7	13-6	~~17-5~~ 17-8	~~21-4~~ 21-7	~~24-8~~ 25-1	~~8-5~~ 8-6	~~12-4~~ 12-6	~~15-7~~ 15-10	~~19-1~~ 19-4	~~22-1~~ 22-5
	Douglas fir-larch	#3	~~7-1~~ 7-3	~~10-5~~ 10-8	~~13-2~~ 13-6	~~16-1~~ 16-6	~~18-8~~ 19-2	~~6-4~~ 6-6	~~9-4~~ 9-6	~~11-9~~ 12-1	~~14-5~~ 14-9	~~16-8~~ 17-1
	Hem-Fir	#1	8-5	13-3	17-5	~~22-2~~ 22-3	~~25-9~~ 26-0	8-5	~~12-10~~ 13-0	~~16-3~~ 16-6	~~19-10~~ 20-1	~~23-0~~ 23-4
16	Douglas fir-larch	SS	8-3	13-0	17-2	21-0	Note b	8-3	13-0	17-2	~~21-3~~ 21-7	~~24-8~~ 25-1
	Douglas fir-larch	#2	7-10	~~11-11~~ 12-1	~~15-1~~ 15-4	~~18-5~~ 18-9	~~21-5~~ 21-8	~~7-3~~ 7-5	~~10-8~~ 10-10	~~13-6~~ 13-8	~~16-6~~ 16-9	~~19-2~~ 19-5
	Douglas fir-larch	#3	~~6-2~~ 6-4	~~9-0~~ 9-3	~~11-5~~ 11-8	~~13-11~~ 14-3	~~16-2~~ 16-7	~~5-6~~ 5-8	~~8-1~~ 8-3	~~10-3~~ 10-6	~~12-6~~ 12-9	~~14-6~~ 14-10
	Hem-Fir	#1	7-8	12-0	~~15-9~~ 15-10	~~19-3~~ 19-6	~~22-3~~ 22-7	~~7-7~~ 7-8	~~11-1~~ 11-3	~~14-1~~ 14-3	~~17-2~~ 17-5	~~19-11~~ 20-2
19.2	Douglas fir-larch	SS	7-9	12-3	16-1	20-7	25-0	7-9	12-3	~~15-10~~ 16-1	~~19-5~~ 19-9	~~22-6~~ 22-10
	Douglas fir-larch	#2	7-4	~~10-11~~ 11-0	~~13-9~~ 14-0	~~16-10~~ 17-1	~~19-6~~ 19-10	~~6-8~~ 6-9	~~9-9~~ 9-1	~~12-4~~ 12-6	~~15-1~~ 15-3	~~17-6~~ 17-9
	Douglas fir-larch	#3	~~5-7~~ 5-9	~~8-3~~ 8-5	~~10-5~~ 10-8	~~12-9~~ 13-1	~~14-9~~ 15-2	~~5-0~~ 5-2	~~7-4~~ 7-7	~~9-4~~ 9-7	~~11-5~~ 11-8	~~13-2~~ 13-6
	Hem-Fir	#1	7-2	11-4	~~14-4~~ 14-7	~~17-7~~ 17-9	~~20-4~~ 20-7	~~6-11~~ 7-0	~~16-2~~ 16-3	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-2~~ 18-5
24	Douglas fir-larch	SS	7-3	11-4	15-0	19-1	~~22-6~~ 22-10	7-3	~~11-3~~ 11-4	~~14-2~~ 14-5	~~17-4~~ 17-8	~~20-1~~ 20-5
	Douglas fir-larch	#2	~~6-8~~ 6-9	~~9-9~~ 9-10	~~12-4~~ 12-6	~~15-1~~ 15-3	~~17-6~~ 17-9	~~5-11~~ 6-0	~~8-8~~ 8-10	~~11-0~~ 11-2	~~13-6~~ 13-8	~~15-7~~ 15-10
	Douglas fir-larch	#3	~~5-0~~ 5-2	~~7-4~~ 7-7	~~9-4~~ 9-7	~~11-5~~ 11-8	~~13-2~~ 13-6	~~4-6~~ 4-7	~~6-7~~ 6-9	~~8-4~~ 8-7	~~10-2~~ 10-5	~~11-10~~ 12-1
	Hem-Fir	#1	6-8	~~10-2~~ 10-3	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-2~~ 18-5	~~6-2~~ 6-3	~~9-1~~ 9-2	~~11-6~~ 11-8	~~14-0~~ 14-3	~~16-3~~ 16-6

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(6)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load = 50 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Douglas fir-larch	SS	7-8	12-1	15-11	20-3	24-8	7-8	12-1	15-1	20-3	~~24-0~~ 24-5
12	Douglas fir-larch	#2	7-3	~~11-3~~ 11-5	~~14-3~~ 14-5	~~17-5~~ 17-8	~~20-2~~ 20-5	~~7-1~~ 7-3	~~10-5~~ 10-7	~~13-2~~ 13-4	~~16-1~~ 16-4	~~18-8~~ 18-11
12	Douglas fir-larch	#3	~~5-10~~ 6-0	~~8-6~~ 8-9	~~10-9~~ 11-0	~~13-2~~ 13-6	~~15-3~~ 15-7	~~5-5~~ 5-6	~~7-10~~ 8-1	~~10-0~~ 10-3	~~12-2~~ 12-6	~~14-1~~ 14-6
12	Hem-Fir	#1	7-1	11-2	14-8	~~18-1~~ 18-4	~~21-0~~ 21-3	7-1	~~10-10~~ 11-0	~~13-9~~ 13-11	~~16-9~~ 17-0	~~19-5~~ 19-9
16	Douglas fir-larch	SS	7-0	11-0	14-5	18-5	22-5	7-0	11-0	14-5	~~17-11~~ 18-3	~~20-10~~ 21-2
16	Douglas fir-larch	#2	6-7	~~9-9~~ 9-10	~~12-4~~ 12-6	~~15-1~~ 15-3	~~17-6~~ 17-9	~~6-2~~ 6-3	~~9-0~~ 9-2	~~11-5~~ 11-7	~~13-11~~ 14-2	~~16-2~~ 16-5
16	Douglas fir-larch	#3	~~5-0~~ 5-2	~~7-4~~ 7-7	~~9-4~~ 9-7	~~11-5~~ 11-8	~~13-2~~ 13-6	~~4-8~~ 4-9	~~6-10~~ 7-0	~~8-8~~ 8-10	~~10-6~~ 10-10	~~12-3~~ 12-6
16	Hem-Fir	#1	~~6-5~~	10-2	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-2~~ 18-5	6-5	~~9-5~~ 9-6	~~11-11~~ 12-1	~~14-6~~ 14-9	~~16-10~~ 17-1
19.2	Douglas fir-larch	SS	6-7	10-4	13-7	17-4	~~20-6~~ 20-11	6-7	10-4	~~13-5~~ 13-7	~~16-5~~ 16-8	~~19-0~~ 19-4
19.2	Douglas fir-larch	#2	~~6-1~~ 6-2	~~8-11~~ 9-0	~~11-3~~ 11-5	~~13-9~~ 13-11	~~15-11~~ 16-2	~~5-7~~ 5-8	~~8-3~~ 8-4	~~10-5~~ 10-7	~~12-9~~ 12-11	~~14-9~~ 15-0
19.2	Douglas fir-larch	#3	~~4-7~~ 4-8	~~6-9~~ 6-11	~~8-6~~ 8-9	~~10-5~~ 10-8	~~12-1~~ 12-4	~~4-3~~ 4-4	~~6-3~~ 6-4	~~7-11~~ 8-1	~~9-7~~ 9-10	~~11-2~~ 11-5
19.2	Hem-Fir	#1	6-1	~~9-3~~ 9-5	~~11-9~~ 11-11	~~14-4~~ 14-6	~~16-7~~ 16-10	~~5-10~~ 5-11	~~8-7~~ 8-8	~~10-10~~ 11-0	~~13-3~~ 13-5	~~15-5~~ 15-7
24	Douglas fir-larch	SS	6-1	9-7	12-7	~~15-10~~ 16-1	~~18-4~~ 18-8	6-1	~~9-6~~ 9-7	~~12-0~~ 12-2	~~14-8~~ 14-11	~~17-0~~ 17-3
24	Douglas fir-larch	#2	~~5-5~~ 5-6	~~7-11~~ 8-1	~~10-1~~ 10-3	~~12-4~~ 12-6	~~14-3~~ 14-6	~~5-0~~ 5-1	~~7-4~~ 7-6	~~9-4~~ 9-5	~~11-5~~ 11-7	~~13-2~~ 13-5
24	Douglas fir-larch	#3	~~4-1~~ 4-3	~~6-0~~ 6-2	~~7-7~~ 7-10	~~9-4~~ 9-6	~~10-9~~ 11-1	~~3-10~~ 3-11	~~5-7~~ 5-8	~~7-1~~ 7-3	~~8-7~~ 8-10	~~10-0~~ 10-3
24	Hem-Fir	#1	5-8	~~8-3~~ 8-5	~~10-6~~ 10-8	~~12-10~~ 13-0	~~14-10~~ 15-1	~~5-3~~ 5-4	~~7-8~~ 7-9	~~9-9~~ 9-10	~~11-10~~ 12-0	~~13-9~~ 13-11

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(7)
RAFTER SPANS FOR 70 PSF GROUND SNOW LOAD
(Ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Douglas fir-larch	SS	7-7	11-0	15-8	~~19-5~~ 19-9	~~22-6~~ 22-10	7-7	11-10	~~15-0~~ 15-3	~~18-3~~ 18-7	~~21-2~~ 21-7
12	Douglas fir-larch	#2	~~6-8~~ 6-9	~~9-9~~ 9-10	~~12-4~~ 12-6	~~15-1~~ 15-3	~~17-6~~ 17-9	~~6-3~~ 6-4	~~9-2~~ 9-4	~~11-8~~ 11-9	~~14-2~~ 14-5	~~16-6~~ 16-8
12	Douglas fir-larch	#3	~~5-0~~ 5-2	~~7-4~~ 7-7	~~9-4~~ 9-7	~~11-5~~ 11-8	~~13-2~~ 13-6	~~4-9~~ 4-10	~~6-11~~ 7-1	~~8-9~~ 9-0	~~10-9~~ 11-0	~~12-5~~ 12-9

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
	Hem-Fir	#1	~~6-11~~ 7-0	~~10-2~~ 10-3	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-2~~ 18-5	~~6-6~~ 6-7	~~9-7~~ 9-8	~~12-1~~ 12-3	~~14-10~~ 15-0	~~17-2~~ 17-5
16	Douglas fir-larch	SS	6-10	10-9	~~13-9~~ 14-0	~~16-10~~ 17-1	~~19-6~~ 19-10	6-10	~~10-3~~ 10-5	~~13-0~~ 13-2	~~15-10~~ 16-1	~~18-4~~ 18-8
	Douglas fir-larch	#2	~~5-9~~ 5-10	~~8-5~~ 8-7	~~10-8~~ 10-10	~~13-1~~ 13-3	~~15-2~~ 15-4	~~5-5~~ 5-6	~~7-11~~ 8-1	~~10-1~~ 10-3	~~12-4~~ 12-6	~~14-3~~ 14-6
	Douglas fir-larch	#3	~~4-4~~ 4-6	~~6-4~~ 6-6	~~8-1~~ 8-3	~~9-10~~ 10-1	~~11-5~~ 11-9	~~4-1~~ 4-3	~~6-0~~ 6-2	~~7-7~~ 7-10	~~9-4~~ 9-6	~~10-9~~ 11-1
	Hem-Fir	#1	~~6-0~~ 6-1	~~8-9~~ 8-11	~~11-2~~ 11-3	~~13-7~~ 13-9	~~15-9~~ 16-0	~~5-8~~ 5-9	~~8-3~~ 8-5	~~10-6~~ 10-8	~~12-10~~ 13-0	~~14-10~~ 15-1
19.2	Douglas fir-larch	SS	~~6-5~~ 6-6	~~9-11~~ 10-1	~~12-7~~ 12-9	~~15-4~~ 15-7	~~17-9~~ 18-1	~~6-5~~ 6-6	~~9-4~~ 9-6	~~11-10~~ 12-0	~~14-5~~ 14-8	~~16-9~~ 17-1
	Douglas fir-larch	#2	~~5-3~~ 5-4	~~7-8~~ 7-10	~~9-9~~ 9-11	~~11-11~~ 12-1	~~13-10~~ 14-0	5-0	~~7-3~~ 7-4	~~9-2~~ 9-4	~~11-3~~ 11-5	~~13-0~~ 13-2
	Douglas fir-larch	#3	~~4-0~~ 4-1	~~5-10~~ 6-0	~~7-4~~ 7-7	~~9-0~~ 9-3	~~10-5~~ 10-8	~~3-9~~ 3-10	~~5-6~~ 5-7	~~6-11~~ 7-1	~~8-6~~ 8-8	~~9-10~~ 10-1
	Hem-Fir	#1	~~5-6~~ 5-7	~~8-0~~ 8-2	~~10-2~~ 10-3	~~12-5~~ 12-7	~~14-5~~ 14-7	~~5-2~~ 5-3	~~7-7~~ 7-8	~~9-7~~ 9-8	~~11-8~~ 11-10	~~13-7~~ 13-9
24	Douglas fir-larch	SS	6-0	~~8-10~~ 9-0	~~11-3~~ 11-5	~~13-9~~ 13-11	~~15-11~~ 16-2	~~5-9~~ 5-10	~~8-4~~ 8-6	~~10-7~~ 10-9	~~12-11~~ 13-2	~~15-0~~ 15-3
	Douglas fir-larch	#2	~~4-8~~ 4-9	~~6-11~~ 7-0	~~8-9~~ 8-10	~~10-8~~ 10-10	~~12-4~~ 12-6	~~4-5~~ 4-6	~~6-6~~ 6-7	~~8-3~~ 8-4	~~10-0~~ 10-2	~~11-8~~ 11-10
	Douglas fir-larch	#3	~~3-7~~ 3-8	~~5-2~~ 5-4	~~6-7~~ 6-9	~~8-1~~ 8-3	~~9-4~~ 9-7	~~3-4~~ 3-5	~~4-11~~ 5-0	~~6-3~~ 6-4	~~7-7~~ 7-9	~~8-10~~ 9-0
	Hem-Fir	#1	~~4-11~~ 5-0	~~7-2~~ 7-3	~~9-1~~ 9-2	~~11-1~~ 11-3	~~12-10~~ 13-0	~~4-7~~ 4-8	~~6-9~~ 6-10	~~8-7~~ 8-8	~~10-6~~ 10-7	~~12-2~~ 12-4

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(8)
RAFTER SPANS FOR 70 PSF GROUND SNOW LOAD
(Ceiling attached to rafters, L/∆ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Douglas fir-larch	SS	6-10	10-9	14-3	18-2	22-1	6-10	10-9	14-3	18-2	~~21-2~~ 21-7
	Douglas fir-larch	#2	6-6	~~9-9~~ 9-10	~~12-4~~ 12-6	~~15-1~~ 15-3	~~17-6~~ 17-9	~~6-3~~ 6-4	~~9-2~~ 9-4	~~11-8~~ 11-9	~~14-2~~ 14-5	~~16-6~~ 16-8
	Douglas fir-larch	#3	~~5-0~~ 5-2	~~7-4~~ 7-7	~~9-4~~ 9-7	~~11-5~~ 11-8	~~13-2~~ 13-6	~~4-9~~ 4-10	~~6-11~~ 7-1	~~8-9~~ 9-0	~~10-9~~ 11-0	~~12-5~~ 12-9
	Hem-Fir	#1	6-4	10-0	~~12-10~~ 13-0	~~15-8~~ 15-11	~~18-2~~ 18-5	6-4	~~9-7~~ 9-8	~~12-1~~ 12-3	~~14-10~~ 15-0	~~17-2~~ 17-5
16	Douglas fir-larch	SS	6-3	9-10	12-11	16-6	~~19-6~~ 19-10	6-3	9-10	12-11	~~15-10~~ 16-1	~~18-4~~ 18-8
	Douglas fir-larch	#2	~~5-9~~ 5-10	~~8-5~~ 8-7	~~10-8~~ 10-10	~~13-1~~ 13-3	~~15-2~~ 15-4	~~5-5~~ 5-6	~~7-11~~ 8-1	~~10-1~~ 10-3	~~12-4~~ 12-6	~~14-3~~ 14-6

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
	Douglas fir-larch	#3	~~4-4~~ 4-6	~~6-4~~ 6-6	~~8-1~~ 8-3	~~9-10~~ 10-1	~~11-5~~ 11-9	~~4-1~~ 4-3	~~6-0~~ 6-2	~~7-7~~ 7-10	~~9-4~~ 9-6	~~10-9~~ 11-1
	Hem-Fir	#1	5-9	~~8-9~~ 8-11	~~11-2~~ 11-3	~~13-7~~ 13-9	~~15-9~~ 16-0	~~5-8~~ 5-9	~~8-3~~ 8-5	~~10-6~~ 10-8	~~12-10~~ 13-0	~~14-10~~ 15-1
19.2	Douglas fir-larch	SS	5-10	9-3	12-2	~~15-4~~ 15-6	~~17-9~~ 18-1	5-10	9-3	~~11-10~~ 12-0	~~14-5~~ 14-8	~~16-9~~ 17-1
	Douglas fir-larch	#2	~~5-3~~ 5-4	~~7-8~~ 7-10	~~9-9~~ 9-11	~~11-11~~ 12-1	~~13-10~~ 14-0	5-0	~~7-3~~ 7-4	~~9-2~~ 9-4	~~11-3~~ 11-5	~~13-0~~ 13-2
	Douglas fir-larch	#3	~~4-0~~ 4-1	~~5-10~~ 6-0	~~7-4~~ 7-7	~~9-0~~ 9-3	~~10-5~~ 10-8	~~3-9~~ 3-10	~~5-6~~ 5-7	~~6-11~~ 7-	~~8-6~~ 8-8	~~9-10~~ 10-1
	Hem-Fir	#1	5-5	~~8-0~~ 8-2	~~10-2~~ 10-3	~~12-5~~ 12-7	~~14-5~~ 14-7	~~5-2~~ 5-3	~~7-7~~ 7-8	~~9-7~~ 9-8	~~11-8~~ 11-10	~~13-7~~ 13-9
24	Douglas fir-larch	SS	5-5	8-7	11-3	~~13-9~~ 13-11	~~15-11~~ 16-2	5-5	~~8-4~~ 8-6	~~10-7~~ 10-9	~~12-11~~ 13-2	~~15-0~~ 15-3
	Douglas fir-larch	#2	~~4-8~~ 4-9	~~6-11~~ 7-0	~~8-9~~ 8-10	~~10-8~~ 10-10	~~12-4~~ 12-6	~~4-5~~ 4-6	~~6-6~~ 6-7	~~8-3~~ 8-4	~~10-0~~ 10-2	~~11-8~~ 11-10
	Douglas fir-larch	#3	~~3-7~~ 3-8	~~5-2~~ 5-4	~~6-7~~ 6-9	~~8-1~~ 8-3	~~9-4~~ 9-7	~~3-4~~ 3-5	~~4-11~~ 5-0	~~6-3~~ 6-4	~~7-7~~ 7-9	~~8-10~~ 9-0
	Hem-Fir	#1	~~4-11~~ 5-0	~~7-2~~ 7-3	~~9-1~~ 9-2	~~11-1~~ 11-3	~~12-10~~ 13-0	~~4-7~~ 4-8	~~6-9~~ 6-10	~~8-7~~ 8-8	~~10-6~~ 10-7	~~12-2~~ 12-4

(Portions of Table not shown remain unchanged)

Reason: Between 1991 and 1997, the standard for deriving sawn lumber design values, ASTM D1990, was slightly revised. As a result, bending design values for sawn lumber were re-calculated which led to slight increases to design values of some grades of certain species. Revised design values for Select Structural, #2, and #3 grades of Douglas fir-Larch and #1 grade of Hem-Fir all increased by 25 psi. Design values in the design value supplements to the 1997 *NDS* and the *Span Tables for Joist & Rafters* were all revised, as were the spans in the 2001 *WFCM* and AWC's on-line span calculator.

It was recently pointed out that span tables incorporated into the 2000 IBC and 2000 IRC were based on span tables pre-dating the revised design values. This proposal revises the IRC span table spans for Select Structural, #2, and #3 grades of Douglas fir-Larch and #1 grade of Hem-Fir using the slightly higher bending values. These spans will be in agreement with current span tables being used by the design community.

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB248-13 **AS**

Code Change No: RB249-13

Original Proposal

Section(s): Table R502.3.3(1), Table R502.3.3(2)

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

TABLE R502.3.3(1)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING LIGHT-FRAME EXTERIOR BEARING WALL AND ROOF ONLY[a, b, c, f, g, h]
(Floor Live Load ≤ 40 psf, Roof Live Load ≤ 20 psf)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Tabulated values are for clear-span roof supported solely by exterior bearing walls.
b. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, ~~southern pine~~ and spruce-pine-fir for repetitive (three or more) members.

(Portions of Table not shown remain unchanged)

TABLE R502.3.3(2)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING EXTERIOR BALCONY[a, b, e, f]

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, ~~southern pine~~ and spruce-pine-fir for repetitive (three or more) members.

(Portions of Table not shown remain unchanged)

Reason: It is likely the design values for wider width southern pine lumber will change in early 2013. This proposal will eliminate the use of these tables with southern pine. It is the proponent's intent to find a solution that will allow for the continued use of southern pine with this table, but that will only be possible once the new design values are certified. In the meantime, this change to footnote "b" will prohibit the unintended use of these spans with southern pine lumber.

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE R502.3.3(1)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING LIGHT-FRAME EXTERIOR BEARING WALL AND ROOF ONLY[a, b, c, f, g, h]
(Floor Live Load ≤ 40 psf, Roof Live Load ≤ 20 psf)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Tabulated values are for clear-span roof supported solely by exterior bearing walls.
b. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, and spruce-pine-fir for repetitive (three or more) members. <u>No. 1 or better shall be used for southern pine.</u>

(Portions of Table not shown remain unchanged)

TABLE R502.3.3(2)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING EXTERIOR BALCONY[a, b, e, f]

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, and spruce-pine-fir for repetitive (three or more) members. <u>No. 1 or better shall be used for southern pine.</u>

(Portions of Table not shown remain unchanged)

Committee Reason: Approval was based upon the proponent's published reason. The modification allows southern-pine but limits it to grade #1 or better.

Assembly Action: **None**

Final Hearing Results

RB249-13 **AM**

Code Change No: RB250-13

Original Proposal

Section(s): Table R502.5(1), Table R502.5(2), Table R802.4(1), Table R802.4(2), Table R802.5.1(1) through R802.5.1(8)

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

TABLE R502.5(1)
GIRDER SPANS [a, b] AND HEADER SPANS [a, b] FOR EXTERIOR BEARING WALLS
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir~~[b]~~ and required number of jack studs)

(Portions of Table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.
b. No. 1 or better grade lumber shall be used for Southern Pine 2x4s. Other tabulated values assume #2 grade lumber.
c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
d. NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.
e. Use 30 psf ground snow load for cases in which ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.

TABLE R502.5(2)
GIRDER SPANS [a, b] AND HEADER SPANS [a, b] FOR INTERIOR BEARING WALLS
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir~~[b]~~ and required number of jack studs)

(Portions of Table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Spans are given in feet and inches.
b. No. 1 or better grade lumber shall be used for Southern Pine 2x4s. Other tabulated values assume #2 grade lumber.
c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
d. NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.

Revise as follows:

TABLE R802.4(1)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics without storage, live load = 10 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 5 psf			
			2x4	2x6	2x8	2x10
			Maximum ceiling joist spans			
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine	#2	~~12-5~~ 11-10	19-6	25-8	Note a
	Southern pine	#3	~~11-6~~ 9-8	17-0	21-8	25-7
16	Southern pine	#2	~~11-3~~ 10-9	17-8	23-4	Note a

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 5 psf			
			2x4	2x6	2x8	2x10
			Maximum ceiling joist spans			
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Southern pine	#3	~~10-0~~ 8-5	14-9	18-9	22-2
19.2	Southern pine	#2	~~10-7~~ 10-2	16-8	21-11	Note a
	Southern pine	#3	~~9-1~~ 7-8	13-6	17-2	20-3
24	Southern pine	#2	~~9-10~~ 9-1	15-6	20-1	23-11
	Southern pine	#3	~~8-2~~ 6-10	12-0	15-4	18-1

(Portions of Table not shown remain unchanged)

TABLE R802.4(2)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics without storage, live load = 20 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf			
			2x4	2x6	2x8	2x10
			Maximum ceiling joist spans			
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine	#2	~~9-10~~ 9-1	15-6	20-1	23-11
	Southern pine	#3	~~8-2~~ 6-10	12-0	15-4	18-1
16	Southern pine	#2	~~8-11~~ 7-10	13-6	17-5	20-9
	Southern pine	#3	~~7-1~~ 5-11	10-5	13-3	15-8
19.2	Southern pine	#2	~~8-5~~ 7-2	12-3	15-10	18-11
	Southern pine	#3	~~6-5~~ 5-5	9-6	12-1	14-4
24	Southern pine	#2	~~7-8~~ 6-5	11-0	14-2	16-11
	Southern pine	#3	~~5-9~~ 4-10	8-6	10-10	12-10

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(1)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Roof live load = 20 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Southern Pine	#2	~~10-10~~ 10-2	17-0	22-5	Note b	Note b	~~10-6~~ 8-9	15-1	19-5	23-2	Note b

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
	Southern Pine #3	~~9-1~~ 7-8	13-6	17-2	20-3	24-1	~~7-11~~ 6-8	11-8	14-10	17-6	20-11
16	Southern Pine #2	~~9-10~~ 8-9	15-1	19-5	23-2	Note b	~~9-1~~ 7-7	13-0	16-10	20-1	23-7
	Southern Pine #3	~~7-11~~ 6-8	11-8	14-10	17-6	20-11	~~6-10~~ 5-9	10-1	12-10	15-2	18-1
19.2	Southern Pine #2	~~9-3~~ 8-0	13-9	17-9	21-2	24-10	~~8-4~~ 6-11	11-11	15-4	18-4	21-6
	Southern Pine #3	~~7-3~~ 6-1	10-8	13-7	16-0	19-1	~~6-3~~ 5-3	9-3	11-9	13-10	16-6
24	Southern Pine #2	~~8-7~~ 7-2	12-3	15-10	18-11	22-2	~~7-5~~ 6-2	10-8	13-9	16-5	19-3
	Southern Pine #3	~~6-5~~ 5-5	9-6	12-1	14-4	17-1	~~5-7~~ 4-8	8-3	10-6	12-5	14-9

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(2)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Roof live load = 20 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Southern Pine #2	~~9-10~~ 9-5	15-6	20-5	Note b	Note b	~~9-10~~ 8-9	15-1	19-5	23-2	Note b
	Southern Pine #3	~~9-1~~ 7-8	13-6	17-2	20-3	24-1	~~7-11~~ 6-8	11-8	14-10	17-6	20-11
16	Southern Pine #2	~~8-11~~ 8-7	14-1	18-6	23-2	Note b	~~8-11~~ 7-7	13-0	16-10	20-1	23-7
	Southern Pine #3	~~7-11~~ 6-8	11-8	14-10	17-6	20-11	~~6-10~~ 5-9	10-1	12-10	15-2	18-1
19.2	Southern Pine #2	~~8-5~~ 8-0	13-3	17-5	21-2	24-10	~~8-4~~ 6-11	11-11	15-14	18-4	21-6
	Southern Pine #3	~~7-3~~ 6-1	10-8	13-7	16-0	19-1	~~6-3~~ 5-3	9-3	11-9	13-10	16-6
24	Southern Pine #2	~~7-10~~ 7-2	12-3	15-10	18-11	22-2	~~7-5~~ 6-2	10-8	13-9	16-5	19-3
	Southern Pine #3	~~6-5~~ 5-5	9-6	12-1	14-4	17-1	~~5-7~~ 4-8	8-3	10-6	12-5	14-9

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(3)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load = 30 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)

12	Southern Pine #2	~~9-6~~ 8-5	14-5	18-8	22-3	Note b	~~9-0~~ 7-6	12-11	16-8	19-11	23-4
	Southern Pine #3	~~7-7~~ 6-4	11-2	14-3	16-10	20-0	~~6-9~~ 5-8	10-0	12-9	15-1	17-11
16	Southern Pine #2	~~8-7~~ 7-3	12-6	16-2	19-3	22-7	~~7-10~~ 6-6	11-2	14-5	17-3	20-2
	Southern Pine #3	~~6-7~~ 5-6	9-8	12-4	14-7	17-4	~~5-10~~ 4-11	8-8	11-0	13-0	15-6
19.2	Southern Pine #2	~~7-11~~ 6-8	11-5	14-9	17-7	20-7	~~7-1~~ 6-0	10-2	13-2	15-9	18-5
	Southern Pine #3	~~6-0~~ 5-0	8-10	11-3	13-4	15-10	~~5-4~~ 4-6	7-11	10-1	11-11	14-2
24	Southern Pine #2	~~7-1~~ 6-0	10-2	13-2	15-9	18-5	~~6-4~~ 5-4	9-2	11-9	14-1	16-6
	Southern Pine #3	~~5-4~~ 4-6	7-11	10-1	11-11	14-2	~~4-9~~ 4-0	7-1	9-0	10-8	12-8

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(4)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load = 50 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Southern Pine #2	~~8-0~~ 6-10	11-9	15-3	18-2	21-3	~~7-7~~ 6-4	10-11	14-1	16-10	19-9
	Southern Pine #3	~~6-2~~ 5-2	9-2	11-8	13-9	16-4	~~5-9~~ 4-10	8-5	10-9	12-9	15-2
16	Southern Pine #2	~~7-1~~ 6-0	10-2	13-2	15-9	18-5	~~6-7~~ 5-6	9-5	12-2	14-7	17-1
	Southern Pine #3	~~5-4~~ 4-6	7-11	10-1	11-11	14-2	~~4-11~~ 4-2	7-4	9-4	11-0	13-1
19.2	Southern Pine #2	~~6-6~~ 5-5	9-4	12-0	14-4	16-10	~~6-0~~ 5-0	8-8	11-2	13-4	15-7
	Southern Pine #3	~~4-11~~ 4-1	7-3	9-2	10-10	12-11	~~4-6~~ 3-10	6-8	8-6	10-1	12-0
24	Southern Pine #2	~~5-10~~ 4-10	8-4	10-9	12-10	15-1	~~5-5~~ 4-6	7-9	10-0	11-11	13-11
	Southern Pine #3	~~4-4~~ 3-8	6-5	8-3	9-9	11-7	~~4-1~~ 3-5	6-0	7-7	9-0	10-8

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(5)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load = 30 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Southern Pine #2	~~8-7~~ 8-3	13-6	17-10	22-3	Note b	~~8-7~~ 7-6	12-11	16-8	19-11	23-4
	Southern Pine #3	~~7-7~~ 6-4	11-2	14-3	16-10	20-0	~~6-9~~ 5-8	10-0	12-9	15-1	17-11

16	Southern Pine #2	~~7-10~~ 7-3	12-3	16-2	19-3	22-7	~~7-10~~ 6-6	11-2	14-5	17-3	20-2
	Southern Pine #3	~~6-7~~ 5-6	9-8	12-4	14-7	17-4	~~5-10~~ 4-11	8-8	11-0	13-0	15-6
19.2	Southern Pine #2	~~7-4~~ 6-8	11-5	14-9	17-7	20-7	~~7-1~~ 6-0	10-2	13-2	15-9	18-5
	Southern Pine #3	~~6-0~~ 5-0	8-10	11-3	13-4	15-10	~~5-4~~ 4-6	7-11	10-1	11-11	14-2
24	Southern Pine #2	~~6-10~~ 6-0	10-2	13-2	15-9	18-5	~~6-4~~ 5-4	9-2	11-9	14-1	16-6
	Southern Pine #3	~~5-4~~ 4-6	7-11	10-1	11-11	14-2	~~4-9~~ 4-0	7-1	9-0	10-8	12-8

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(6)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load = 50 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Southern Pine #2	~~7-3~~ 6-10	11-5	15-0	18-2	21-3	~~7-3~~ 6-4	10-11	14-1	16-10	19-9
	Southern Pine #3	~~6-2~~ 5-2	9-2	11-8	13-9	16-4	~~5-9~~ 4-10	8-5	10-9	12-9	15-2
16	Southern Pine #2	~~6-7~~ 6-0	10-2	13-2	15-9	18-5	~~6-7~~ 5-6	9-5	12-2	14-7	17-1
	Southern Pine #3	~~5-4~~ 4-6	7-11	10-1	11-11	14-2	~~4-11~~ 4-2	7-4	9-4	11-0	13-1
19.2	Southern Pine #2	~~6-2~~ 5-5	9-4	12-0	14-4	16-10	~~6-0~~ 5-0	8-8	11-2	13-4	15-7
	Southern Pine #3	~~4-11~~ 4-1	7-3	9-2	10-10	12-11	~~4-6~~ 3-10	6-8	8-6	10-1	12-0
24	Southern Pine #2	~~5-9~~ 4-10	8-4	10-9	12-10	15-1	~~5-5~~ 4-6	7-9	10-0	11-11	13-11
	Southern Pine #3	~~4-4~~ 3-8	6-5	8-3	9-9	11-7	~~4-1~~ 3-5	6-0	7-7	9-0	10-18

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(7)
RAFTER SPANS FOR 70 PSF GROUND SNOW LOAD
(Ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans[a]									
		(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Southern Pine #2	~~7-1~~ 6-0	10-2	13-2	15-9	18-5	~~6-8~~ 5-7	9-7	12-5	14-10	17-5
	Southern Pine #3	~~5-4~~ 4-6	7-11	10-1	11-11	14-2	~~5-1~~ 4-3	7-5	9-6	11-3	13-4
16	Southern Pine #2	~~6-2~~ 5-2	8-10	11-5	13-7	16-0	~~5-10~~ 4-10	8-4	10-9	12-10	15-1

	Southern Pine	#3	~~4-8~~ 3-11	6-10	8-9	10-4	12-3	~~4-4~~ 3-8	6-5	8-3	9-9	11-7
19.2	Southern Pine	#2	~~5-7~~ 4-8	8-1	10-5	12-5	14-7	~~5-4~~ 4-5	7-7	9-10	11-9	13-9
	Southern Pine	#3	~~4-3~~ 3-7	6-3	8-0	9-5	11-2	~~4-0~~ 3-4	5-11	7-6	8-10	10-7
24	Southern Pine	#2	~~5-0~~ 4-3	7-3	9-4	11-1	13-0	~~4-9~~ 4-0	6-10	8-9	10-6	12-4
	Southern Pine	#3	~~3-9~~ 3-2	5-7	7-1	8-5	10-0	~~3-7~~ 3-0	5-3	6-9	7-11	9-5

(Portions of Table not shown remain unchanged)

TABLE R802.5.1(8)
RAFTER SPANS FOR 70 PSF GROUND SNOW LOAD
(Ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans[a]									
			(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)	(feet – inches)
12	Southern Pine	#2	~~6-6~~ 6-0	10-2	13-2	15-9	18-5	~~6-6~~ 5-7	9-7	12-5	14-10	17-5
	Southern Pine	#3	~~5-4~~ 4-6	7-11	10-1	11-11	14-2	~~5-1~~ 4-3	7-5	9-6	11-3	13-4
16	Southern Pine	#2	~~5-11~~ 5-2	8-10	11-5	13-7	16-0	~~5-10~~	8-4	10-9	12-10	15-1
	Southern Pine	#3	~~4-8~~ 3-11	6-10	8-9	10-4	12-3	~~4-4~~	6-5	8-3	9-9	11-7
19.2	Southern Pine	#2	~~5-6~~ 4-8	8-1	10-5	12-5	14-7	~~5-4~~ 4-5	7-7	9-10	11-9	13-9
	Southern Pine	#3	~~4-3~~ 3-7	6-3	8-0	9-5	11-2	~~4-0~~ 3-4	5-11	7-6	8-10	10-7
24	Southern Pine	#2	~~5-0~~ 4-3	7-3	9-4	11-1	13-0	~~4-9~~ 4-0	6-10	8-9	10-6	12-4
	Southern Pine	#3	~~3-9~~ 3-2	5-7	7-1	8-5	10-0	~~3-7~~ 3-0	5-3	6-9	7-11	9-5

(Portions of Table not shown remain unchanged)

Reason: New design values for 2x4 Southern Pine #2 and all lower grades (i.e. #3, Stud, Construction, Standard, and Utility) were certified by the American Lumber Standards Committee Board of Review (BOR) on January 11, 2012, and became effective on June 1, 2012. This proposed change to multiple tables of the IRC reflects lower spans resulting from the newly certified design values. It is anticipated the Board of Review will certify new design values for other widths and grades of southern pine in early 2013. The use of the phrase "no change" is intended to mean that, as of the January 3, 2013 code change deadline, there are no revisions to these table entries. Further, it is likely there will be changes affecting these entries during the time period of the Group B development cycle. If new design values are certified and there is time prior to the IRC Committee hearings, AWC will prepare a floor modification to amend all the affected spans. Alternatively, the revised span tables will be developed for consideration during the Final Action Hearings. Regardless, approval of these spans by the Committee will allow the greatest degree of flexibility to further modify the spans at the Final Action Hearings.

In October 2012, the ICC membership approved code changes S281-12 and S283-12. These changes established a link between changes made to span tables in the IRC to identical IBC span tables. Since design values for wider width southern pine lumber were not available for the IBC Group A development cycle, S281-12 and S283-12 instruct ICC staff to extract the appropriate tables from the 2015 IRC. This will ensure that the 2015 IBC and 2015 IRC have identical state-of-the-art spans for southern pine.

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

TABLE R502.5(1)
GIRDER SPANS [a, b] AND HEADER SPANS [a, b] FOR EXTERIOR BEARING WALLS
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir and required number of jack studs)

(Portions of Table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.
b. No. 1 or better grade lumber shall be used for Southern Pine~~ 2x4s~~. Other tabulated values assume #2 grade lumber.
c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
d. NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.
e. Use 30 psf ground snow load for cases in which ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.

TABLE R502.5(2)
GIRDER SPANS [a, b] AND HEADER SPANS [a, b] FOR INTERIOR BEARING WALLS
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir and required number of jack studs)

TABLE R502.3.1(1)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential sleeping areas, live load = 30 psf, L/Δ= 360)[a]

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
			(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)
12	Southern pine	#1	~~12-0~~ 11-10	~~15-10~~ 15-7	~~20-3~~ 19-10	~~24-8~~ 24-2	~~12-0~~ 11-10	~~15-10~~ 15-7	~~20-3~~ 18-7	~~24-8~~ 22-0
	Southern pine	#2	~~11-10~~ 11-3	~~15-7~~ 14-11	~~19-10~~ 18-1	~~24-2~~ 21-4	~~11-10~~ 10-9	~~15-7~~ 13-8	~~18-7~~ 16-2	~~21-9~~ 19-1
	Southern pine	#3	~~10-5~~ 9-2	~~13-3~~ 11-6	15-8 14-0	~~18-8~~ 16-6	~~9-4~~ 8-2	~~11-11~~ 10-3	~~14-0~~ 12-6	~~16-8~~ 14-9
16	Southern pine	#1	~~10-11~~ 10-9	~~14-5~~ 14-2	~~18-5~~ 18-0	~~22-5~~ 21-4	~~10-11~~ 10-9	~~14-5~~ 13-9	~~17-11~~ 16-1	~~21-4~~ 19-1
	Southern pine	#2	~~10-9~~ 10-3	~~14-2~~ 13-3	~~18-0~~ 15-8	~~21-1~~ 18-6	~~10-5~~ 9-4	~~13-6~~ 11-10	~~16-1~~ 14-0	~~18-10~~ 16-6
	Southern pine	#3	~~9-0~~ 7-11	~~11-6~~ 10-10	~~13-7~~ 12-1	~~16-2~~ 14-4	~~8-1~~ 7-1	~~10-3~~ 8-11	~~12-2~~ 10-10	~~14-6~~ 12-10
19.2	Southern pine	#1	~~10-4~~ 10-1	~~13-7~~ 13-4	~~17-4~~ 16-5	~~21-1~~ 19-6	~~10-4~~ 9-11	~~13-7~~ 12-7	~~16-4~~ 14-8	~~19-6~~ 17-5
	Southern pine	#2	~~10-1~~ 9-6	~~13-4~~ 12-1	~~16-5~~ 14-4	~~19-3~~ 16-10	~~9-6~~ 8-6	~~12-4~~ 10-10	~~14-8~~ 12-10	~~17-2~~ 15-1
	Southern pine	#3	~~8-3~~ 7-3	~~10-6~~ 9-1	~~12-5~~ 11-0	~~14-9~~ 13-1	~~7-4~~ 6-5	~~9-5~~ 8-2	~~11-1~~ 9-10	~~13-2~~ 11-8
24	Southern pine	SS	9-9	12-10	16-5	19-11	9-9	12-10	16-5	~~19-11~~ 19-8
	Southern pine	#1	~~9-7~~ 9-4	~~12-7~~ 12-4	~~16-1~~ 14-8	~~19-6~~ 17-5	~~9-7~~ 8-10	~~12-4~~ 11-3	~~14-7~~ 13-1	~~17-5~~ 15-7
	Southern pine	#2	~~9-4~~ 8-6	~~12-4~~ 10-10	~~14-8~~ 12-10	~~17-2~~ 15-1	~~8-6~~ 7-7	~~11-0~~ 9-8	~~13-1~~ 11-5	~~15-5~~ 13-6
	Southern pine	#3	~~7-4~~ 6-5	~~9-5~~ 8-2	~~11-1~~ 9-10	~~13-2~~ 11-8	~~6-7~~ 5-9	~~8-5~~ 7-3	~~9-11~~ 8-10	~~11-10~~ 10-5

(Portions of Table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Spans are given in feet and inches.
b. No. 1 or better grade lumber shall be used for Southern Pine~~ 2x4s.~~ Other tabulated values assume #2 grade lumber.
c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.

d. NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.

Add the tables as follows:

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

Note: Check sources for availability of lumber in lengths greater than 20 feet.

a. Dead load limits for townhouses in Seismic Design Category C and all structures in Seismic Design Categories D_0, D_1 and D_2 shall be determined in accordance with Section R301.2.2.2.1.

(Portions of table not shown remain unchanged)

TABLE R502.3.1(2)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential living areas, live load = 40 psf, L/Δ = 360)[b]

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
			(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)
12	Southern pine	#1	~~10-11~~ 10-9	~~14-5~~ 14-2	~~18-5~~ 18-0	~~22-5~~ 21-11	~~10-11~~ 10-9	~~14-5~~ 14-2	~~18-5~~ 16-11	~~22-5~~ 20-1
	Southern pine	#2	~~10-9~~ 10-3	~~14-2~~ 13-6	~~18-0~~ 16-2	~~21-9~~ 19-1	~~10-9~~ 9-10	~~14-2~~ 12-6	~~16-11~~ 14-9	~~19-10~~ 17-5
	Southern pine	#3	~~9-4~~ 8-2	~~11-11~~ 10-3	~~14-0~~ 12-6	~~16-8~~ 14-9	~~8-6~~ 7-5	~~10-10~~ 9-5	~~12-10~~ 11-5	~~15-3~~ 13-6
16	Southern pine	#1	~~9-11~~ 9-9	~~13-1~~ 12-10	~~16-9~~ 16-1	~~20-4~~ 19-1	~~9-11~~ 9-9	~~13-1~~ 12-7	~~16-4~~ 14-8	~~19-6~~ 17-5
	Southern pine	#2	~~9-9~~ 9-4	~~12-10~~ 11-10	~~16-1~~ 14-0	~~18-10~~ 16-6	~~9-6~~ 8-6	~~12-4~~ 10-10	~~14-8~~ 12-10	~~17-2~~ 15-1
	Southern pine	#3	~~8-1~~ 7-1	~~10-3~~ 8-11	~~12-2~~ 10-10	~~14-6~~ 12-10	~~7-4~~ 6-5	~~9-5~~ 8-2	~~11-1~~ 9-10	~~13-2~~ 11-8
19.2	Southern pine	#1	~~9-4~~ 9-2	~~12-4~~ 12-1	~~15-9~~ 14-8	~~19-2~~ 17-5	~~9-4~~ 9-0	~~12-4~~ 11-5	~~14-11~~ 13-5	~~17-9~~ 15-11
	Southern pine	#2	~~9-2~~ 8-6	~~12-1~~ 10-10	~~14-8~~ 12-10	~~17-2~~ 15-1	~~8-8~~ 7-9	~~11-3~~ 9-10	~~13-5~~ 11-8	~~15-8~~ 13-9
	Southern pine	#3	~~7-4~~ 6-5	~~9-5~~ 8-2	~~11-1~~ 9-10	~~13-2~~ 11-8	~~6-9~~ 5-11	~~8-7~~ 7-5	~~10-1~~ 9-0	~~12-1~~ 10-8
24	Southern pine	SS	8-10	11-8	14-11	18-1	8-10	11-8	14-11	~~18-1~~ 18-0
	Southern pine	#1	~~8-8~~ 8-6	~~11-5~~ 11-3	~~14-7~~ 13-1	~~17-5~~ 15-7	~~8-8~~ 8-1	~~11-3~~ 10-3	~~13-4~~ 12-0	~~15-11~~ 14-3
	Southern pine	#2	~~8-6~~ 7-7	~~11-0~~ 9-8	~~13-1~~ 11-5	~~15-5~~ 13-6	~~7-9~~ 7-0	~~10-0~~ 8-10	~~12-0~~ 10-5	~~14-0~~ 12-4
	Southern pine	#3	~~6-7~~ 5-9	~~8-5~~ 7-3	~~9-11~~ 8-10	~~11-10~~ 10-5	~~6-0~~ 5-3	~~7-8~~ 6-8	~~9-1~~ 8-1	~~10-9~~ 9-6

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

Note: Check sources for availability of lumber in lengths greater than 20 feet.

a. End bearing length shall be increased to 2 inches.

b. Dead load limits for townhouses in Seismic Design Category C and all structures in Seismic Design Categories D_0, D_1, and D_2 shall be determined in accordance with Section R301.2.2.2.1.

(Portions of table not shown remain unchanged)

Revise the tables as follows:

TABLE R802.4(1)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics without storage, live load = 10 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 5 psf			
			2 × 4	2 × 6	2 × 8	2 × 10
			Maximum ceiling joist spans			
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	#1	~~12-8~~ 12-5	~~19-11~~ 19-6	~~Note a~~ 25-8	Note a
	Southern pine	#2	~~12-5~~ 11-10	~~19-6~~ 18-8	~~25-8~~ 24-7	Note a
	Southern pine	#3	~~11-6~~ 10-1	~~17-0~~ 14-11	~~21-8~~ 18-9	~~25-7~~ 22-9
16	Southern pine	#1	~~11-6~~ 11-3	~~18-1~~ 17-8	~~23-10~~ 23-4	Note a
	Southern pine	#2	~~11-3~~ 10-9	~~17-8~~ 16-11	~~23-4~~ 21-7	~~Note a~~ 25-7

	Southern pine	#3	~~10-0~~ 8-9	~~14-9~~ 12-11	~~18-9~~ 16-3	~~22-2~~ 19-9
19.2	Southern pine	#1	~~10-10~~ 10-7	~~17-0~~ 16-8	~~22-5~~ 22-0	Note a
	Southern pine	#2	~~10-7~~ 10-2	~~16-8~~ 15-7	~~21-11~~ 19-8	~~Note a~~ 23-5
	Southern pine	#3	~~9-1~~ 8-0	~~13-6~~ 11-9	~~17-2~~ 14-10	~~20-3~~ 18-0
24	Southern pine	#1	~~10-0~~ 9-10	~~15-9~~ 15-6	~~20-10~~ 20-5	~~Note a~~ 24-0
	Southern pine	#2	~~9-10~~ 9-3	~~15-6~~ 13-11	~~20-1~~ 17-7	~~23-11~~ 20-11
	Southern pine	#3	~~8-2~~ 7-2	~~12-0~~ 10-6	~~15-4~~ 13-3	~~18-1~~ 16-1

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479kPa.

a. Span exceeds 26 feet in length.

(Portions of table not shown remain unchanged)

TABLE R802.4(2)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics with limited storage, live load = 20 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf			
			2 × 4	2 × 6	2 × 8	2 × 10
			Maximum ceiling joist spans			
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	#1	~~10-0~~ 9-10	~~15-9~~ 15-6	~~20-10~~ 20-5	~~Note a~~ 24-0
	Southern pine	#2	~~9-10~~ 9-3	~~15-6~~ 13-11	~~20-1~~ 17-7	~~23-11~~ 20-11
	Southern pine	#3	~~8-2~~ 7-2	~~12-0~~ 10-6	~~15-4~~ 13-3	~~18-1~~ 16-1
16	Southern pine	#1	~~9-1~~ 8-11	~~14-4~~ 14-0	~~18-11~~ 17-9	~~23-1~~ 20-9
	Southern pine	#2	~~8-11~~ 8-0	~~13-6~~ 12-0	~~17-5~~ 15-3	~~20-9~~ 18-1
	Southern pine	#3	~~7-1~~ 6-2	~~10-5~~ 9-2	~~13-3~~ 11-6	~~15-8~~ 14-0
19.2	Southern pine	SS	8-9	13-9	~~18-1~~ 18-2	23-1
	Southern pine	#1	~~8-7~~ 8-5	~~13-6~~ 12-9	~~17-9~~ 16-2	~~21-1~~ 18-11
	Southern pine	#2	~~8-5~~ 7-4	~~12-3~~ 11-0	~~15-10~~ 13-11	~~18-11~~ 16-6
	Southern pine	#3	~~6-5~~ 5-8	~~9-6~~ 8-4	~~12-1~~ 10-6	~~14-4~~ 12-9
24	Southern pine	#1	~~8-0~~ 7-8	~~12-6~~ 11-5	~~15-10~~ 14-6	~~18-10~~ 16-11
	Southern pine	#2	~~7-8~~ 6-7	~~11-0~~ 9-10	~~14-2~~ 12-6	~~16-11~~ 14-9
	Southern pine	#3	~~5-9~~ 5-1	~~8-6~~ 7-5	~~10-10~~ 9-5	~~12-10~~ 11-5

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479kPa.

a. Span exceeds 26 feet in length.

(Portions of table not shown remain unchanged)

TABLE R802.5.1(1)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Roof live load=20 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	#1	~~11-1~~ 10-10	~~17-4~~ 17-0	~~22-11~~ 22-5	Note b	Note b	~~11-1~~ 10-6	~~17-3~~ 15-8	~~21-9~~ 19-10	~~25-10~~ 23-2	Note b
	Southern pine	#2	~~10-10~~ 10-4	~~17-0~~ 15-7	~~22-5~~ 19-8	~~Note b~~ 23-5	Note b	~~10-6~~ 9-0	~~15-1~~ 13-6	~~19-5~~ 17-1	~~23-2~~ 20-3	~~Note b~~ 23-10

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
	Southern pine	#3	~~9-1~~ 8-0	~~13-6~~ 11-9	~~17-2~~ 14-10	~~20-3~~ 18-0	~~24-1~~ 21-4	~~7-11~~ 6-11	~~11-8~~ 10-2	~~14-10~~ 12-10	~~17-6~~ 15-7	~~20-11~~ 18-6
16	Southern pine	SS	10-3	16-1	21-2	Note b	Note b	10-3	16-1	21-2	~~Note b~~ 25-7	Note b
	Southern pine	#1	~~10-0~~ 9-10	~~15-9~~ 15-6	~~20-10~~ 19-10	~~25-10~~ 23-2	Note b	~~10-0~~ 9-1	~~15-0~~ 13-7	~~18-10~~ 17-2	~~22-4~~ 20-1	~~Note b~~ 23-10
	Southern pine	#2	~~9-10~~ 9-0	~~15-1~~ 13-6	~~19-5~~ 17-1	~~23-2~~ 20-3	~~Note b~~ 23-10	~~9-1~~ 7-9	~~13-0~~ 11-8	~~16-10~~ 14-9	~~20-1~~ 17-6	~~23-7~~ 20-8
	Southern pine	#3	~~7-11~~ 6-11	~~11-8~~ 10-2	~~14-10~~ 12-10	~~17-6~~ 15-7	~~20-11~~ 18-6	~~6-10~~ 6-0	~~10-1~~ 8-10	~~12-10~~ 11-2	~~15-2~~ 13-6	~~18-1~~ 16-0
19.2	Southern pine	SS	9-8	15-2	19-11	25-5	Note b	9-8	15-2	~~19-11~~ 19-7	~~25-5~~ 23-4	Note b
	Southern pine	#1	~~9-5~~ 9-3	~~14-10~~ 14-3	~~19-7~~ 18-1	~~23-7~~ 21-2	~~Note b~~ 25-2	~~9-3~~ 8-4	~~13-8~~ 12-4	~~17-2~~ 15-8	~~20-5~~ 18-4	~~24-4~~ 21-9
	Southern pine	#2	~~9-3~~ 8-2	~~13-9~~ 12-3	~~17-9~~ 15-7	~~21-2~~ 18-6	~~24-10~~ 21-9	~~8-4~~ 7-1	~~11-11~~ 10-8	~~15-4~~ 13-6	~~18-4~~ 16-0	~~21-6~~ 18-10
	Southern pine	#3	~~7-3~~ 6-4	~~10-8~~ 9-4	~~13-7~~ 11-9	~~16-0~~ 14-3	~~19-1~~ 16-10	~~6-3~~ 5-6	~~9-3~~ 8-1	~~11-9~~ 10-2	~~13-10~~ 12-4	~~16-6~~ 14-7
24	Southern pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	~~14-1~~ 13-10	~~18-6~~ 17-6	~~22-11~~ 20-10	~~Note b~~ 24-8
	Southern pine	#1	~~8-9~~ 8-7	~~13-9~~ 12-9	~~17-9~~ 16-2	~~21-1~~ 18-11	~~25-2~~ 22-6	~~8-3~~ 7-5	~~12-3~~ 11-1	~~15-4~~ 14-0	~~18-3~~ 16-5	~~21-9~~ 19-6
	Southern pine	#2	~~8-7~~ 7-4	~~12-3~~ 11-0	~~15-10~~ 13-11	~~18-11~~ 16-6	~~22-2~~ 19-6	~~7-5~~ 6-4	~~10-8~~ 9-6	~~13-9~~ 12-1	~~16-5~~ 14-4	~~19-3~~ 16-10
	Southern pine	#3	~~6-5~~ 5-8	~~9-6~~ 8-4	~~12-1~~ 10-6	~~14-4~~ 12-9	~~17-1~~ 15-1	~~5-7~~ 4-11	~~8-3~~ 7-3	~~10-6~~ 9-1	~~12-5~~ 11-0	~~14-9~~ 13-1

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

(Portions of table not shown remain unchanged)

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

b. Span exceeds 26 feet in length.

TABLE R802.5.1(2)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Roof live load=20 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	#1	~~10-0~~ 9-10	~~15-9~~ 15-6	~~20-10~~ 20-5	Note b	Note b	~~10-0~~ 9-10	~~15-9~~ 15-6	~~20-10~~ 19-10	~~25-10~~ 23-2	Note b
	Southern pine	#2	~~9-10~~ 9-5	~~15-6~~ 14-9	~~20-5~~ 19-6	~~Note b~~ 23-5	Note b	~~9-10~~ 9-0	~~15-1~~ 13-6	~~19-5~~ 17-1	~~23-2~~ 20-3	~~Note b~~ 23-10
	Southern pine	#3	~~9-1~~ 8-0	~~13-6~~ 11-9	~~17-2~~ 14-10	~~20-3~~ 18-0	~~24-1~~ 21-4	~~7-11~~ 6-11	~~11-8~~ 10-2	~~14-10~~ 12-10	~~17-6~~ 15-7	~~20-11~~ 18-6
16	Southern pine	#1	~~9-1~~ 8-11	~~14-4~~ 14-1	~~18-11~~ 18-6	~~24-1~~ 23-2	Note b	~~9-1~~ 8-11	~~14-4~~ 13-7	~~18-10~~ 17-2	~~22-4~~ 20-1	~~Note b~~ 23-10
	Southern pine	#2	~~8-11~~ 8-7	~~14-1~~ 13-5	~~18-6~~ 17-1	~~23-2~~ 20-3	~~Note b~~ 23-10	~~8-11~~ 7-9	~~13-0~~ 11-8	~~16-10~~ 14-9	~~20-1~~ 17-6	~~23-7~~ 20-8
	Southern pine	#3	~~7-11~~ 6-11	~~11-8~~ 10-2	~~14-10~~ 12-10	~~17-6~~ 15-7	~~20-11~~ 18-6	~~6-10~~ 6-0	~~10-1~~ 8-10	~~12-10~~ 11-2	~~15-2~~ 13-6	~~18-1~~ 16-0

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
19.2	Southern pine	SS	8-9	13-9	~~18-1~~ 18-2	23-1	Note b	8-9	13-9	~~18-1~~ 18-2	23-1	Note b
	Southern pine	#1	~~8-7~~ 8-5	~~13-6~~ 13-3	~~17-9~~ 17-5	~~22-8~~ 21-2	~~Note b~~ 25-2	~~8-7~~ 8-4	~~13-6~~ 12-4	~~17-2~~ 15-8	~~20-5~~ 18-4	~~24-4~~ 21-9
	Southern pine	#2	~~8-5~~ 8-1	~~13-3~~ 12-3	~~17-5~~ 15-7	~~21-2~~ 18-6	~~24-10~~ 21-9	~~8-4~~ 7-1	~~11-11~~ 10-8	~~15-4~~ 13-6	~~18-4~~ 16-0	~~21-6~~ 18-10
	Southern pine	#3	~~7-3~~ 6-4	~~10-8~~ 9-4	~~13-7~~ 11-9	~~16-0~~ 14-3	~~19-1~~ 16-10	~~6-3~~ 5-6	~~9-3~~ 8-1	~~11-9~~ 10-2	~~13-10~~ 12-4	~~16-6~~ 14-7
24	Southern pine	SS	8-1	12-9	16-10	21-6	Note b	8-1	12-9	16-10	~~21-6~~ 20-10	~~Note b~~ 24-8
	Southern pine	#1	~~8-0~~ 7-10	~~12-6~~ 12-3	~~16-6~~ 16-2	~~21-1~~ 18-11	~~25-2~~ 22-6	~~8-0~~ 7-5	~~12-3~~ 11-1	~~15-4~~ 14-0	~~18-3~~ 16-5	~~21-9~~ 19-6
	Southern pine	#2	~~7-10~~ 7-4	~~12-3~~ 11-0	~~15-10~~ 13-11	~~18-11~~ 16-6	~~22-2~~ 19-6	~~7-5~~ 6-4	~~10-8~~ 9-6	~~13-9~~ 12-1	~~16-5~~ 14-4	~~19-3~~ 16-10
	Southern pine	#3	~~6-5~~ 5-8	~~9-6~~ 8-4	~~12-1~~ 10-6	~~14-4~~ 12-9	~~17-1~~ 15-1	~~5-7~~ 4-11	~~8-3~~ 7-3	~~10-6~~ 9-1	~~12-5~~ 11-0	~~14-9~~ 13-1

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

(Portions of table not shown remain unchanged)

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

b. Span exceeds 26 feet in length.

TABLE R802.5.1(3)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load=30 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	SS	9-10	15-6	20-5	Note b	Note b	9-10	15-6	20-5	~~Note b~~ 25-4	Note b
	Southern pine	#1	~~9-8~~ 9-6	~~15-2~~ 14-10	~~20-0~~ 19-0	~~24-9~~ 22-3	Note b	~~9-8~~ 9-0	~~14-10~~ 13-5	~~18-8~~ 17-0	~~22-2~~ 19-11	~~Note b~~ 23-7
	Southern pine	#2	~~9-6~~ 8-7	~~14-5~~ 12-11	~~18-8~~ 16-4	~~22-3~~ 19-5	~~Note b~~ 22-10	~~9-0~~ 7-8	~~12-11~~ 11-7	~~16-8~~ 14-8	~~19-11~~ 17-4	~~23-4~~ 20-5
	Southern pine	#3	~~7-7~~ 6-7	~~11-2~~ 9-9	~~14-3~~ 12-4	~~16-10~~ 15-0	~~20-0~~ 17-9	~~6-9~~ 5-11	~~10-0~~ 8-9	~~12-9~~ 11-0	~~15-1~~ 13-5	~~17-11~~ 15-10
16	Southern pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	~~18-6~~ 18-5	~~23-8~~ 21-11	~~Note b~~ 25-11
	Southern pine	#1	~~8-9~~ 8-7	~~13-9~~ 13-0	~~18-1~~ 16-6	~~21-5~~ 19-3	~~25-7~~ 22-10	~~8-8~~ 7-10	~~12-10~~ 11-7	~~16-2~~ 14-9	~~19-2~~ 17-3	~~22-10~~ 20-5
	Southern pine	#2	~~8-7~~ 7-6	~~12-6~~ 11-2	~~16-2~~ 14-2	~~19-3~~ 16-10	~~22-7~~ 19-10	~~7-10~~ 6-8	~~11-2~~ 10-0	~~14-5~~ 12-8	~~17-3~~ 15-1	~~20-2~~ 17-9
	Southern pine	#3	~~6-7~~ 5-9	~~9-8~~ 8-6	~~12-4~~ 10-8	~~14-7~~ 13-0	~~17-4~~ 15-4	~~5-10~~ 5-2	~~8-8~~ 7-7	~~11-0~~ 9-7	~~13-0~~ 11-7	~~15-6~~ 13-9

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
19.2	Southern pine	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	~~17-5~~ 16-10	~~22-0~~ 20-0	~~25-9~~ 23-7
	Southern pine	#1	~~8-3~~ 8-0	~~13-0~~ 11-10	~~16-6~~ 15-1	~~19-7~~ 17-7	~~23-4~~ 20-11	~~7-11~~ 7-1	~~11-9~~ 10-7	~~14-9~~ 13-5	~~17-6~~ 15-9	~~20-11~~ 18-8
	Southern pine	#2	~~7-11~~ 6-10	~~11-5~~ 10-2	~~14-9~~ 12-11	~~17-7~~ 15-4	~~20-7~~ 18-1	~~7-1~~ 6-1	~~10-2~~ 9-2	~~13-2~~ 11-7	~~15-9~~ 13-9	~~18-5~~ 16-2
	Southern pine	#3	~~6-0~~ 5-3	~~8-10~~ 7-9	~~11-3~~ 9-9	~~13-4~~ 11-10	~~15-10~~ 14-0	~~5-4~~ 4-8	~~7-11~~ 6-11	~~10-1~~ 8-9	~~11-11~~ 10-7	~~14-2~~ 12-6
24	Southern pine	SS	7-10	12-3	16-2	~~20-8~~ 20-0	~~25-1~~ 23-7	7-10	~~12-3~~ 11-10	~~16-2~~ 15-0	~~19-8~~ 17-11	~~23-0~~ 21-2
	Southern pine	#1	~~7-8~~ 7-1	~~11-9~~ 10-7	~~14-9~~ 13-5	~~17-6~~ 15-9	~~20-11~~ 18-8	~~7-1~~ 6-4	~~10-6~~ 9-6	~~13-2~~ 12-0	~~15-8~~ 14-1	~~18-8~~ 16-8
	Southern pine	#2	~~7-1~~ 6-1	~~10-2~~ 9-2	~~13-2~~ 11-7	~~15-9~~ 13-9	~~18-5~~ 16-2	~~6-4~~ 5-5	~~9-2~~ 8-2	~~11-9~~ 10-4	~~14-1~~ 12-3	~~16-6~~ 14-6
	Southern pine	#3	~~5-4~~ 4-8	~~7-11~~ 6-11	~~10-1~~ 8-9	~~11-11~~ 10-7	~~14-2~~ 12-6	~~4-9~~ 4-2	~~7-1~~ 6-2	~~9-0~~ 7-10	~~10-8~~ 9-6	~~12-8~~ 11-2

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

(Portions of table not shown remain unchanged)

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

b. Span exceeds 26 feet in length.

TABLE R802.5.1(4)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load=50 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	SS	8-4	~~13-0~~ 13-1	17-2	21-11	Note b	8-4	~~13-0~~ 13-1	17-2	~~21-11~~ 21-5	~~Note b~~ 25-3
	Southern pine	#1	~~8-2~~ 8-0	~~12-10~~ 12-3	~~16-10~~ 15-6	~~20-3~~ 18-2	~~24-1~~ 21-7	~~8-2~~ 7-7	~~12-6~~ 11-4	~~15-9~~ 14-5	~~18-9~~ 16-10	~~22-4~~ 20-0
	Southern pine	#2	~~8-0~~ 7-0	~~11-9~~ 10-6	~~15-3~~ 13-4	~~18-2~~ 15-10	~~21-3~~ 18-8	~~7-7~~ 6-6	~~10-11~~ 9-9	~~14-1~~ 12-4	~~16-10~~ 14-8	~~19-9~~ 17-3
	Southern pine	#3	~~6-2~~ 5-5	~~9-2~~ 8-0	~~11-8~~ 10-1	~~13-9~~ 12-3	~~16-4~~ 14-6	~~5-9~~ 5-0	~~8-5~~ 7-5	~~10-9~~ 9-4	~~12-9~~ 11-4	~~15-2~~ 13-5
16	Southern pine	SS	7-6	11-10	15-7	19-11	~~24-3~~ 23-7	7-6	11-10	15-7	~~19-11~~ 18-6	~~23-10~~ 21-10
	Southern pine	#1	~~7-5~~ 7-1	~~11-7~~ 10-7	~~14-9~~ 13-5	~~17-6~~ 15-9	~~20-11~~ 18-8	~~7-4~~ 6-7	~~10-10~~ 9-10	~~13-8~~ 12-5	~~16-2~~ 14-7	~~19-4~~ 17-3
	Southern pine	#2	~~7-1~~ 6-1	~~10-2~~ 9-2	~~13-2~~ 11-7	~~15-9~~ 13-9	~~18-5~~ 16-2	~~6-7~~ 5-8	~~9-5~~ 8-5	~~12-2~~ 10-9	~~14-7~~ 12-9	~~17-1~~ 15-0
	Southern pine	#3	~~5-4~~ 4-8	~~7-11~~ 6-11	~~10-1~~ 8-9	~~11-11~~ 10-7	~~14-2~~ 12-6	~~4-11~~ 4-4	~~7-4~~ 6-5	~~9-4~~ 8-1	~~11-0~~ 9-10	~~13-1~~ 11-7
19.2	Southern pine	SS	7-1	11-2	14-8	~~18-9~~ 18-3	~~22-10~~ 21-7	7-1	11-2	~~14-8~~ 14-2	~~18-7~~ 16-11	~~21-9~~ 20-0

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
	Southern pine	#1	~~7-0~~ 6-6	~~10-8~~ 9-8	~~13-5~~ 12-3	~~16-0~~ 14-4	~~19-1~~ 17-1	~~6-8~~ 6-0	~~9-11~~ 9-0	~~12-5~~ 11-4	~~14-10~~ 13-4	~~17-8~~ 15-9
	Southern pine	#2	~~6-6~~ 5-7	~~9-4~~ 8-4	~~12-0~~ 10-7	~~14-4~~ 12-6	~~16-10~~ 14-9	~~6-0~~ 5-2	~~8-8~~ 7-9	~~11-2~~ 9-9	~~13-4~~ 11-7	~~15-7~~ 13-8
	Southern pine	#3	~~4-11~~ 4-3	~~7-3~~ 6-4	~~9-2~~ 8-0	~~10-10~~ 9-8	~~12-11~~ 11-5	~~4-6~~ 4-0	~~6-8~~ 5-10	~~8-6~~ 7-4	~~10-1~~ 8-11	~~12-0~~ 10-7
24	Southern pine	SS	6-7	10-4	13-8	~~17-5~~ 16-4	~~21-0~~ 19-3	6-7	~~10-4~~ 10-0	~~13-8~~ 12-8	~~16-7~~ 15-2	~~19-5~~ 17-10
	Southern pine	#1	~~6-5~~ 5-10	~~9-7~~ 8-8	~~12-0~~ 11-0	~~14-4~~ 12-10	~~17-1~~ 15-3	~~6-0~~ 5-5	~~8-10~~ 8-0	~~11-2~~ 10-2	~~13-3~~ 11-11	~~15-9~~ 14-1
	Southern pine	#2	~~5-10~~ 5-0	~~8-4~~ 7-5	~~10-9~~ 9-5	~~12-10~~ 11-3	~~15-1~~ 13-2	~~5-5~~ 4-7	~~7-9~~ 6-11	~~10-0~~ 8-9	~~11-11~~ 10-5	~~13-11~~ 12-3
	Southern pine	#3	~~4-4~~ 3-10	~~6-5~~ 5-8	~~8-3~~ 7-1	~~9-9~~ 8-8	~~11-7~~ 10-3	~~4-1~~ 3-6	~~6-0~~ 5-3	~~7-7~~ 6-7	~~9-0~~ 8-0	~~10-8~~ 9-6

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

(Portions of table not shown remain unchanged)

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

b. Span exceeds 26 feet in length.

TABLE R802.5.1(5)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load=30 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	#1	~~8-9~~ 8-7	~~13-9~~ 13-6	~~18-2~~ 17-10	~~23-2~~ 22-3	Note b	~~8-9~~ 8-7	~~13-9~~ 13-5	~~18-2~~ 17-0	~~22-2~~ 19-11	~~Note b~~ 23-7
	Southern pine	#2	~~8-7~~ 8-3	~~13-6~~ 12-11	~~17-10~~ 16-4	~~22-3~~ 19-5	~~Note b~~ 22-10	~~8-7~~ 7-8	~~12-11~~ 11-7	~~16-8~~ 14-8	~~19-11~~ 17-4	~~23-4~~ 20-5
	Southern pine	#3	~~7-7~~ 6-7	~~11-2~~ 9-9	~~14-3~~ 12-4	~~16-10~~ 15-0	~~20-0~~ 17-9	~~6-9~~ 5-11	~~10-0~~ 8-9	~~12-9~~ 11-0	~~15-1~~ 13-5	~~17-11~~ 15-10
16	Southern pine	SS	8-1	12-9	16-10	21-6	Note b	8-1	12-9	16-10	21-6	~~Note b~~ 25-11
	Southern pine	#1	~~8-0~~ 7-10	~~12-6~~ 12-3	~~16-6~~ 16-2	~~21-1~~ 19-3	~~25-7~~ 22-10	~~8-0~~ 7-10	~~12-6~~ 11-7	~~16-2~~ 14-9	~~19-2~~ 17-3	~~22-10~~ 20-5
	Southern pine	#2	~~7-10~~ 7-6	~~12-3~~ 11-2	~~16-2~~ 14-2	19-3 16-10	~~22-7~~ 19-10	~~7-10~~ 6-8	~~11-2~~ 10-0	~~14-5~~ 12-8	~~17-3~~ 15-1	~~20-2~~ 17-9
	Southern pine	#3	~~6-7~~ 5-9	~~9-8~~ 8-6	~~12-4~~ 10-8	~~14-7~~ 13-0	~~17-4~~ 15-4	~~5-10~~ 5-2	~~8-8~~ 7-7	~~11-0~~ 9-7	~~13-0~~ 11-7	~~15-6~~ 13-9
19.2	Southern pine	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-10	~~20-2~~ 20-0	~~24-7~~ 23-7
	Southern pine	#1	~~7-6~~ 7-4	~~11-9~~ 11-7	~~15-6~~ 15-1	~~19-7~~ 17-7	~~23-4~~ 20-11	~~7-6~~ 7-1	~~11-9~~ 10-7	~~14-9~~ 13-5	~~17-6~~ 15-9	~~20-11~~ 18-8

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
	Southern pine	#2	~~7-4~~ 6-10	~~11-5~~ 10-2	~~14-9~~ 12-11	~~17-7~~ 15-4	~~20-7~~ 18-1	~~7-1~~ 6-1	~~10-2~~ 9-2	~~13-2~~ 11-7	~~15-9~~ 13-9	~~18-5~~ 16-2
	Southern pine	#3	~~6-0~~ 5-3	~~8-10~~ 7-9	~~11-3~~ 9-9	~~13-4~~ 11-10	~~15-10~~ 14-0	~~5-4~~ 4-8	~~7-11~~ 6-11	~~10-1~~ 8-9	~~11-11~~ 10-7	~~14-2~~ 12-6
24	Southern pine	SS	7-1	11-2	14-8	18-9	22-10	7-1	11-2	14-8	~~18-9~~ 17-11	~~22-10~~ 21-2
	Southern pine	#1	~~7-0~~ 6-10	~~10-11~~ 10-7	~~14-5~~ 13-5	~~17-6~~ 15-9	~~20-11~~ 18-8	~~7-0~~ 6-4	~~10-6~~ 9-6	~~13-2~~ 12-0	~~15-8~~ 14-1	~~18-8~~ 16-8
	Southern pine	#2	~~6-10~~ 6-1	~~10-2~~ 9-2	~~13-2~~ 11-7	~~15-9~~ 13-9	~~18-5~~ 16-2	~~6-4~~ 5-5	~~9-2~~ 8-2	~~11-9~~ 10-4	~~14-1~~ 12-3	~~16-6~~ 14-6
	Southern pine	#3	~~5-4~~ 4-8	~~7-11~~ 6-11	~~10-1~~ 8-9	~~11-11~~ 10-7	~~14-2~~ 12-6	~~4-9~~ 4-2	~~7-1~~ 6-2	~~9-0~~ 7-10	~~10-8~~ 9-6	~~12-8~~ 11-2

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

(Portions of table not shown remain unchanged)

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

b. Span exceeds 26 feet in length.

TABLE R802.5.1(6)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground snow load=50 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine	#1	~~7-5~~ 7-3	~~11-7~~ 11-5	~~15-4~~ 15-0	~~19-7~~ 18-2	~~23-9~~ 21-7	~~7-5~~ 7-3	~~11-7~~ 11-4	~~15-4~~ 14-5	~~18-9~~ 16-10	~~22-4~~ 20-0
	Southern pine	#2	~~7-3~~ 6-11	~~11-5~~ 10-6	~~15-0~~ 13-4	~~18-2~~ 15-10	~~21-3~~ 18-8	~~7-3~~ 6-6	~~10-11~~ 9-9	~~14-1~~ 12-4	~~16-10~~ 14-8	~~19-9~~ 17-3
	Southern pine	#3	~~6-2~~ 5-5	~~9-2~~ 8-0	~~11-8~~ 10-1	~~13-9~~ 12-3	~~16-4~~ 14-6	~~5-9~~ 5-0	~~8-5~~ 7-5	~~10-9~~ 9-4	~~12-9~~ 11-4	~~15-2~~ 13-5
16	Southern pine	SS	6-10	10-9	14-2	18-1	22-0	6-10	10-9	14-2	18-1	~~22-0~~ 21-10
	Southern pine	#1	~~6-9~~ 6-7	~~10-7~~ 10-4	~~13-11~~ 13-5	~~17-6~~ 15-9	~~20-11~~ 18-8	~~6-9~~ 6-7	~~10-7~~ 9-10	~~13-8~~ 12-5	~~16-2~~ 14-7	~~19-4~~ 17-3
	Southern pine	#2	~~6-7~~ 6-1	~~10-2~~ 9-2	~~13-2~~ 11-7	~~15-9~~ 13-9	~~18-5~~ 16-2	~~6-7~~ 5-8	~~9-5~~ 8-5	~~12-2~~ 10-9	~~14-7~~ 12-9	~~17-1~~ 15-0
	Southern pine	#3	~~5-4~~ 4-8	~~7-11~~ 6-11	~~10-1~~ 8-9	~~11-11~~ 10-7	~~14-2~~ 12-6	~~4-11~~ 4-4	~~7-4~~ 6-5	~~9-4~~ 8-1	~~11-0~~ 9-10	~~13-1~~ 11-7
19.2	Southern pine	SS	6-5	10-2	13-4	17-0	20-9	6-5	10-2	13-4	~~17-0~~ 16-11	~~20-9~~ 20-0
	Southern pine	#1	~~6-4~~ 6-2	~~9-11~~ 9-8	~~13-1~~ 12-3	~~16-0~~ 14-4	~~19-1~~ 17-1	~~6-4~~ 6-0	~~9-11~~ 9-0	~~12-5~~ 11-4	~~14-10~~ 13-4	~~17-8~~ 15-9

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Southern pine	#2	~~6-2~~ 5-7	~~9-4~~ 8-4	~~12-0~~ 10-7	~~14-4~~ 12-6	~~16-10~~ 14-9	~~6-0~~ 5-2	~~8-8~~ 7-9	~~11-2~~ 9-9	~~13-4~~ 11-7	~~15-7~~ 13-8
	Southern pine	#3	~~4-11~~ 4-3	~~7-3~~ 6-4	~~9-2~~ 8-0	~~10-10~~ 9-8	~~12-11~~ 11-5	~~4-6~~ 4-0	~~6-8~~ 5-10	~~8-6~~ 7-4	~~10-1~~ 8-11	~~12-0~~ 10-7
24	Southern pine	SS	6-0	9-5	12-5	15-10	19-3	6-0	9-5	12-5	~~15-10~~ 15-2	~~19-3~~ 17-10
	Southern pine	#1	~~5-10~~ 5-9	~~9-3~~ 8-8	~~12-0~~ 11-0	~~14-4~~ 12-10	~~17-1~~ 15-3	~~5-10~~ 5-5	~~8-10~~ 8-0	~~11-2~~ 10-2	~~13-3~~ 11-11	~~15-9~~ 14-1
	Southern pine	#2	~~5-9~~ 5-0	~~8-4~~ 7-5	~~10-9~~ 9-5	~~12-10~~ 11-3	~~15-1~~ 13-2	~~5-5~~ 4-7	~~7-9~~ 6-11	~~10-0~~ 8-9	~~11-11~~ 10-5	~~13-11~~ 12-3
	Southern pine	#3	~~4-4~~ 3-10	~~6-5~~ 5-8	~~8-3~~ 7-1	~~9-9~~ 8-8	~~11-7~~ 10-3	~~4-1~~ 3-6	~~6-0~~ 5-3	~~7-7~~ 6-7	~~9-0~~ 8-0	~~10-8~~ 9-6

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

(Portions of table not shown remain unchanged)

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:
H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.
H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

TABLE R802.5.1(7)
RAFTER SPANS FOR 70 PSF GROUND SNOW LOAD
(Ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum Rafter Spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine	SS	7-5	11-8	15-4	19-7	~~23-10~~ 23-7	7-5	11-8	15-4	~~19-7~~ 18-10	~~23-10~~ 22-3
	Southern pine	#1	~~7-3~~ 7-1	~~11-5~~ 10-7	~~14-9~~ 13-5	~~17-6~~ 15-9	~~20-11~~ 18-8	~~7-3~~ 6-9	~~11-1~~ 10-0	~~13-11~~ 12-8	~~16-6~~ 14-10	~~19-8~~ 17-7
	Southern pine	#2	~~7-1~~ 6-1	~~10-2~~ 9-2	~~13-2~~ 11-7	~~15-9~~ 13-9	~~18-5~~ 16-2	~~6-8~~ 5-9	~~9-7~~ 8-7	~~12-5~~ 10-11	~~14-10~~ 12-11	~~17-5~~ 15-3
	Southern pine	#3	~~5-4~~ 4-8	~~7-11~~ 6-11	~~10-1~~ 8-9	~~11-11~~ 10-7	~~14-2~~ 12-6	~~5-1~~ 4-5	~~7-5~~ 6-6	~~9-6~~ 8-3	~~11-3~~ 10-0	~~13-4~~ 11-10
16	Southern pine	SS	6-9	10-7	14-0	~~17-10~~ 17-4	~~21-8~~ 20-5	6-9	10-7	~~14-0~~ 13-9	~~17-10~~ 16-4	~~21-0~~ 19-3
	Southern pine	#1	~~6-7~~ 6-2	~~10-2~~ 9-2	~~12-9~~ 11-8	~~15-2~~ 13-8	~~18-1~~ 16-2	~~6-5~~ 5-10	~~9-7~~ 8-8	~~12-0~~ 11-0	~~14-4~~ 12-10	~~17-1~~ 15-3
	Southern pine	#2	~~6-2~~ 5-3	~~8-10~~ 7-11	~~11-5~~ 10-0	~~13-7~~ 11-11	~~16-0~~ 14-0	~~5-10~~ 5-0	~~8-4~~ 7-5	~~10-9~~ 9-5	~~12-10~~ 11-3	~~15-1~~ 13-2
	Southern pine	#3	~~4-8~~ 4-1	~~6-10~~ 6-0	~~8-9~~ 7-7	~~10-4~~ 9-2	~~12-3~~ 10-10	~~4-4~~ 3-10	~~6-5~~ 5-8	~~8-3~~ 7-1	~~9-9~~ 8-8	~~11-7~~ 10-3
19.2	Southern pine	SS	6-4	10-0	13-2	~~16-9~~ 15-10	~~20-4~~ 18-8	6-4	~~10-0~~ 9-10	~~13-2~~ 12-6	~~16-5~~ 14-11	~~19-2~~ 17-7

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum Rafter Spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Southern pine	#1	~~6-3~~ 5-8	~~9-3~~ 8-5	~~11-8~~ 10-8	~~13-10~~ 12-5	~~16-6~~ 14-9	~~5-11~~ 5-4	~~8-9~~ 7-11	~~11-0~~ 10-0	~~13-1~~ 11-9	~~15-7~~ 13-11
	Southern pine	#2	~~5-7~~ 4-10	~~8-1~~ 7-3	~~10-5~~ 9-2	~~12-5~~ 10-10	~~14-7~~ 12-9	~~5-4~~ 4-6	~~7-7~~ 6-10	~~9-10~~ 8-8	~~11-9~~ 10-3	~~13-9~~ 12-1
	Southern pine	#3	~~4-3~~ 3-8	~~6-3~~ 5-6	~~8-0~~ 6-11	~~9-5~~ 8-4	~~11-2~~ 9-11	~~4-0~~ 3-6	~~5-11~~ 5-2	~~7-6~~ 6-6	~~8-10~~ 7-11	~~10-7~~ 9-4
24	Southern pine	SS	5-11	9-3	~~12-2~~ 11-11	~~15-7~~ 14-2	~~18-2~~ 16-8	5-11	~~9-3~~ 8-10	~~12-2~~ 11-2	~~14-8~~ 13-4	~~17-2~~ 15-9
	Southern pine	#1	~~5-7~~ 5-0	~~8-3~~ 7-6	~~10-5~~ 9-6	~~12-5~~ 11-1	~~14-9~~ 13-2	~~5-3~~ 4-9	~~7-10~~ 7-1	~~9-10~~ 9-0	~~11-8~~ 10-6	~~13-11~~ 12-5
	Southern pine	#2	~~5-0~~ 4-4	~~7-3~~ 6-5	~~9-4~~ 8-2	~~11-1~~ 9-9	~~13-0~~ 11-5	~~4-9~~ 4-1	~~6-10~~ 6-1	~~8-9~~ 7-9	~~10-6~~ 9-2	~~12-4~~ 10-9
	Southern pine	#3	~~3-9~~ 3-4	~~5-7~~ 4-11	~~7-1~~ 6-2	~~8-5~~ 7-6	~~10-0~~ 8-10	~~3-7~~ 3-1	~~5-3~~ 4-7	~~6-9~~ 5-10	~~7-11~~ 7-1	~~9-5~~ 8-4

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

(Portions of table not shown remain unchanged)

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:
H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.
H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

TABLE R802.5.1(8)
RAFTER SPANS FOR 70 PSF GROUND SNOW LOAD
(Ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	#1	~~6-7~~ 6-6	~~10-5~~ 10-2	~~13-8~~ 13-5	~~17-6~~ 15-9	~~20-11~~ 18-8	~~6-7~~ 6-6	~~10-5~~ 10-0	~~13-8~~ 12-8	~~16-6~~ 14-10	~~19-8~~ 17-7
	Southern pine	#2	~~6-6~~ 6-1	~~10-2~~ 9-2	~~13-2~~ 11-7	~~15-9~~ 13-9	~~18-5~~ 16-2	~~6-6~~ 5-9	~~9-7~~ 8-7	~~12-5~~ 10-11	~~14-10~~ 12-11	~~17-5~~ 15-3
	Southern pine	#3	~~5-4~~ 4-8	~~7-11~~ 6-11	~~10-1~~ 8-9	~~11-11~~ 10-7	~~14-2~~ 12-6	~~5-1~~ 4-5	~~7-5~~ 6-6	~~9-6~~ 8-3	~~11-3~~ 10-0	~~13-4~~ 11-10
16	Southern pine	SS	6-1	9-7	12-8	16-2	19-8	6-1	9-7	12-8	16-2	~~19-8~~ 19-3
	Southern pine	#1	~~6-0~~ 5-11	~~9-5~~ 9-2	~~12-5~~ 11-8	~~15-2~~ 13-8	~~18-1~~ 16-2	~~6-0~~ 5-10	~~9-5~~ 8-8	~~12-0~~ 11-0	~~14-4~~ 12-10	~~17-1~~ 15-3
	Southern pine	#2	~~5-11~~ 5-3	~~8-10~~ 7-11	~~11-5~~ 10-0	~~13-7~~ 11-11	~~16-0~~ 14-0	~~5-10~~ 5-0	~~8-4~~ 7-5	~~10-9~~ 9-5	~~12-10~~ 11-3	~~15-1~~ 13-2
	Southern pine	#3	~~4-8~~ 4-1	~~6-10~~ 6-0	~~8-9~~ 7-7	~~10-4~~ 9-2	~~12-3~~ 10-10	~~4-4~~ 3-10	~~6-5~~ 5-8	~~8-3~~ 7-1	~~9-9~~ 8-8	~~11-7~~ 10-3
19.2	Southern pine	SS	5-9	9-1	11-11	15-3	18-6	5-9	9-1	11-11	~~15-3~~ 14-11	~~18-6~~ 17-7
	Southern pine	#1	~~5-8~~ 5-6	~~8-11~~ 8-5	~~11-8~~ 10-8	~~13-10~~ 12-5	~~16-6~~ 14-9	~~5-8~~ 5-4	~~8-9~~ 7-11	~~11-0~~ 10-0	~~13-1~~ 11-9	~~15-7~~ 13-11

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
	Southern pine	#2	~~5-6~~ 4-10	~~8-1~~ 7-3	~~10-5~~ 9-2	~~12-5~~ 10-10	~~14-7~~ 12-9	~~5-4~~ 4-6	~~7-7~~ 6-10	~~9-10~~ 8-8	~~11-9~~ 10-3	~~13-9~~ 12-1
	Southern pine	#3	~~4-3~~ 3-8	~~6-3~~ 5-6	~~8-0~~ 6-11	~~9-5~~ 8-4	~~11-2~~ 9-11	~~4-0~~ 3-6	~~5-11~~ 5-2	~~7-6~~ 6-6	~~8-10~~ 7-11	~~10-7~~ 9-4
24	Southern pine	SS	5-4	8-5	11-1	14-2	~~17-2~~ 16-8	5-4	8-5	11-1	~~14-2~~ 13-4	~~17-2~~ 15-9
	Southern pine	#1	~~5-3~~ 5-0	~~8-3~~ 7-6	~~10-5~~ 9-6	~~12-5~~ 11-1	~~14-9~~ 13-2	~~5-3~~ 4-9	~~7-10~~ 7-1	~~9-10~~ 9-0	~~11-8~~ 10-6	~~13-11~~ 12-5
	Southern pine	#2	~~5-0~~ 4-4	~~7-3~~ 6-5	~~9-4~~ 8-2	~~11-1~~ 9-9	~~13-0~~ 11-5	~~4-9~~ 4-1	~~6-10~~ 6-1	~~8-9~~ 7-9	~~10-6~~ 9-2	~~12-4~~ 10-9
	Southern pine	#3	~~3-9~~ 3-4	~~5-7~~ 4-11	~~7-1~~ 6-2	~~8-5~~ 7-6	~~10-0~~ 8-10	~~3-7~~ 3-1	~~5-3~~ 4-7	~~6-9~~ 5-10	~~7-11~~ 7-1	~~9-5~~ 8-4

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

(Portions of table not shown remain unchanged)

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/10 or less	1.00

where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

Committee Reason: Approval was based upon the proponent's published reason. The modifications updated the span tables for southern pine based on the current design values certified by the American Lumber Standards Committee Board of Review.

Assembly Action: **None**

Public Comments

Public Comment:

Dennis Pitts, American Wood Council, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

TABLE R502.3.1(1)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential sleeping areas, live load = 30 psf, L/∆ = 360)[a]

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10psf
			2 x 8
			Maximum floor joist spans
			(ft – in)
16	Southern pine	#3	~~10-10~~ 10-0

(Portions of Table not shown remain unchanged)

Commenter's Reason: This public comment corrects a typo in our original proposal.

Final Hearing Results

RB250-13	**AMPC**

Code Change No: RB251-13

Original Proposal

Section(s): R502.5, Table R502.5(3) (NEW)

Proponent: Brian Foley, P.E., Fairfax County, VA, representing Virginia Building and Code Officials Association (brian.foley@fairfaxcounty.gov), Lynn Underwood, Norfolk, VA, representing Virginia Building and Code Officials Association

Revise as follows:

R502.5 Allowable girder and header spans. The allowable spans of girders and headers fabricated of dimension lumber shall not exceed the values set forth in Tables R502.5(1) ~~and~~ through ~~R502.5(2)~~ R502.5(3).

TABLE R502.5(3)
GIRDER AND HEADER SPANS [a] FOR OPEN PORCHES
(Maximum span for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir [b])

SIZE	SUPPORTING ROOF GROUND SNOW LOAD [c] (psf)						SUPPORTING FLOOR	
	30		50		70			
	DEPTH OF PORCH [d] (feet)							
	8	14	8	14	8	14	8	14
2-2 x 6	7-6	5-8	6-2	4-8	5-4	4-0	6-4	4-9
2-2 x 8	10-1	7-7	8-3	6-2	7-1	5-4	8-5	6-4
2-2 x 10	12-4	9-4	10-1	7-7	8-9	6-7	10-4	7-9
2-2 x 12	14-4	10-10	11-8	8-10	10-1	7-8	11-11	9-0

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa

a. Spans are given in feet and inches.
b. Tabulated values assume #2 grade lumber, wet service and incising for refractory species. Use 30 psf ground snow load for cases in which ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.
c. Porch width is measured horizontally from building face to the centerline of the header. For widths between those shown, spans are permitted to be interpolated.

Reason: The *International Residential Code* (IRC) regulates the size of headers in Chapter 5. Tables R502.5(1) and (2) has categories of building width that begins at 20 feet. Choosing porch header sizes based on those tables would produce oversize sections. To comply, the builder must construct the porch of an oversized header or seek an engineering solution to use the actual header size required.

This code change proposal provides a table based on post construction to support headers for porches with an 8 foot or 14 foot width. The span lengths in the table were based on the 2005 AF&PA/NDS and the species which are commonly identified in other IRC tables similarly to the other span tables in the code.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides the builders and building officials with a useful table for headers for open porches. This will eliminate the use of oversized or engineered headers.

Assembly Action: **None**

Final Hearing Results

RB251-13	AS

Code Change No: RB252-13

Original Proposal

Section(s): R301.2.2.2.5, R404.1.9.2, R502.5, Table R502.5(1), Table R502.5(2), R602.3, R602.7, Table R602.7.1

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

R301.2.2.2.5 Irregular buildings. The seismic provisions of this code shall not be used for irregular structures located in Seismic Design Categories C, D_0, D_1 and D_2. Irregular portions of structures shall be designed in accordance with accepted engineering practice to the extent the irregular features affect the performance of the remaining structural system. When the forces associated with the irregularity are resisted by a structural system designed in accordance with accepted engineering practice, design of the remainder of the building shall be permitted using the provisions of this code. A building or portion of a building shall be considered to be irregular when one or more of the following conditions occur:

3. When the end of a *braced wall panel* occurs over an opening in the wall below and ends at a horizontal distance greater than 1 foot (305 mm) from the edge of the opening. This provision is applicable to shear walls and *braced wall panels* offset in plane and to *braced wall panels* offset out of plane as permitted by the exception to Item 1 above.

    Exception: For wood light-frame wall construction, one end of a *braced wall panel* shall be permitted to extend more than 1 foot (305 mm) over an opening not more than 8 feet (2438 mm) wide in the wall below provided that the opening includes a header in accordance with the following:

    1. The building width, loading condition and framing member species limitations of Table ~~R502.5(1)~~ R602.7(1) shall apply; and

(Portions of text not shown remain unchanged)

Revise as follows:

R404.1.9.2 Masonry piers supporting floor girders. Masonry piers supporting wood girders sized in accordance with Tables ~~R502.5(1)~~ R602.7(1) and ~~R502.5(2)~~ R602.7(2) shall be permitted in accordance with this section. Piers supporting girders for interior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 10 feet (3048 mm) from top of footing to bottom of sill plate or girder. Piers supporting girders for exterior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 4 feet (1220 mm) from top of footing to bottom of sill plate or girder. Girders and sill plates shall be anchored to the pier or footing in accordance with Section R403.1.6 or Figure R404.1.5(1). Floor girder bearing shall be in accordance with Section R502.6.

Revise as follows:

R502.5 Allowable girder spans. The allowable spans of girders fabricated of dimension lumber shall not exceed the values set forth in ~~Tables R502.5(1) and R502.5(2)~~ Tables R602.7(1) and R602.7(2)

TABLE ~~R502.5(1)~~ R602.7(1)
GIRDER SPANS[a] AND HEADER SPANS[a] FOR EXTERIOR BEARING WALLS
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD (psf)[e]																	
		30						50						70					
		Building width[c] (feet)																	
		20		28		36		20		28		36		20		28		36	
		Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]
Roof and ceiling	1-2 × 8	4-6	1	3-10	1	3-5	1	3-9	1	3-2	1	2-10	2	—	—	—	—	—	—
	1-2 × 10	5-8	1	4-11	1	4-4	1	4-9	1	4-1	1	3-7	2	—	—	—	—	—	—
	1-2 × 12	6-11	1	5-11	2	5-3	2	5-9	2	4-8	2	3-8	2	—	—	—	—	—	—
	2-2 × 4	3-6	1	3-2	1	2-10	1	3-2	1	2-9	1	2-6	1	2-10	1	2-6	1	2-3	1
	2-2 × 6	5-5	1	4-8	1	4-2	1	4-8	1	4-1	1	3-8	2	4-2	1	3-8	2	3-3	2
	2-2 × 8	6-10	1	5-11	2	5-4	2	5-11	2	5-2	2	4-7	2	5-4	2	4-7	2	4-1	2
	2-2 × 10	8-5	2	7-3	2	6-6	2	7-3	2	6-3	2	5-7	2	6-6	2	5-7	2	5-0	2
	2-2 × 12	9-9	2	8-5	2	7-6	2	8-5	2	7-3	2	6-6	2	7-6	2	6-6	2	5-10	3
	3-2 × 8	8-4	1	7-5	1	6-8	1	7-5	1	6-5	2	5-9	2	6-8	1	5-9	2	5-2	2
	3-2 × 10	10-6	1	9-1	2	8-2	2	9-1	2	7-10	2	7-0	2	8-2	2	7-0	2	6-4	2
	3-2 × 12	12-2	2	10-7	2	9-5	2	10-7	2	9-2	2	8-2	2	9-5	2	8-2	2	7-4	2
	4-2 × 8	9-2	1	8-4	1	7-8	1	8-4	1	7-5	1	6-8	1	7-8	1	6-8	1	5-11	2
	4-2 × 10	11-8	1	10-6	1	9-5	2	10-6	1	9-1	2	8-2	2	9-5	2	8-2	2	7-3	2
	4-2 × 12	14-1	1	12-2	2	10-11	2	12-2	2	10-7	2	9-5	2	10-11	2	9-5	2	8-5	2
Roof, ceiling and one center-bearing floor	1-2 × 8	3-11	1	3-5	1	3-0	1	3-7	1	3-0	2	2-8	2	—	—	—	—	—	—
	1-2 × 10	5-0	2	4-4	2	3-10	2	4-6	2	3-11	2	3-4	2	—	—	—	—	—	—
	1-2 × 12	5-10	2	4-9	2	4-2	2	5-5	2	4-2	2	3-4	2	—	—	—	—	—	—
	2-2 × 4	3-1	1	2-9	1	2-5	1	2-9	1	2-5	1	2-2	1	2-7	1	2-3	1	2-0	1
	2-2 × 6	4-6	1	4-0	1	3-7	2	4-1	1	3-7	2	3-3	2	3-9	2	3-3	2	2-11	2
	2-2 × 8	5-9	2	5-0	2	4-6	2	5-2	2	4-6	2	4-1	2	4-9	2	4-2	2	3-9	2
	2-2 × 10	7-0	2	6-2	2	5-6	2	6-4	2	5-6	2	5-0	2	5-9	2	5-1	2	4-7	3
	2-2 × 12	8-1	2	7-1	2	6-5	2	7-4	2	6-5	2	5-9	3	6-8	2	5-10	3	5-3	3
	3-2 × 8	7-2	1	6-3	2	5-8	2	6-5	2	5-8	2	5-1	2	5-11	2	5-2	2	4-8	2
	3-2 × 10	8-9	2	7-8	2	6-11	2	7-11	2	6-11	2	6-3	2	7-3	2	6-4	2	5-8	2
	3-2 × 12	10-2	2	8-11	2	8-0	2	9-2	2	8-0	2	7-3	2	8-5	2	7-4	2	6-7	2
	4-2 × 8	8-1	1	7-3	1	6-7	1	7-5	1	6-6	1	5-11	2	6-10	1	6-0	2	5-5	2
	4-2 × 10	10-1	1	8-10	2	8-0	2	9-1	2	8-0	2	7-2	2	8-4	2	7-4	2	6-7	2
	4-2 × 12	11-9	2	10-3	2	9-3	2	10-7	2	9-3	2	8-4	2	9-8	2	8-6	2	7-7	2
Roof, ceiling and one clear span floor	1-2 × 8	3-6	1	3-0	1	2-8	1	3-5	1	2-11	1	2-7	2	—	—	—	—	—	—
	1-2 × 10	4-6	1	3-10	1	3-3	1	4-4	1	3-9	1	3-1	2	—	—	—	—	—	—
	1-2 × 12	5-6	1	4-2	2	3-3	2	5-4	2	3-11	2	3-1	2	—	—	—	—	—	—
	2-2 × 4	2-8	1	2-4	1	2-1	1	2-7	1	2-3	1	2-0	1	2-5	1	2-1	1	1-10	1
	2-2 × 6	3-11	1	3-5	2	3-0	2	3-10	2	3-4	2	3-0	2	3-6	2	3-1	2	2-9	2
	2-2 × 8	5-0	2	4-4	2	3-10	2	4-10	2	4-2	2	3-9	2	4-6	2	3-11	2	3-6	2
	2-2 × 10	6-1	2	5-3	2	4-8	2	5-11	2	5-1	2	4-7	3	5-6	2	4-9	2	4-3	3
	2-2 × 12	7-1	2	6-1	3	5-5	3	6-10	2	5-11	3	5-4	3	6-4	2	5-6	3	5-0	3
	3-2 × 8	6-3	2	5-5	2	4-10	2	6-1	2	5-3	2	4-8	2	5-7	2	4-11	2	4-5	2
	3-2 × 10	7-7	2	6-7	2	5-11	2	7-5	2	6-5	2	5-9	2	6-10	2	6-0	2	5-4	2
	3-2 × 12	8-10	2	7-8	2	6-10	2	8-7	2	7-5	2	6-8	2	7-11	2	6-11	2	6-3	2
	4-2 × 8	7-2	1	6-3	2	5-7	2	7-0	1	6-1	2	5-5	2	6-6	1	5-8	2	5-1	2

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD (psf)[e]																	
		30						50						70					
		Building width[c] (feet)																	
		20		28		36		20		28		36		20		28		36	
		Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]
	4-2 × 10	8-9	2	7-7	2	6-10	2	8-7	2	7-5	2	6-7	2	7-11	2	6-11	2	6-2	2
	4-2 × 12	10-2	2	8-10	2	7-11	2	9-11	2	8-7	2	7-8	2	9-2	2	8-0	2	7-2	2

(Portion of Table not shown remain unchanged)

TABLE ~~R502.5(2)~~ R602.7(2)
GIRDER SPANS[a] AND HEADER SPANS[a] FOR INTERIOR BEARING WALLS
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

(*Portions of Table not shown remain unchanged)*

Revise as follows:

R602.3 Design and construction. Exterior walls of wood-frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3(2) or in accordance with AF&PA's NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(1) through R602.3(4). Wall sheathing shall be fastened directly to framing members and, when placed on the exterior side of an exterior wall, shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). Wood structural panel sheathing used for exterior walls shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance Category by a grade mark or certificate of inspection issued by an approved agency and shall conform to the requirements of Table R602.3(3). Wall sheathing used only for exterior wall covering purposes shall comply with Section R703.

Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

Exception: Jack studs, trimmer studs and cripple studs at openings in walls that comply with Tables ~~R502.5(1)~~ R602.7(1) and ~~R502.5(2)~~ R602.7(2).

R602.7 Headers. For header spans see Tables ~~R502.5(1), R502.5(2), and R602.7.1~~ R602.7(1) and R602.7(2).

~~TABLE R602.7.1~~
~~SPANS FOR MINIMUM No. 2 GRADE SINGLE HEADER[a, b, c, f]~~

(Portions of Table not shown remain unchanged)

Reason: This change incorporates the single-ply header table into the main header table. The single-ply header is becoming more common for reasons of energy efficiency.

Single-ply header spans are based on #2 grade Hem-Fir design values, the same basis as the multi-ply headers in the main header table.

It also moves the main header tables back to Chapter 6, the wall chapter, since headers and girders are often considered wall elements and the header tables are commonly referenced in wall provisions. This change should make the tables easier to find since they are more often consulted for headers (walls) than for girders (floors).

The subsections and associated figures on single-ply headers, and the subsection, figure, and table on box headers, remain intact and in the same location.

This change will also facilitate the efficient updating of spans for new lumber design values as they become available.

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB252-13	**AS**

Code Change No: RB254-13

Original Proposal

Section(s): R502.10

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

Revise as follows:

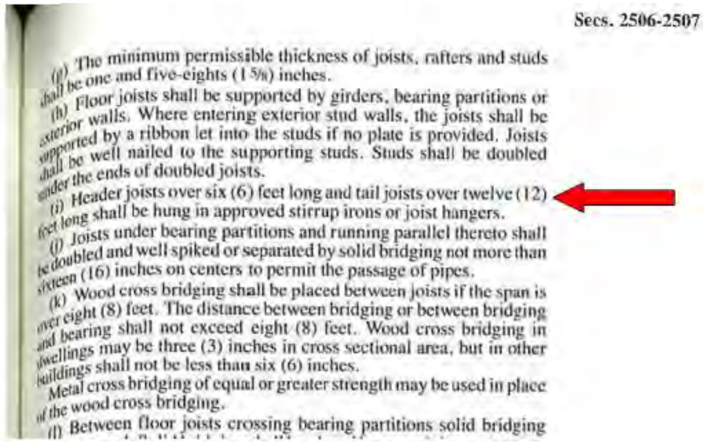
R502.10 Framing of openings. Openings in floor framing shall be framed with a header and trimmer joists. When the header joist span does not exceed 4 feet (1219 mm), the header joist may be a single member the same size as the floor joist. Single trimmer joists may be used to carry a single header joist that is located within 3 feet (914 mm) of the trimmer joist bearing. When the header joist span exceeds 4 feet (1219 mm), the trimmer joists and the header joist shall be doubled and of sufficient cross section to support the floor joists framing into the header. ~~*Approved* hangers shall be used for the header joist to trimmer joist connections when the header joist span exceeds 6 feet (1829 mm). Tail joists over 12 feet (3658 mm) long shall be supported at the header by framing anchors or on ledger strips not less than 2 inches by 2 inches (51 mm by 51 mm).~~

Reason: There is conflicting language in the code regarding the support of framing members at floor openings. R502.10 requires ***header joists*** be provided with approved hangers only when they exceed 6 feet in length and that ***joists*** to be supported on framing anchors or ledger strips only when they are over 12 feet long.

The conflict is that R502.6 requires ***all*** joists, beams, and girders to have not less than 1.5 inches of bearing regardless of length. Applying the existing language literally, a ten foot long joist framed into a stairway opening at one end and into the face of a beam a the other would require a joist hanger where it connects to the beam but not at the stairway header. The loads are assumed to be distributed evenly along the joist. Either the code should require all joists to meet the same requirements or it should exclude all joists 12 feet or less in length from needing hangers. This proposal deletes the language applicable to framing at openings and applies the bearing requirements for all joists as per R502.3. As an aside, the language requiring hangers only for tail joists over 12 feet in length was tracked back to the 1927 *Uniform Building Code*.

For information only:

R502.6 Bearing. The ends of each joist, beam or girder shall have not less than 1.5 inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on masonry or concrete except where supported on a 1-inch by 4-inch (25.4 mm by 102 mm) ribbon strip and nailed to the adjacent stud or by the use of approved joist hangers. The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch-minimum (51 mm) nominal thickness shall be provided under the joist, beam or girder. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm).



Secs. 2506-2507

(g) The minimum permissible thickness of joists, rafters and studs shall be one and five-eights (1 5/8) inches.

(h) Floor joists shall be supported by girders, bearing partitions or exterior walls. Where entering exterior stud walls, the joists shall be supported by a ribbon let into the studs if no plate is provided. Joists shall be well nailed to the supporting studs. Studs shall be doubled under the ends of doubled joists.

(i) Header joists over six (6) feet long and tail joists over twelve (12) feet long shall be hung in approved stirrup irons or joist hangers.

(j) Joists under bearing partitions and running parallel thereto shall be doubled and well spiked or separated by solid bridging not more than sixteen (16) inches on centers to permit the passage of pipes.

(k) Wood cross bridging shall be placed between joists if the span is over eight (8) feet. The distance between bridging or between bridging and bearing shall not exceed eight (8) feet. Wood cross bridging in dwellings may be three (3) inches in cross sectional area, but in other buildings shall not be less than six (6) inches.

Metal cross bridging of equal or greater strength may be used in place of the wood cross bridging.

(l) Between floor joists crossing bearing partitions solid bridging

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change deletes conflicting language with Section R502.6.

Assembly Action: **None**

Final Hearing Results

RB254-13 **AS**

Code Change No: RB255-13

Original Proposal

Section(s): R503.2.1, R602.3, R604.1, R803.2.1

Proponent: Lisa Reiheld, CSA Group (lisa.reiheld@csagroup.org)

Revise as follows:

R503.2.1 Identification and grade. Wood structural panel sheathing used for structural purposes shall conform to DOC PS 1, DOC PS 2 ~~or, when manufactured in Canada~~, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance Category by a grade *mark* or certificate of inspection issued by an *approved agency*. The Performance Category value shall be used as the "nominal panel thickness" or "panel thickness" whenever referenced in this code.

Revise as follows:

R602.3 Design and construction. Exterior walls of woodframe construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3(2) or in accordance with AF&PA's NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(1) through R602.3(4). Wall sheathing shall be fastened directly to framing members and, when placed on the exterior side of an exterior wall, shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). Wood structural panel sheathing used for exterior walls shall conform to DOC PS 1, DOC PS 2 ~~or, when manufactured in Canada~~, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance Category by a grade mark or certificate of inspection issued by an approved agency and shall conform to the requirements of Table R602.3(3). Wall sheathing used only for exterior wall covering purposes shall comply with Section R703.

Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

Exception: Jack studs, trimmer studs and cripple studs at openings in walls that comply with Tables R502.5(1) and R502.5(2).

R604.1 Identification and grade. Wood structural panels shall conform to DOC PS 1, DOC PS 2 or ANSI/APA PRP 210 ~~or, when manufactured in Canada~~, CSA O437 or CSA O325. All panels shall be identified by a grade mark or certificate of inspection issued by an *approved* agency.

Revise as follows:

R803.2.1 Identification and grade. Wood structural panels shall conform to DOC PS 1, DOC PS 2 ~~or, when manufactured in Canada~~, CSA O437 or CSA O325, and shall be identified for grade, bond classification, and Performance Category by a grade mark or certificate of inspection issued by an *approved* agency. Wood structural panels shall comply with the grades specified in Table R503.2.1.1(1).

Reason: The intent should not be specific to what country the product is manufactured in as long as it complies with an accepted standard.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change removes redundant language. The standard is applicable regardless of the location of the manufacturer.

Assembly Action: **None**

Final Hearing Results

RB255-13	**AS**

Code Change No: RB256-13

Original Proposal

Section(s): Table R503.2.1.1(1), Chapter 44

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement* and self

Revise as follows:

TABLE R503.2.1.1(1)
ALLOWABLE SPANS AND LOADS FOR WOOD STRUCTURAL PANELS FOR ROOF AND SUBFLOOR SHEATHING AND COMBINATION SUBFLOOR UNDERLAYMENT[a,b,c]

j. Unsupported edges shall have tongue-and-groove joints or shall be supported with blocking unless minimum ¼-inch thick wood panel-type underlayment or fiber-cement underlayment with end and edge joints offset at least 2 inches or 1.5 inches of lightweight concrete or approved cellular concrete is placed over the subfloor or ¾-inch wood finish flooring is installed at right angles to the supports. Fiber-cement underlayment shall comply with ASTM C1288 or ISO 8336 Category C. Allowable uniform live load at maximum span based on deflection of 1/360 of span is 100 psf.

k. Unsupported edges shall have tongue-and-groove joints or shall be supported with blocking unless minimum ¼-inch thick wood panel-type underlayment or fiber-cement underlayment with end and edge joints offset at least 2 inches or 1.5 inches of lightweight concrete or approved cellular concrete is placed over the subfloor or ¾-inch wood finish flooring is installed at right angles to the supports. Fiber-cement underlayment shall comply with ASTM C1288 or ISO 8336 Category C. Allowable uniform live load at maximum span based on deflection of 1/360 of span is 100 psf, except panels with a span rating of 48 on center are limited to 65 psf total uniform load at maximum span.

(Portions of Table not shown remain unchanged)

Add new standard to Chapter 44 as follows:

ISO

8336 – Fibre-Cement Flat Sheets – Product Specification and Test Methods

Reason: The current table and footnote clearly limit the allowable type of permitted underlayment to wood, lightweight concrete, approved cellular concrete, or wood finish flooring. The table and footnotes as currently worded restrain trade by prohibiting the use of another approved type of underlayment. The inclusion of a reference to “fiber-cement” clarifies an alternative recognized product permitted in this type of Code-compliant subfloor/underlayment application (see attached ICC-ES ESR-1381 [reference Section 4.3], ESR-2280 [reference Sections 4.2.2.1 and 4.2.3.1], and ESR-2292 [reference Section 4.2]).

IBC Table 722.6.2(4) has, as a result of the Group A IBC Code Hearings, been revised to recognize fiber-cement underlayment in subfloor/underlayment combination. The addition of the new referenced ISO standard and “product category” were also approved during the Group A IBC Code Hearings. This proposed revision brings the two building codes (IBC & IRC) and the applicable code sections and standards references into general alignment by allowing fiber-cement underlayment in subfloor/underlayment combination applications.

Performance requirements of ISO 8336, *Fibre-cement flat sheets – Product specification and test methods*, have been harmonized with the performance requirements of ASTM C1288, *Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets*. Fiber-cement producers in Mexico, Central and South America, Europe, Asia, Australia and New Zealand currently manufacture and test their fiber-cement products for compliance with ISO 8336. The inclusion of this Standard reference in the IRC will permit manufacturers worldwide to demonstrate product compliance to IRC requirements. The addition of a reference to ISO 8336 in the Code removes a barrier to trade.

Cost Impact: The code change proposal will not increase the cost of construction because the proposed addition of fiber-cement underlayment to the table footnote only provides for the choice and use of a type of underlayment currently used in this type of application and permitted in ICC-ES Evaluation Service Reports.

Analysis: A review of the standard proposed for inclusion in the code, ISO 8336 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ISO8336 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The change adds another alternate for underlayment and an appropriate standard.

Assembly Action: **None**

Final Hearing Results

RB256-13	**AS**

Code Change No: RB257-13

Original Proposal

Section(s): Table R503.2.1.1(2), Chapter 44

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement* and Self

Revise as follows:

TABLE R503.2.1.1(2)
ALLOWABLE SPANS FOR SANDED PLYWOOD COMBINATION SUBFLOOR UNDERLAYMENT[a]

a. Plywood continuous over two or more spans and face grain perpendicular to supports. Unsupported edges shall be tongue-and-groove or blocked except where nominal ¼-inch-thick wood panel-type underlayment or fiber-cement underlayment or ¾-inch wood finish floor is used. Fiber-cement underlayment shall comply with ASTM C1288 or ISO 8336 Category C. Allowable uniform live load at maximum span based on deflection of 1/360 of span is 100 psf.

(Portions of Table not shown remain unchanged)

Add new standard to Chapter 44 as follows:

ISO

8336 – Fibre-Cement Flat Sheets – Product Specification and Test Methods

Reason: The current table and footnote clearly limit the allowable type of permitted underlayment to wood or wood finished floor. The table and footnote as currently worded restrains trade by prohibiting the use of another approved type of underlayment. The inclusion of a reference to "fiber-cement" clarifies an alternative recognized product permitted in this type of Code-compliant subfloor/underlayment application (see attached ICC-ES ESR-1381 [reference Section 4.3], ESR-2280 [reference Sections 4.2.2.1 and 4.2.3.1], and ESR-2292 [reference Section 4.2]).

IBC Table 722.6.2(4) has, as a result of the Group A IBC Code Hearings, been revised to recognize fiber-cement underlayment in subfloor/underlayment combination. The addition of the new referenced ISO standard and "product category" were also approved during the Group A IBC Code Hearings. This proposed revision brings the two building codes (IBC & IRC) and the applicable code sections and standards references into general alignment by allowing fiber-cement underlayment in subfloor/underlayment combination applications.

Performance requirements of ISO 8336, *Fibre-cement flat sheets – Product specification and test methods*, have been harmonized with the performance requirements of ASTM C1288, *Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets*. Fiber-cement producers in Mexico, Central and South America, Europe, Asia, Australia and New Zealand currently manufacture and test their fiber-cement products for compliance with ISO 8336. The inclusion of this Standard reference in the IRC will permit manufacturers worldwide to demonstrate product compliance to IRC requirements. The addition of a reference to ISO 8336 in the Code removes a barrier to trade.

Cost Impact: The code change proposal will not increase the cost of construction because the proposed addition of fiber-cement underlayment to the table footnote only provides for the choice and use of a type of underlayment currently used in this type of application and permitted in ICC-ES Evaluation Service Reports.

Analysis: A review of the standard proposed for inclusion in the code, ISO 8336 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ISO8336 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This change is consistent with the committee's action on RB256-13 and the IBC committee action of Group A.

Assembly Action: **None**

Final Hearing Results

RB257-13	**AS**

Code Change No: RB258-13

Original Proposal

Section(s): R505, R505.1, R505.1.1, R505.2, R505.2.1, Figure R505.2(1), Table R505.2(1), Figure R505.2(2), Table R505.2(2), R505.2.2, R505.2.3, Table 505.2.3 (NEW), R505.2.4, Table R505.2.4, R505.2.5, R505.2.5.1, Figure R505.2.5.1, R505.2.5.2, R505.2.5.3, Figure R505.2.5.3, R505.3.1, Table R505.3.1(1), R505.3.2, Table R505.3.2(1), Table R505.3.2(2), Table R505.3.2(3), R505.3.3.1, R505.3.4, Table R505.3.4(1), Table R505.3.4(2), Table R505.3.4(3), Table R505.3.4(4), Figure R505.3.4(2), M1308.1, M2101.6, P2603.2

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org)

Revise as follows:

SECTION R505 COLD-FORMED STEEL FLOOR FRAMING

R505.1 Cold-formed steel floor framing. Elements shall be straight and free of any defects that would significantly affect structural performance. Cold-formed steel floor framing members shall be in accordance ~~comply~~ with the requirements of this section.

R505.1.1 Applicability limits. The provisions of this section shall control the construction of cold-formed steel floor framing for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist span, not greater than 40 feet (12 192 mm) in width parallel to the joist span, and less than or equal to three stories above *grade* plane. Cold-formed steel floor framing constructed in accordance with the provisions of this section shall be limited to sites ~~subjected to a maximum~~ where the ultimate design wind speed ~~of 110~~ is less than 139 miles per hour (62~~49~~ m/s), Exposure Category B or C, and ~~a maximum~~ the ground snow load is less than or equal to ~~of~~ 70 pounds per square foot (3.35 kPa).

R505.2 Structural framing. Load-bearing cold-formed steel floor framing members shall be in accordance ~~comply~~ with this section. ~~Figure R505.2(1) and with the dimensional and minimum thickness requirements specified in Tables R505.2(1) and R505.2(2). Tracks shall comply with Figure R505.2(2) and shall have a minimum flange width of~~ ~~$1^{1}/_{4}$ inches (32 mm).~~

R505.2.1 Material. Load-bearing cold-formed steel framing members shall be cold formed to shape from structural quality sheet steel complying with the requirements of ~~one of the following:~~

~~1. ASTM A 653: Grades 33 and 50 (Class 1 and 3).~~
~~2. ASTM A 792: Grades 33 and 50A.~~
~~3.~~ ASTM A 1003,~~:~~ Structural Grades 33 Type H and 50 Type H.

FIGURE R505.2.3(1) C-SHAPED SECTION

(Figure remains unchanged)

FIGURE R505.2.3(2) TRACK SECTION

(Figure remains unchanged)

~~TABLE R505.2(1)~~
~~COLD-FORMED STEEL JOIST SIZES~~

~~MEMBER DESIGNATION[a]~~	~~WEB DEPTH (inches)~~	~~MINIMUM FLANGE WIDTH (inches)~~	~~MAXIMUM FLANGE WIDTH (inches)~~	~~MINIMUM LIP SIZE (inches)~~
~~550S162-t~~	~~5.5~~	~~1.625~~	~~2~~	~~0.5~~
~~800S162-t~~	~~8~~	~~1.625~~	~~2~~	~~0.5~~
~~1000S162-t~~	~~10~~	~~1.625~~	~~2~~	~~0.5~~
~~1200S162-t~~	~~12~~	~~1.625~~	~~2~~	~~0.5~~

~~For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm.~~

~~a. The member designation is defined by the first number representing the member depth in 0.01 inch, the letter "S" representing a stud or joist member, the second number representing the flange width in 0.01 inch, and the letter "t" shall be a number representing the minimum base metal thickness in mils [See Table R505.2(2)].~~

TABLE R505.2.3
COLD-FORMED STEEL JOIST SIZES AND THICKNESSES

MEMBER DESIGNATION[a]	WEB DEPTH (inches)	MINIMUM BASE STEEL THICKNESS mil (inches)
550S162-t	5.5	33 (0.0329), 43 (0.0428), 54 (0.0538), 68 (0.0677)
800S162-t	8	33 (0.0329), 43 (0.0428), 54 (0.0538), 68 (0.0677)
1000S162-t	10	43 (0.0428), 54 (0.0538), 68 (0.0677)
1200S162-t	12	43 (0.0428), 54 (0.0538), 68 (0.0677)

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm.

a. The member designation is defined by the first number representing the member depth in 0.01 inch, the letter "S" representing a stud or joist member, the second number representing the flange width in 0.01 inch, and the letter "t" shall be a number representing the minimum base metal thickness in mils

~~TABLE R505.2(2)~~
~~MINIMUM THICKNESS OF COLD-FORMED STEEL MEMBERS~~

~~DESIGNATION THICKNESS (mils)~~	~~MINIMUM BASE STEEL THICKNESS (inches)~~
~~33~~	~~0.0329~~
~~43~~	~~0.0428~~
~~54~~	~~0.0538~~
~~68~~	~~0.0677~~
~~97~~	~~0.0966~~

~~For SI: inch = 25.4 mm, 1 mil = 0.0254 mm.~~

R505.2.2 Corrosion protection. Load-bearing cold-formed steel framing shall have a metallic coating complying with ASTM A 1003 and one of the following:

1. A minimum of G 60 in accordance with ASTM A 653.
2. A minimum of AZ 50 in accordance with ASTM A 792.

R505.2.3 Dimension, thickness and material grade. Load-bearing cold-formed steel floor framing members shall comply with Figure R505.2.3(1) and with the dimensional and thickness requirements specified in Table R505.2.3. Additionally, all c-shaped sections shall have a minimum flange width of 1.625 inches (41 mm) and a maximum flange width of 2 inches (51 mm). The minimum lip size for c-shaped sections shall be 0.5 inches (13 mm). Track sections shall comply with Figure R505.2.3(2) and shall have a minimum flange width of $1^1/_4$ inches (32 mm). Minimum Grade 33 ksi steel shall be used wherever 33 mil and 43 mil thicknesses are specified. Minimum Grade 50 ksi steel shall be used wherever 54 and 68 mil thicknesses are specified.

~~**R505.2.2**~~ **R505.2.4 Identification.** Load-bearing cold-formed steel framing members shall have a legible *label*, stencil, stamp or embossment with the following information as a minimum:

1. Manufacturer's identification.
2. Minimum base steel thickness in inches (mm).
3. Minimum coating designation.
4. Minimum yield strength, in kips per square inch (ksi) (MPa).

~~**R505.2.3 Corrosion protection.** Load-bearing cold-formed steel framing shall have a metallic coating complying with ASTM A 1003 and one of the following:~~

~~1. A minimum of G 60 in accordance with ASTM A 653.~~
~~2. A minimum of AZ 50 in accordance with ASTM A 792.~~

~~**R505.2.4**~~ **R505.2.5 Fastening** ~~**requirements.**~~ Screws for steel-to-steel connections shall be installed with a minimum edge distance and center-to-center spacing of $^1/_2$ inch (12.7 mm), shall be self-drilling tapping, and shall conform to ASTM C 1513. Floor sheathing shall be attached to cold-formed steel joists with minimum No. 8 self-drilling tapping screws that conform to ASTM C 1513. Screws attaching floor-sheathing to cold-formed steel joists shall have a minimum head diameter of 0.292 inch (7.4 mm) with countersunk heads and shall be installed with a minimum edge distance of $^3/_8$ inch (9.5 mm). Gypsum board ceilings shall be attached to cold-formed steel joists with minimum No. 6 screws conforming to ASTM C 954 or ASTM C 1513 with a bugle head style and shall be installed in accordance with Section R702. For all connections, screws shall extend through the steel a minimum of three exposed threads. All fasteners shall have rust inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion.

~~Where No. 8 screws are specified in a steel-to-steel connection, the required number of screws in the connection is permitted to be reduced in accordance with the reduction factors in Table R505.2.4 when larger screws are used or when one of the sheets of steel being connected is thicker than 33 mils (0.84 mm). When applying the reduction factor, the resulting number of screws shall be rounded up.~~

~~**TABLE R505.2.4**~~
~~**SCREW SUBSTITUTION FACTOR**~~

~~**SCREW SIZE**~~	~~**THINNEST CONNECTED STEEL SHEET (mils)**~~	
	~~**33**~~	~~**43**~~
~~#8~~	~~1.0~~	~~0.67~~
~~#10~~	~~0.93~~	~~0.62~~
~~#12~~	~~0.86~~	~~0.56~~

~~For SI: 1 mil = 0.0254 mm.~~

~~**R505.2.5**~~ **R505.2.6 Web holes, web hole reinforcing and web hole patching.** Web holes, web hole reinforcing, and web hole patching shall be in accordance with this section.

~~**R505.2.5.1**~~ **R505.2.6.1 Web holes.** Web holes in floor joists shall comply with all of the following conditions:

1. Holes shall conform to Figure ~~R505.2.5.1~~ R505.2.6.1;
2. Holes shall be permitted only along the centerline of the web of the framing member;
3. Holes shall have a center-to-center spacing of not less than 24 inches (610 mm);
4. Holes shall have a web hole width not greater than 0.5 times the member depth, or $2^1/_2$ inches (64.5 mm);

5. Holes shall have a web hole length not exceeding $4^1/_2$ inches (114 mm); and
6. Holes shall have a minimum distance between the edge of the bearing surface and the edge of the web hole of not less than 10 inches (254 mm).

Framing members with web holes not conforming to the above requirements shall be reinforced in accordance with Section ~~R505.2.5.2~~ R505.2.6.2, patched in accordance with Section ~~R505.2.5.3~~ R505.2.6.3 or designed in accordance with accepted engineering practices.

FIGURE ~~R505.2.5.1~~ R505.2.6.1 FLOOR JOIST WEB HOLES

(Figure remains unchanged)

~~R505.2.5.2~~ R505.2.6.2 Web hole reinforcing. Reinforcement of web holes in floor joists not conforming to the requirements of Section ~~R505.2.5.1~~ R505.2.6.1 shall be permitted if the hole is located fully within the center 40 percent of the span and the depth and length of the hole does not exceed 65 percent of the flat width of the web. The reinforcing shall be a steel plate or C-shape section with a hole that does not exceed the web hole size limitations of Section ~~R505.2.5.1~~ R505.2.6.1 for the member being reinforced. The steel reinforcing shall be the same thickness as the receiving member and shall extend at least 1 inch (25.4 mm) beyond all edges of the hole. The steel reinforcing shall be fastened to the web of the receiving member with No. 8 screws spaced no more than 1 inch (25.4 mm) center-to-center along the edges of the patch with minimum edge distance of $^1/_2$ inch (12.7 mm).

~~R505.2.5.3~~ R505.2.6.3 Hole patching. Patching of web holes in floor joists not conforming to the requirements in Section ~~R505.2.5.1~~ R505.2.6.1 shall be permitted in accordance with either of the following methods:

1. Framing members shall be replaced or designed in accordance with accepted engineering practices where web holes exceed the following size limits:
   1.1. The depth of the hole, measured across the web, exceeds 70 percent of the flat width of the web; or
   1.2. The length of the hole measured along the web, exceeds 10 inches (254 mm) or the depth of the web, whichever is greater.
2. Web holes not exceeding the dimensional requirements in Section ~~R505.2.5.3~~ R505.2.6.3, Item 1, shall be patched with a solid steel plate, stud section, or track section in accordance with Figure ~~R505.2.5.3~~ R505.2.6.3. The steel patch shall, as a minimum, be of the same thickness as the receiving member and shall extend at least 1 inch (25 mm) beyond all edges of the hole. The steel patch shall be fastened to the web of the receiving member with No. 8 screws spaced no more than 1 inch (25 mm) center-to-center along the edges of the patch with minimum edge distance of $^1/_2$ inch (13 mm).

FIGURE ~~R505.2.5.3~~ R505.2.6.3
FLOOR JOIST WEB HOLE PATCH

(Figure remains unchanged)

R505.3.1 Floor to foundation or load-bearing wall connections. Cold-formed steel framed floors shall be anchored to foundations, wood sills or load-bearing walls in accordance with Table R505.3.1(1) and Figure R505.3.1(1), R505.3.1(2), R505.3.1(3), R505.3.1(4), R505.3.1(5) or R505.3.1(6). Anchor bolts shall be located not more than 12 inches (305 mm) from corners or the termination of bottom tracks. Continuous cold-formed steel joists supported by interior load-bearing walls shall be constructed in accordance with Figure R505.3.1(7). Lapped cold-formed steel joists shall be constructed in accordance with Figure R505.3.1(8). End floor joists constructed on foundation walls parallel to the joist span shall be doubled unless a C-shaped bearing stiffener, sized in accordance with Section R505.3.4, is installed web-to-web with the floor joist beneath each supported wall stud, as shown in Figure R505.3.1(9). Fastening of cold-formed steel joists to other framing members shall be in accordance with Section ~~R505.2.4~~ R505.2.5 and Table R505.3.1(2).

TABLE R505.3.1(1)
FLOOR TO FOUNDATION OR BEARING WALL CONNECTION REQUIREMENTS[a, b]

FRAMING CONDITION	BASIC ULTIMATE WIND SPEED (mph) AND EXPOSURE	
	~~85~~110 mph Exposure Category C or less than ~~110~~139 mph Exposure Category B	Less than ~~110~~139 mph Exposure Category C
Floor joist to wall track of exterior wall per Figure R505.3.1(1)	2-No. 8 screws	3-No. 8 screws
Rim track or end joist to load-bearing wall top track per Figure R505.3.1(1)	1-No. 8 screw at 24 inches o.c.	1-No. 8 screw at 24 inches o.c.
Rim track or end joist to wood sill per Figure R505.3.1(2)	Steel plate spaced at 4 feet o.c. with 4-No. 8 screws and 4-10d or 6-8d common nails	Steel plate spaced at 2 feet o.c. with 4-No. 8 screws and 4-10d or 6-8d common nails
Rim track or end joist to foundation per Figure R505.3.1(3)	$^1/_2$ inch minimum diameter anchor bolt and clip angle spaced at 6 feet o.c. with 8-No. 8 screws	$^1/_2$ inch minimum diameter anchor bolt and clip angle spaced at 4 feet o.c. with 8-No. 8 screws
Cantilevered joist to foundation per Figure R505.3.1(4)	$^1/_2$ inch minimum diameter anchor bolt and clip angle spaced at 6 feet o.c. with 8-No. 8 screws	$^1/_2$ inch minimum diameter anchor bolt and clip angle spaced at 4 feet o.c. with 8-No. 8 screws
Cantilevered joist to wood sill per Figure R505.3.1(5)	Steel plate spaced at 4 feet o.c. with 4-No. 8 screws and 4-10d or 6-8d common nails	Steel plate spaced at 2 feet o.c. with 4-No. 8 screws and 4-10d or 6-8d common nails
Cantilevered joist to exterior load-bearing wall track per Figure R505.3.1(6)	2-No. 8 screws	3-No. 8 screws

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour – 0.447 m/s, 1 foot – 304.8 mm.

a. Anchor bolts are to be located not more than 12 inches from corners or the termination of bottom tracks (e.g, at door openings or corners). Bolts extend a minimum of 15 inches into masonry or 7 inches into concrete. Anchor bolts connecting cold-formed steel framing to the foundation structure are to be installed so that the distance from the center of the bolt hole to the edge of the connected member is not less than one and one-half bolt diameters.
b. All screw sizes shown are minimum.

R505.3.2 Minimum floor joist sizes. Floor joist size and thickness shall be determined in accordance with the limits set forth in Table R505.3.2~~(1)~~ for single or continuous spans ~~and Tables R505.3.2(2) and R505.3.2(3) for multiple spans.~~ When continuous joist members are used, the interior bearing supports shall be located within 2 feet (610 mm) of mid-span of the cold-formed steel joists, and the individual spans shall not exceed the spans in Table ~~R505.3.2(2) or R505.3.2(3), as applicable~~ R505.3.2. Floor joists shall have a bearing support length of not less than $1^1/_2$ inches (38 mm) for exterior wall supports and $3^1/_2$ inches (89 mm) for interior wall supports. Tracks shall be a minimum of 33 mils (0.84 mm) thick except when used as part of a floor header or trimmer in accordance with Section R505.3.8. Bearing stiffeners shall be installed in accordance with Section R505.3.4.

TABLE R505.3.2~~(1)~~
ALLOWABLE SPANS FOR COLD-FORMED STEEL JOISTS—
SINGLE OR CONTINUOUS SPANS[a, b, c, d, e]
~~33 ksi STEEL~~

JOIST DESIGNATION	30 PSF LIVE LOAD				40 PSF LIVE LOAD			
	Spacing (inches)				Spacing (inches)			
	12	16	19.2	24	12	16	19.2	24
550S162-33	11′-7″	10′-7″	9′-6″	8′-6″	10′-7″	9′-3″	8′-6″	7′-6″
550S162-43	12′-8″	11′-6″	10′-10″	10′-2″	11′-6″	10′-5″	9′-10″	9′-1″
550S162-54	13′-7″	12′-4″	11′-7″	10′-9″	12′-4″	11′-2″	10′-6″	9′-9″
550S162-68	14′-7″	13′-3″	12′-6″	11′-7″	13′-3″	12′-0″	11′-4″	10′-6″
~~550S162-97~~	~~16′-2″~~	~~14′-9″~~	~~13′-10″~~	~~12′-10″~~	~~14′-9″~~	~~13′-4″~~	~~12′-7″~~	~~11′-8″~~
800S162-33	15′-8″	13′-11″	12′-9″	11′-5″	14′-3″	12′-5″	11′-3″	9′-0″
800S162-43	17′-1″	15′-6″	14′-7″	13′-7″	15′-6″	14′-1″	13′-3″	12′-4″
800S162-54	18′-4″	16′-8″	15′-8″	14′-7″	16′-8″	15′-2″	14′-3″	13′-3″
800S162-68	19′-9″	17′-11″	16′-10″	15′-8″	17′-11″	16′-3″	15′-4″	14′-2″
~~800S162-97~~	~~22′-0″~~	~~20′-0″~~	~~16′-10″~~	~~17′-5″~~	~~20′-0″~~	~~18′-2″~~	~~17′-1″~~	~~15′-10″~~
1000S162-43	20′-6″	18′-8″	17′-6″	15′-8″	18′-8″	16′-11″	15′-6″	13′-11″
1000S162-54	22′-1″	20′-0″	18′-10″	17′-6″	20′-0″	18′-2″	17′-2″	15′-11″
1000S162-68	23′-9″	21′-7″	20′-3″	18′-10″	21′-7″	19′-7″	18′-5″	17′-1″
~~1000S162-97~~	~~26′-6″~~	~~24′-1″~~	~~22′-8″~~	~~21′-0″~~	~~24′-1″~~	~~21′-10″~~	~~20′-7″~~	~~19′-1″~~
1200S162-43	23′-9″	20′-10″	19′-0″	16′-8″	21′-5″	18′-6″	16′-6″	13′-2″
1200S162-54	25′-9″	23′-4″	22′-0″	20′-1″	23′-4″	21′-3″	20′-0″	17′-10″
1200S162-68	27′-8″	25′-1″	23′-8″	21′-11″	25′-1″	22′-10″	21′-6″	21′-1″
~~1200S162-97~~	~~30′-11″~~	~~28′-1″~~	~~26′-5″~~	~~24′-6″~~	~~28′-1″~~	~~25′-6″~~	~~24′-0″~~	~~22′-3″~~

For SI: 1 inch – 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Deflection criteria: *L*/480 for live loads, *L*/240 for total loads.
b. Floor dead load – 10 psf.
c. Table provides the maximum clear span in feet and inches.
d. Bearing stiffeners are to be installed at all support points and concentrated loads.
e. Minimum Grade 33 ksi steel shall be used for 33 mil and 43 mil thicknesses. Minimum Grade 50 ksi steel shall be used for 54 and 68 mil thicknesses.

~~TABLE R505.3.2(2)~~
~~ALLOWABLE SPANS FOR COLD-FORMED STEEL JOISTS—MULTIPLE SPANS[a, b, c, d, e, f] 33 ksi STEEL~~

~~JOIST DESIGNATION~~	~~30 PSF LIVE LOAD~~				~~40 PSF LIVE LOAD~~			
	~~Spacing (inches)~~				~~Spacing (inches)~~			
	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~
~~550S162-33~~	~~12′-1″~~	~~10′-5″~~	~~9′-6″~~	~~8′-6″~~	~~10′-9″~~	~~9′-3″~~	~~8′-6″~~	~~7′-6″~~
~~550S162-43~~	~~14′-5″~~	~~12′-5″~~	~~11′-4″~~	~~10′-2″~~	~~12′-9″~~	~~11′-11″~~	~~10′-1″~~	~~9′-0″~~
~~550S162-54~~	~~16′-3″~~	~~14′-1″~~	~~12′-10″~~	~~11′-6″~~	~~14′-5″~~	~~12′-6″~~	~~11′-5″~~	~~10′-2″~~
~~550S162-68~~	~~19′-7″~~	~~17′-9″~~	~~16′-9″~~	~~15′-6″~~	~~17′-9″~~	~~16′-2″~~	~~15′-2″~~	~~14′-1″~~
~~550S162-97~~	~~21′-9″~~	~~19′-9″~~	~~18′-7″~~	~~17′-3″~~	~~19′-9″~~	~~17′-11″~~	~~16′-10″~~	~~15′-4″~~
~~800S162-33~~	~~14′-8″~~	~~11′-10″~~	~~10′-4″~~	~~8′-8″~~	~~12′-4″~~	~~9′-11″~~	~~8′-7″~~	~~7′-2″~~
~~800S162-43~~	~~20′-0″~~	~~17′-4″~~	~~15′-9″~~	~~14′-1″~~	~~17′-9″~~	~~15′-4″~~	~~14′-0″~~	~~12′-0″~~
~~800S162-54~~	~~23′-7″~~	~~20′-5″~~	~~18′-8″~~	~~16′-8″~~	~~21′-0″~~	~~18′-2″~~	~~16′-7″~~	~~14′-10″~~
~~800S162-68~~	~~26′-5″~~	~~23′-1″~~	~~21′-0″~~	~~18′-10″~~	~~23′-8″~~	~~20′-6″~~	~~18′-8″~~	~~16′-9″~~
~~800S162-97~~	~~29′-6″~~	~~26′-10″~~	~~25′-3″~~	~~22′-8″~~	~~26′-10″~~	~~24′-4″~~	~~22′-6″~~	~~20′-2″~~
~~1000S162-43~~	~~22′-2″~~	~~18′-3″~~	~~16′-0″~~	~~13′-7″~~	~~18′-11″~~	~~15′-5″~~	~~13′-6″~~	~~11′-5″~~

~~JOIST DESIGNATION~~	~~30 PSF LIVE LOAD~~				~~40 PSF LIVE LOAD~~			
	~~Spacing (inches)~~				~~Spacing (inches)~~			
	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~
~~1000S162-54~~	~~26′-2″~~	~~22′-8″~~	~~20′-8″~~	~~18′-6″~~	~~23′-3″~~	~~20′-2″~~	~~18′-5″~~	~~16′-5″~~
~~1000S162-68~~	~~31′-5″~~	~~27′-2″~~	~~24′-10″~~	~~22′-2″~~	~~27′-11″~~	~~24′-2″~~	~~22′-1″~~	~~19′-9″~~
~~1000S162-97~~	~~35′-6″~~	~~32′-3″~~	~~29′-11″~~	~~26′-9″~~	~~32′-3″~~	~~29′-2″~~	~~26′-7″~~	~~23′-9″~~
~~1200S162-43~~	~~21′-8″~~	~~17′-6″~~	~~15′-3″~~	~~12′-10″~~	~~18′-3″~~	~~14′-8″~~	~~12′-8″~~	~~10′-6"~~
~~1200S162-54~~	~~28′-5″~~	~~24′-8″~~	~~22′-6″~~	~~19′-6″~~	~~25′-3″~~	~~21′-11″~~	~~19′-4″~~	~~16′-6″~~
~~1200S162-68~~	~~33′-7″~~	~~29′-1″~~	~~26′-6″~~	~~23′-9″~~	~~29′-10″~~	~~25′-10″~~	~~23′-7″~~	~~21′-1″~~
~~1200S162-97~~	~~41′-5″~~	~~37′-8″~~	~~34′-6″~~	~~30′-10″~~	~~37′-8″~~	~~33′-6″~~	~~30′-7″~~	~~27′-5″~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Deflection criteria: *L*/480 for live loads, *L*/240 for total loads.~~
~~b. Floor dead load = 10 psf.~~
~~c. Table provides the maximum clear span in feet and inches to either side of the interior support.~~
~~d. Interior bearing supports for multiple span joists consist of structural (bearing) walls or beams.~~
~~e. Bearing stiffeners are to be installed at all support points and concentrated loads.~~
~~f. Interior supports shall be located within 2 feet of mid-span provided that each of the resulting span does not exceed the appropriate maximum span shown in the table above.~~

~~TABLE R505.3.2(3)~~
~~ALLOWABLE SPANS FOR COLD-FORMED STEEL JOISTS—MULTIPLE SPANS~~[a, b, c, d, e, f] ~~50 ksi STEEL~~

~~JOIST DESIGNATION~~	~~30 PSF LIVE LOAD~~				~~40 PSF LIVE LOAD~~			
	~~Spacing (inches)~~				~~Spacing (inches)~~			
	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~
~~550S162-33~~	~~13′-11″~~	~~12′-0″~~	~~11′-0″~~	~~9′-3″~~	~~12′-3″~~	~~10′-8″~~	~~9′-7″~~	~~8′-4″~~
~~550S162-43~~	~~16′-3″~~	~~14′-1″~~	~~12′-10″~~	~~11′-6″~~	~~14′-6″~~	~~12′-6″~~	~~11′-5″~~	~~10′-3″~~
~~550S162-54~~	~~18′-2″~~	~~16′-6″~~	~~15′-4″~~	~~13′-8″~~	~~16′-6″~~	~~14′-11″~~	~~13′-7″~~	~~12′-2″~~
~~550S162-68~~	~~19′-6″~~	~~17′-9″~~	~~16′-8″~~	~~15′-6″~~	~~17′-9″~~	~~16′-1″~~	~~15′-2″~~	~~14′-0″~~
~~550S162-97~~	~~21′-9″~~	~~19′-9″~~	~~18′-6″~~	~~17′-2″~~	~~19′-8″~~	~~17′-10″~~	~~16′-8″~~	~~15′-8″~~
~~800S162-33~~	~~15′-6″~~	~~12′-6″~~	~~10′-10″~~	~~9′-1″~~	~~13′-0″~~	~~10′-5″~~	~~8′-11″~~	~~6′-9″~~
~~800S162-43~~	~~22′-0″~~	~~19′-1″~~	~~17′-5″~~	~~15′-0″~~	~~19′-7″~~	~~16′-11″~~	~~14′-10″~~	~~12′-8″~~
~~800S162-54~~	~~24′-6″~~	~~22′-4″~~	~~20′-6″~~	~~17′-11″~~	~~22′-5″~~	~~19′-9″~~	~~17′-11″~~	~~15′-10″~~
~~800S162-68~~	~~26′-6″~~	~~24′-1″~~	~~22′-8″~~	~~21′-0″~~	~~24′-1″~~	~~21′-10″~~	~~20′-7″~~	~~19′-2″~~
~~800S162-97~~	~~29′-9″~~	~~26′-8″~~	~~25′-2″~~	~~23′-5″~~	~~26′-8″~~	~~24′-3″~~	~~22′-11″~~	~~21′-4″~~
~~1000S162-43~~	~~23′-6″~~	~~19′-2″~~	~~16′-9″~~	~~14′-2″~~	~~19′-11″~~	~~16′-2″~~	~~14′-0″~~	~~11′-9″~~
~~1000S162-54~~	~~28′-2″~~	~~23′-10″~~	~~21′-7″~~	~~18′-11″~~	~~24′-8″~~	~~20′-11″~~	~~18′-9″~~	~~18′-4″~~
~~1000S162-68~~	~~31′-10″~~	~~28′-11″~~	~~27′-2″~~	~~25′-3″~~	~~28′-11″~~	~~26′-3″~~	~~24′-9″~~	~~22′-9″~~
~~1000S162-97~~	~~35′-4″~~	~~32′-1″~~	~~30′-3″~~	~~28′-1″~~	~~32′-1″~~	~~29′-2″~~	~~27′-6″~~	~~25′-6″~~
~~1200S162-43~~	~~22′-11″~~	~~18′-5″~~	~~16′-0″~~	~~13′-4″~~	~~19′-2″~~	~~15′-4″~~	~~13′-2″~~	~~10′-6″~~
~~1200S162-54~~	~~32′-8″~~	~~28′-1″~~	~~24′-9″~~	~~21′-2″~~	~~29′-0″~~	~~23′-10″~~	~~20′-11″~~	~~17′-9″~~
~~1200S162-68~~	~~37′-1″~~	~~32′-5″~~	~~29′-4″~~	~~25′-10″~~	~~33′-4″~~	~~28′-6″~~	~~25′-9″~~	~~22′-7″~~
~~1200S162-97~~	~~41′-2″~~	~~37′-6″~~	~~35′-3″~~	~~32′-9″~~	~~37′-6″~~	~~34′-1″~~	~~32′-1″~~	~~29′-9″~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Deflection criteria: *L*/480 for live loads, *L*/240 for total loads.~~
~~b. Floor dead load = 10 psf.~~
~~c. Table provides the maximum clear span in feet and inches to either side of the interior support.~~
~~d. Interior bearing supports for multiple span joists consist of structural (bearing) walls or beams.~~
~~e. Bearing stiffeners are to be installed at all support points and concentrated loads.~~
~~f. Interior supports shall be located within 2 feet of mid-span provided that each of the resulting span does not exceed the appropriate maximum span shown in the table above.~~

R505.3.3.1 Joist top flange bracing. The top flanges of cold-formed steel joists shall be laterally braced by the application of floor sheathing fastened to the joists in accordance with Section ~~R505.2.4~~ R505.2.5 and Table R505.3.1(2).

R505.3.4 Bearing stiffeners. Bearing stiffeners shall be installed at each joist bearing location in accordance with this section, except for joists lapped over an interior support not carrying a load-bearing wall above. Floor joists supporting jamb studs with multiple members shall have two bearing stiffeners in accordance with Figure R505.3.4(1). Bearing stiffeners shall be fabricated from a C-shaped, track or clip angle member in accordance with the one of following:

1. C-shaped bearing stiffeners:
   1.1. Where the joist is not carrying a load-bearing wall above, the bearing stiffener shall be a minimum 33 mil (0.84 mm) thickness.
   1.2. Where the joist is carrying a load-bearing wall above, the bearing stiffener shall be at least the same designation thickness as the wall stud above.
2. Track bearing stiffeners:
   2.1. Where the joist is not carrying a load-bearing wall above, the bearing stiffener shall be a minimum 43 mil (1.09 mm) thickness.
   2.2. Where the joist is carrying a load-bearing wall above, the bearing stiffener shall be at least one designation thickness greater than the wall stud above.
3. ~~Clip angle bearing stiffeners: Where the clip angle bearing stiffener is fastened to both the web of the member it is stiffening and an adjacent rim track using the fastener pattern shown in Figure R505.3.4(2), the bearing stiffener shall be a minimum 2 inch by 2 inch (51 mm by 51 mm) angle sized in accordance with Tables R505.3.4(1), R505.3.4(2), R505.3.4(3), and R505.3.4(4).~~

The minimum length of a bearing stiffener shall be the depth of member being stiffened minus $^3/_8$ inch (9.5 mm). Each bearing stiffener shall be fastened to the web of the member it is stiffening as shown in Figure R505.3.4(2). ~~Each clip angle bearing stiffener shall also be fastened to the web of the adjacent rim track using the fastener pattern shown in Figure R505.3.4(2)~~. No. 8 screws shall be used for C-shaped and track members of any thickness ~~and for clip angle members with a designation thickness less than or equal to 54. No. 10 screws shall be used for clip angle members with a designation thickness greater than 54~~.

~~TABLE R505.3.4(1)~~
~~CLIP ANGLE BEARING STIFFENERS~~
~~(20 psf equivalent snow load)~~

~~JOIST DESIGNATION~~	~~MINIMUM THICKNESS (mils) OF 2-INCH × 2-INCH (51 mm × 51 mm) CLIP ANGLE~~											
	~~Top floor~~				~~Bottom floor in 2 story Middle floor in 3 story~~				~~Bottom floor in 3 story~~			
	~~Joist spacing (inches)~~				~~Joist spacing (inches)~~				~~Joist spacing (inches)~~			
	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~
~~800S162-33~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~68~~	~~68~~	~~68~~	~~97~~	~~97~~	—
~~800S162-43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~54~~	~~68~~	~~68~~	~~97~~	~~97~~	~~97~~	~~97~~
~~800S162-54~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~68~~	~~68~~	~~68~~	~~97~~	~~97~~	—
~~800S162-68~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~68~~	~~54~~	~~97~~	~~97~~	—
~~800S162-97~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~97~~
~~1000S162-43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~68~~	~~97~~	~~97~~	~~97~~	—	—	—
~~1000S162-54~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~68~~	~~68~~	~~97~~	~~97~~	~~97~~	—	—
~~1000S162-68~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~68~~	~~97~~	~~97~~	~~97~~	—	—	—
~~1000S162-97~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~43~~	~~68~~	~~97~~	—
~~1200S162-43~~	~~43~~	~~54~~	~~54~~	~~54~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—
~~1200S162-54~~	~~54~~	~~54~~	~~54~~	~~54~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—

JOIST DESIGNATION	MINIMUM THICKNESS (mils) OF 2-INCH × 2-INCH (51 mm × 51 mm) CLIP ANGLE											
	Top floor				Bottom floor in 2 story Middle floor in 3 story				Bottom floor in 3 story			
	Joist spacing (inches)				Joist spacing (inches)				Joist spacing (inches)			
	12	16	19.2	24	12	16	19.2	24	12	16	19.2	24
1200S162-68	43	43	54	54	68	97	97	97	—	—	—	—
1200S162-97	43	43	43	43	43	54	68	97	97	—	—	—

~~For SI: 1 mil = 0.254 mm, 1 inch = 25.4 mm, 1 pound per square foot = 0.0479~~

~~TABLE R505.3.4(2)~~
~~CLIP ANGLE BEARING STIFFENERS~~
~~(30 psf equivalent snow load)~~

JOIST DESIGNATION	MINIMUM THICKNESS (mils) OF 2-INCH × 2 INCH (51 mm × 51 mm) CLIP ANGLE											
	Top floor				Bottom floor in 2 story Middle floor in 3 story				Bottom floor in 3 story			
	Joist spacing (inches)				Joist spacing (inches)				Joist spacing (inches)			
	12	16	19.2	24	12	16	19.2	24	12	16	19.2	24
800S162-33	43	43	43	43	54	68	68	97	97	97	97	—
800S162-43	43	43	43	54	68	68	68	97	97	97	97	—
800S162-54	43	43	43	43	54	68	68	97	97	97	—	—
800S162-68	43	43	43	43	43	54	68	97	68	97	97	—
800S162-97	43	43	43	43	43	43	43	43	43	43	68	97
1000S162-43	54	54	54	54	68	97	97	97	97	—	—	—
1000S162-54	54	54	54	54	68	97	97	97	97	—	—	—
1000S162-68	43	43	54	68	68	97	97	—	97	—	—	—
1000S162-97	43	43	43	43	43	43	54	68	54	97	—	—
1200S162-43	54	68	68	68	97	97	97	—	—	—	—	—
1200S162-54	68	68	68	68	97	97	—	—	—	—	—	—
1200S162-68	68	68	68	68	97	97	97	—	—	—	—	—
1200S162-97	43	43	43	43	54	68	97	—	97	—	—	—

~~For SI: 1 mil = 0.254 mm, 1 inch = 25.4 mm, 1 pound per square foot = 0.0479~~

~~TABLE R505.3.4(3)~~
~~CLIP ANGLE BEARING STIFFENERS (50 psf equivalent snow load)~~

JOIST DESIGNATION	MINIMUM THICKNESS (mils) OF 2-INCH × 2-INCH (51 mm × 51 mm) CLIP ANGLE											
	Top floor				Bottom floor in 2 story Middle floor in 3 story				Bottom floor in 3 story			
	Joist spacing (inches)				Joist spacing (inches)				Joist spacing (inches)			
	12	16	19.2	24	12	16	19.2	24	12	16	19.2	24
800S162-33	54	54	54	54	68	97	97	97	97	—	—	—
800S162-43	68	68	68	68	97	97	97	97	—	—	—	—
800S162-54	54	68	68	68	97	97	97	97	—	—	—	—
800S162-68	43	43	54	54	68	97	97	97	97	—	—	—
800S162-97	43	43	43	43	43	43	43	54	54	68	97	—
1000S162-43	97	68	68	68	97	97	97	97	—	—	—	—

~~JOIST DESIGNATION~~	~~MINIMUM THICKNESS (mils) OF 2-INCH × 2-INCH (51 mm × 51 mm) CLIP ANGLE~~											
	~~Top floor~~				~~Bottom floor in 2 story Middle floor in 3 story~~				~~Bottom floor in 3 story~~			
	~~Joist spacing (inches)~~				~~Joist spacing (inches)~~				~~Joist spacing (inches)~~			
	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~
~~1000S162-54~~	~~97~~	~~97~~	~~68~~	~~68~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—
~~1000S162-68~~	~~68~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—
~~1000S162-97~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~68~~	~~97~~	~~97~~	—	—	—	—
~~1200S162-43~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—	—
~~1200S162-54~~	—	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—	—
~~1200S162-68~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—	—
~~1200S162-97~~	~~54~~	~~68~~	~~68~~	~~97~~	~~97~~	—	—	—	—	—	—	—

~~For SI: 1 mil = 0.254 mm, 1 inch = 25.4 mm, 1 pound per square foot = 0.0479~~

~~TABLE R505.3.4(4)~~
~~CLIP ANGLE BEARING STIFFENERS~~
~~(70 psf equivalent snow load)~~

~~JOIST DESIGNATION~~	~~MINIMUM THICKNESS (mils) OF 2-INCH × 2-INCH (51 mm × 51 mm) CLIP ANGLE~~											
	~~Top floor~~				~~Bottom floor in 2 story Middle floor in 3 story~~				~~Bottom floor in 3 story~~			
	~~Joist spacing (inches)~~				~~Joist spacing (inches)~~				~~Joist spacing (inches)~~			
	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~	~~12~~	~~16~~	~~19.2~~	~~24~~
~~800S162-33~~	~~68~~	~~68~~	~~68~~	~~68~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—
~~800S162-43~~	~~97~~	~~97~~	~~97~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—
~~800S162-54~~	~~97~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—
~~800S162-68~~	~~68~~	~~68~~	~~68~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—
~~800S162-97~~	~~43~~	~~43~~	~~43~~	~~43~~	~~43~~	~~54~~	~~68~~	~~97~~	~~97~~	~~97~~	—	—
~~1000S162-43~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—	—
~~1000S162-54~~	—	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—	—
~~1000S162-68~~	~~97~~	~~97~~	—	—	—	—	—	—	—	—	—	—
~~1000S162-97~~	~~68~~	~~68~~	~~68~~	~~68~~	~~97~~	~~97~~	—	—	—	—	—	—
~~1200S162-43~~	~~97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—	—
~~1200S162-54~~	—	—	—	—	—	—	—	—	—	—	—	—
~~1200S162-68~~	—	—	—	—	—	—	—	—	—	—	—	—
~~1200S162-97~~	~~97~~	~~97~~	~~97~~	—	—	—	—	—	—	—	—	—

~~For SI: 1 mil 0.0254 mm, 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.~~

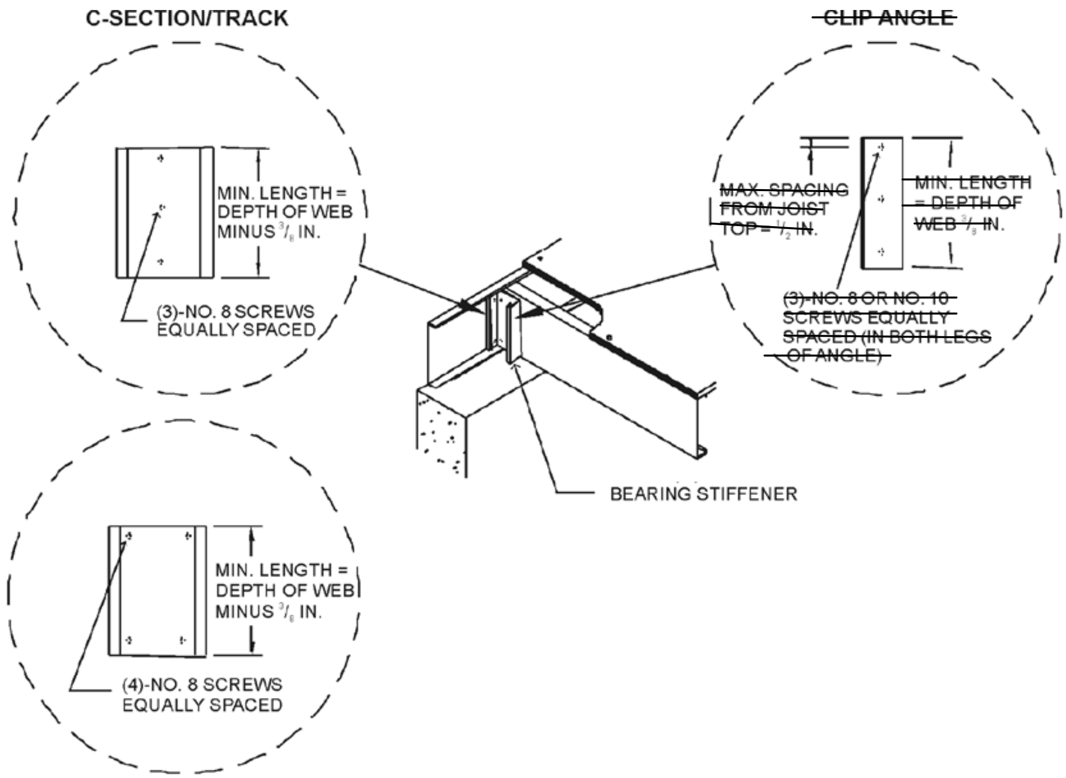


FIGURE R505.3.4(2)
BEARING STIFFENER

Revise as follows:

M1308.1 Drilling and notching. Wood-framed structural members shall be drilled, notched or altered in accordance with the provisions of Sections R502.8, R602.6, R602.6.1 and R802.7. Holes in load-bearing members of cold-formed steel light-frame construction shall be permitted only in accordance with Sections ~~R505.2.5~~ R505.2.6, R603.2.5 and R804.2.5. In accordance with the provisions of Sections R505.3.5, R603.3.4 and R804.3.4, cutting and notching of flanges and lips of load-bearing members of cold-formed steel light frame construction shall not be permitted. Structural insulated panels (SIPs) shall be drilled and notched or altered in accordance with the provisions of Section R613.7.

Revise as follows:

M2101.6 Drilling and notching. Wood-framed structural members shall be drilled, notched or altered in accordance with the provisions of Sections R502.8, R602.6, R602.6.1 and R802.7. Holes in load bearing members of cold-formed steel light-frame construction shall be permitted only in accordance with Sections ~~R505.2.5~~ R505.2.6, R603.2.5 and R804.2.5. In accordance with the provisions of Sections R505.3.5, R603.3.4 and R804.3.4, cutting and notching of flanges and lips of load-bearing members of cold-formed steel light frame construction shall not be permitted. Structural insulated panels (SIPs) shall be drilled and notched or altered in accordance with the provisions of Section R613.

Revise as follows:

P2603.2 Drilling and notching. Wood-framed structural members shall not be drilled, notched or altered in any manner except as provided in Sections R502.8, R602.6, R802.7 and R802.7.1. Holes in load-bearing members of cold-formed steel light-frame construction shall be permitted only in accordance with Sections ~~R505.2.5~~ R505.2.6, R603.2.5 and R804.2.5. In accordance with the provisions in Sections R505.3.5, R603.3.4 and R804.3.4, cutting and notching of flanges and lips of load-bearing members of cold-formed steel light frame construction shall not be permitted. Structural insulated panels (SIPs) shall be drilled and notched or altered in accordance with the provisions of Section R613.7.

Reason: This proposal is one in a series intended to both update and streamline the cold-formed steel (CFS) light frame construction provisions of the IRC. The revisions are based upon recommendations made by the AISI Committee on Framing Standards (COFS) Prescriptive Methods Subcommittee, which is responsible for the requirements' base document -- AISI S230, *Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings.* For the most part, the changes are editorial in nature and work to focus the cold-formed steel solutions presented in the IRC on the most popular and readily available options. The changes also align the cold-formed steel provisions with the latest reference standards, including AISI S230-07 w/S3-12, *Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings,* 2007, with Supplement 3, 2012.

Changes specific to Section R505 include the following:

- **R505:** Title correction.
- **R505.1**: The wind speeds are updated to reflect "ultimate" design wind speeds from ASCE 7-10 and editorial adjustments are made to the language. The design wind speeds are changed based upon the following direct conversion table, which was incorporated into AISI S230-07 w/S3-12:

ASCE 7-10 Wind Speed (mph)	110	115	126	139	152	164	177	190
AISI S230 Wind Speed (mph)	85	90	100	110	120	130	140	150

- **R505.2:** Requirements are relocated to new Section R505.2.3, which is specific to dimension, thickness and material grade.
- **R505.2.1:** The references to ASTM A653 and ASTM A792 are deleted. Since these materials are included under ASTM A1003, they do not need to be repeated in this section.
- **R505.2.2:** The corrosion protection requirements are relocated from Section R505.2.3 for better flow in section.
- **R505.2.3:** Requirements from Section R505.2 are relocated into new section on dimension, thickness and material grade and Table R505.2(1) and Table R505.2(2) are combined into new Table R505.2.3. The minimum flange width, maximum flange width, and minimum lip size are moved into the charging language for the table, since these properties do not vary based upon the member designation. Also, to further streamline the provisions, the most popular and readily available grade-thickness combinations are retained and the less popular and readily available grade-thickness combinations are removed. For Grade 33 ksi steel, 33 and 43 mil thicknesses are specified; while, for Grade 50 ksi steel, 54 mil and 68 mil thicknesses are specified. This language is added to Section R505.2.3. Finally, the reference to 97 mil product is deleted. It is very uncommon in residential construction, and, if need be, the user can still use AISI S230, where solutions include 97 mil product.
- **R505.2.5:** The title is fixed to match others in section and the screw substitution factor is eliminated. This is seldom used in prescriptive design and adds complexity to the provisions.
- **Figure R505.2.6.3:** Title correction.
- **Table R505.3.1(1):** The wind speeds are updated to reflect "ultimate" design wind speeds from ASCE 7-10 and editorial corrections are made to column titles.
- **R505.3.2**: The multi-span joist tables are deleted from the IRC – Tables R505.3.2(2) and R505.3.2(3). These add volume and complexity, but do not provide significant improvement over the single-span tables. Rather, the single span table, Table R505.3.2, can be used conservatively for continuous spans. If the user wants, they can go to AISI S230 for a multi-span solution. To be consistent with changes in other sections, Table R505.3.2 now applies to both Grade 33 ksi and Grade 50 ksi. For Grade 33 ksi steel, 33 and 43 mil thicknesses are specified; while, for Grade 50 ksi steel, 54 mil and 68 mil thicknesses are specified. This language is added to a new table note. Please note that, while Grade 50 ksi steel is now required for 54 mil and 68 mil product, no changes are made to the allowable span spacing, thus resulting in additional conservatism. Also, the reference to 97 mil product is deleted.
- **R505.3.4:** The option for clip angle bearing stiffeners is deleted, including Tables R505.3.4(1) through R505.3.4(4) and the clip angle option shown in Figure R505.3.4(2). The option is quite limited in its application after references to the 97 mil product are removed. The user can go to AISI S230, if they want to utilize clip angle bearing stiffeners.
- **M1308.1, M2101.6, and P2603.2**: Cross-references are updated in each of these sections.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB258-13 **AS**

Code Change No: RB259-13

Original Proposal

Section(s): R506.2.2

Proponent: Stephen S. Szoke, P.E./Portland Cement Association/Portland Cement Association

Revise as follows:

R506.2.2 Base. A 4-in. thick (102 mm) base course consisting of clean graded sand, gravel, crushed stone, crushed concrete, or crushed blast furnace slag passing a 2-inch (51 mm) sieve shall be placed on the prepared subgrade when the slab is below grade.

> **Exception:** A base course is not required when the concrete slab is installed on well-drained or sand-gravel mixture soils classified as Group I according to the United Soil Classification System in accordance with Table R405.1.

Reason: Concrete is commonly recycled by crushing the concrete for use as aggregate. The aggregate is sometimes used in new concrete, but the most use of this aggregate formed from crushed concrete is for base materials. The use of crushed concrete as base material for slab on ground construction is permitted in American Concrete Institute 332 *Residential Code Requirements for Structural Concrete* and is cited as an acceptable practice in the commentary of the ICC *International Green Construction Code* commentary. However, since crushed concrete is not specifically cited in the IRC several building code departments have resisted the use of crushed concrete as base material for slab on ground construction. This change specifically adds crushed concrete to the list of acceptable materials and helps assure that this sustainable building practice, the use of crushed concrete in lieu of virgin aggregates, is permissible in the IRC.

Cost Impact: This change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change permits recycled concrete to be used as aggregate and is consistent with industry practice.

Assembly Action: **None**

Final Hearing Results

RB259-13	**AS**

Code Change No: RB260-13

Original Proposal

Section(s): R507.2.3

Proponent: Hoyt D Jeter, Eagle Eye Consulting Engineers, representing Washington Association of Building Officials Technical Code Development Committee (hoytjeter@centurytel.net)

Revise as follows:

R507.2.3 Deck lateral load connection. The lateral load connection required by Section R507.1 shall be permitted to be in accordance with Figure R507.2.3. Where the lateral load connection is provided in accordance with Figure 507.2.3, hold-down tension devices shall be installed in not less than two locations per deck, <u>within 24" of each end of the deck</u> .Each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N).

Reason: Currently the IRC does not specify where the hold-down connection devices must be placed. The purpose of this code change is to provide clear guidance as to where to locate the lateral load hold-down devices for decks. To maximize the efficiency of the hold downs they should be placed as far apart as possible near the ends of the deck. Deck joist framing typically is not spaced greater than 24" on center so 24 " was selected as the upper limit to place these hold downs.

Cost Impact: The code change proposal will not increase the cost of construction, it will decrease the cost.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change adds direction for the location of the hold-down device relative to the end of the deck.

Assembly Action: **None**

Final Hearing Results

RB260-13	**AS**

Code Change No: RB262-13

Original Proposal

Section(s): R507.2.3, Figure R507.2.3(2) (NEW)

Proponent: Hoyt Jeter, Eagle Eye Consulting Engineers, representing Washington Association of Building Officials Technical Code Development Committee (hoytjeter@centurytel.net)

Revise as follows:

R507.2.3 Deck lateral load connection. The lateral load connection required by Section R507.1 shall be permitted to be in accordance with Figures R507.2.3(1) or R507.2.3(2). Where the lateral load connection is provided in accordance with Figure 507.2.3(1), hold-down tension devices shall be installed in not less than two locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N). Where the lateral load connections is provided in accordance with Figure R507.2.3(2), the hold-down tension devices shall be installed in not less than 4 locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds (3336 N).

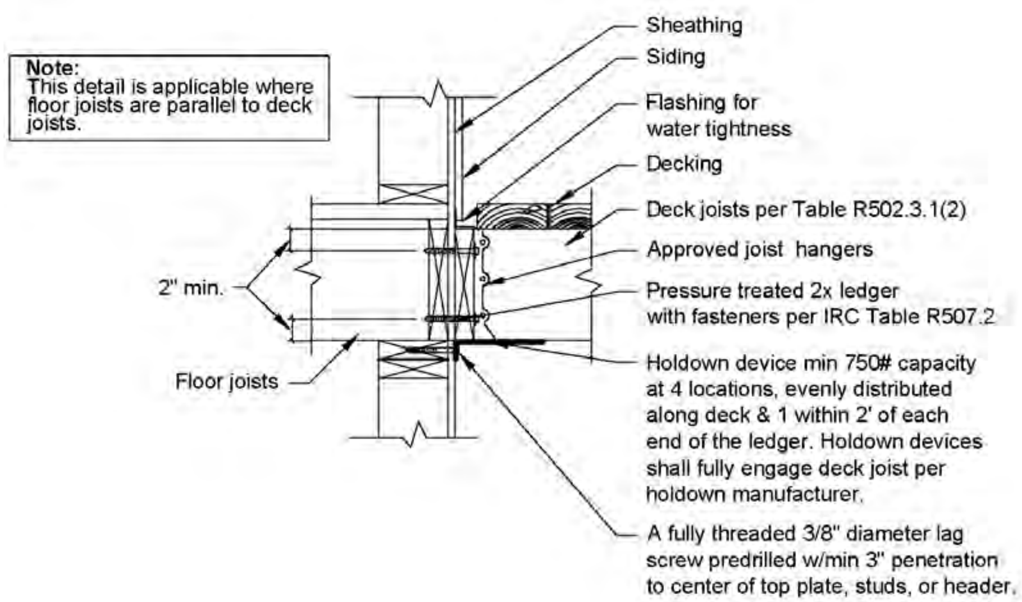


FIGURE R507.2.3(2)

Reason: This proposal provides an alternative prescriptive method to achieve an acceptable lateral load connection for residential decks. For new or replacement decks on existing homes, builders or homeowners must often remove interior sheet rock on ceilings in order to install hold-down tension devices as required by Figure 507.2.3. This proposal achieves an acceptable lateral load connection between the deck and primary structure by permitting the installation of surface mounted hold-down connection devices spread out along the length of the ledger and precludes the need to make expensive and unnecessary ceiling repairs.

Typical deck failures occur because joists separate from the joist-hangers which are fastened to the ledger. This is due to the lack of an adequate tension connection between the joist and the hanger at this joint. This proposal provides a better connection between at least 4 joists and the primary structure thereby reducing the potential failure of the joist to joist-hanger connection and better support form complete collapse of the deck and will reduce the chance of injury.

Cost Impact: The code change proposal will not increase the cost of construction, it will decrease the cost.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Public Comments

Public Comment 2:

Glenn Mathewson, MCP, City of Westminster, CO, representing North American Deck and Railing Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R507.2.3 Deck lateral load connection. The lateral load connection required by Section R507.1 shall be permitted to be in accordance with Figures R507.2.3(1) or R507.2.3(2). Where the lateral load connection is provided in accordance with Figure 507.2.3(1), hold-down tension devices shall be installed in not less than two locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N). Where the lateral load connections is provided in accordance with Figure R507.2.3(2), the hold-down tension devices shall be installed in not less than 4 locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds (3336 N).

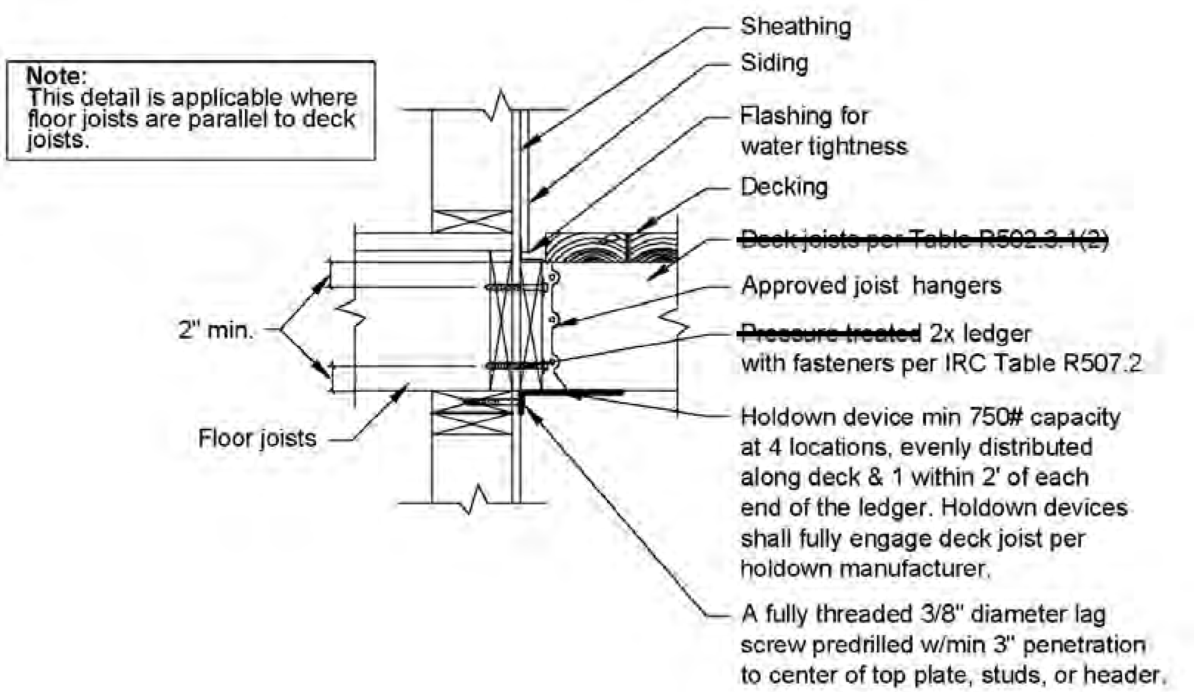


FIGURE R507.2.3(2)

Final Hearing Results

RB262-13 **AMPC2**

Code Change No: RB264-13

Original Proposal

Section(s): R507.1, R507.4 (NEW), R507.5 (NEW), Figure R507.5 (NEW), Table R507.5 (NEW), R507.5.1, R507.6, Figure R507.6 (NEW), Table R507.6 (NEW), R507.7 (NEW), R507.8 (NEW), R507.8.1 (NEW), Figure R507.8.1 (NEW), R507.8.2 (NEW), Figure R507.8.2 (NEW)

Proponent: Brian Foley, P.E. Fairfax County, VA, representing Virginia Building and Code Officials Association (brian.foley@fairfaxcounty.gov), Glenn Mathewson, M.C.P., North American Deck and Railing Association, Randy Shackleford, P.E., Simpson Strong-Tie

Revise as follows:

R507.1 Decks. Wood decks shall be in accordance with this section. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. For decks with cantilevered framing members, connections to exterior walls or other framing members, shall be designed and constructed to resist uplift resulting from the full live load specified in Table R301.5 acting on the cantilevered portion of the deck. The use of other grades, species, loading, materials and conditions not described herein shall be permitted be in accordance with Section R301.

R507.4 Decking. Wood decking shall be at least a nominal 2-inch (51 mm) in thickness and placed at an angle between 45 and 90 degrees to deck joists spaced a maximum of 24-inches (610 mm) on-center. Wood decking shall be attached to each supporting member with a minimum of (2)8d threaded nails or (2)#8 wood screws.

Exceptions:

1. Wood decking with a minimum nominal thickness of 1 $^1/_4$ inches (32 mm) shall be permitted to be installed at 90 degrees to deck joists spaced a maximum of 24 inches (610 mm) on center and not less than 45 degrees to deck joists spaced a maximum of 16 inches (406 mm) on center.
2. Wood/plastic composite decking in accordance with Section R507.3.

R507.5 Allowable deck joist spans. Spans for wood deck joists, as shown in Figure R507.5, shall be in accordance with Table R507.5. Deck joist shall be permitted to cantilever a maximum of one-fourth of the joist span.

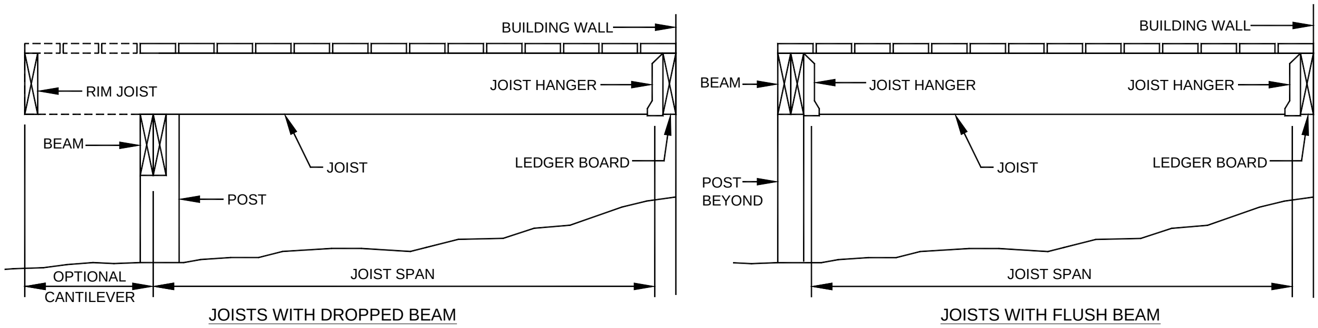


FIGURE R507.5
TYPICAL DECK JOIST SPANS

TABLE R507.5
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft.-in.)

SPECIES[a]	SIZE	SPACING OF DECK JOISTS WITH NO CANTILEVER[b] (in.)			SPACING OF DECK JOISTS WITH CANTILEVERS[c] (in.)		
		12	16	24	12	16	24
Southern pine	2 x 6	10-4	9-5	7-10	7-1	7-1	7-1
	2 x 8	13-8	12–5	10–2	10-9	10-9	10-2
	2 x 10	17-5	15–10	13–1	15-6	15-6	13-1
	2 x 12	18-0	18–0	15-5	18-0	18-0	15-5
Douglas fir-larch[d], hem-fir[d] spruce-pine-fir[d]	2 x 6	9-6	8-8	7-2	6-3	6-3	6-3
	2 x 8	12-6	11–1	9-1	9-5	9-5	9-1
	2 x 10	15-8	13–7	11-1	13-7	13-7	11-1
	2 x 12	18-0	15–9	12-10	18-0	15-9	12-10
Redwood, western cedars, ponderosa pine[e], red pine[e]	2 x 6	8-10	8-0	7-0	5-7	5-7	5-7
	2 x 8	11-8	10–7	8-8	8-6	8-6	8-6
	2 x 10	14-11	13–0	10-7	12-3	12-3	10-7
	2 x 12	17-5	15-1	12-4	16-5	15-1	12-4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. No. 2 grade with wet service factor.
b. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360.
c. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220 pound point load applied to end.
d. Includes incising factor.
e. Northern species with no incising factor

R507.5.1 Lateral restraint at supports. Joist ends and bearing locations shall be provided with lateral restraint to prevent rotation. Where lateral restraint is provided by joist hangers or blocking between joists, their depth shall equal not less than 60 percent of the joist depth. Where lateral restraint is provided by rim joists, they shall be secured to the end of each joist with a minimum of (3)10d threaded nails or (3)#10x3 inch (76 mm) long wood screws.

R507.6 Deck Beams. Spans for deck beams, as shown in Figure R507.6, shall be in accordance with Table R507.6. Beam plies shall be fastened with two rows of 10d threaded nails minimum at 16 inches (406 mm) on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the beam span. Splices of multi-span beams shall be located at interior post locations.

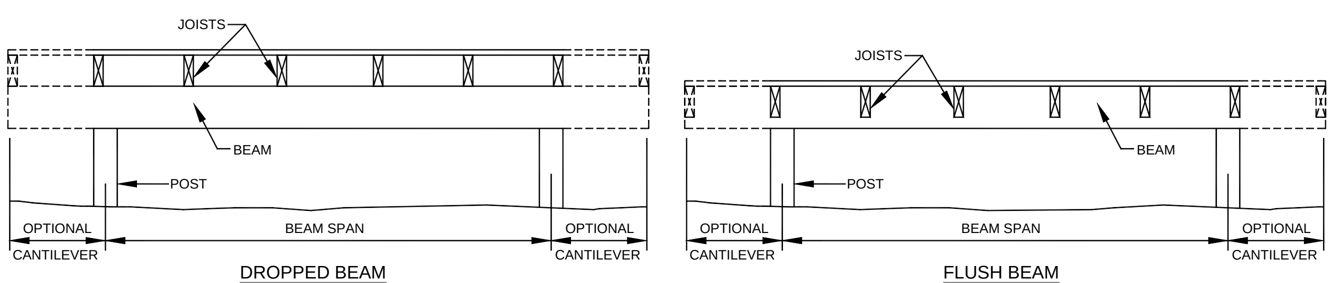


FIGURE R507.6

TYPICAL DECK BEAM SPANS

TABLE R507.6
DECK BEAM SPAN LENGTHS (ft.-in.)[a, b]

SPECIES[c]	SIZE[d]	DECK JOIST SPAN (ft.) LESS THAN OR EQUAL TO:						
		6	8	10	12	14	16	18
Southern pine	2-2x6	7-1	6-2	5-6	5-0	4-8	4-4	4-1
	2-2x8	9-2	7-11	7-1	6-6	6-0	5-7	5-3
	2-2x10	11-10	10-3	9-2	8-5	7-9	7-3	6-10
	2-2x12	13-11	12-0	10-9	9-10	9-1	8-6	8-0
	3-2x6	8-7	7-8	6-11	6-3	5-10	5-5	5-2
	3-2x8	11-4	9-11	8-11	8-1	7-6	7-0	6-7
	3-2x10	14-5	12-10	11-6	10-6	9-9	9-1	8-7
	3-2x12	17-5	15-1	13-6	12-4	11-5	10-8	10-1
Douglas fir-larch[e], hem-fir[e], spruce-pine-fir[e], redwood, western cedars, ponderosa pine[f], red pine[f]	3x6 or2-2x6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3x8 or 2-2x8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3x10 or 2-2x10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3x12 or 2-2x12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4x6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4x8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4x10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4x12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3-2x6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3-2x8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3-2x10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3-2x12	13-11	12-1	10-9	9-10	9-1	8-6	8-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

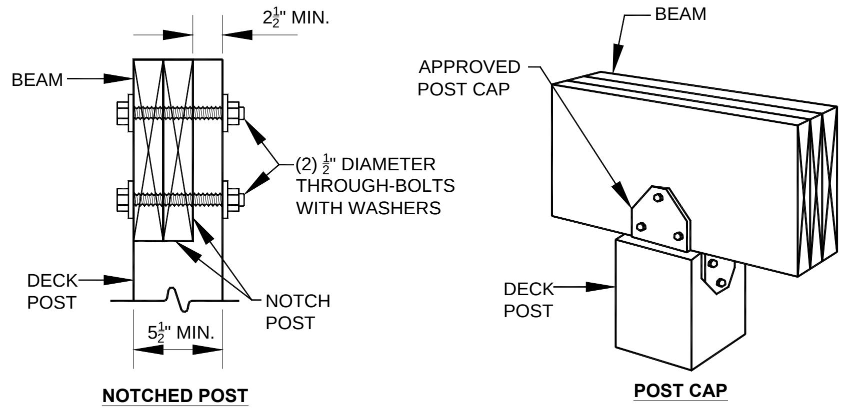
a. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220 pound point load applied at the end.
b. Beams supporting deck joists from one side only.
c. No 2 grade, wet service factor.
d. Beam depth shall be greater than or equal to depth of joists with a flush beam condition.
e. Includes incising factor.
f. Northern species with no incising factor.

R507.7 Deck joist and deck beam bearing. The ends of each joist and beam shall have not less than 1.5 inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on concrete or masonry for the entire width of the beam. Joist framing into the side of a ledger board or beam shall be supported by approved joist hangers. Beam bearing at deck posts shall be in accordance with Section R507.8.1.

R507.8 Deck posts. For single level wood decks with beams sized in accordance with Table R507.6, posts shall be a minimum nominal 6x6 with a maximum height of 14 feet (5486 mm) measured to the underside of the beam.

Exception: Nominal 4x4 or 4x6 posts shall be permitted with a maximum height of 8 feet (2438 mm).

R507.8.1 Deck post to deck beam. Deck beams shall be attached to deck posts in accordance with Figure R507.8.1. Post to beam connections shall be constructed to resist lateral displacement. Manufactured post-to-beam connectors shall be sized for the post and beam sizes. All bolts shall have washers under the head and nut.



For SI: 1 inch = 25.4 mm

FIGURE R507.8.1
DECK BEAM TO DECK POST

R507.8.2 Deck post to deck footing. Posts shall bear on footings in accordance with Section R403 and Figure R507.8.2.

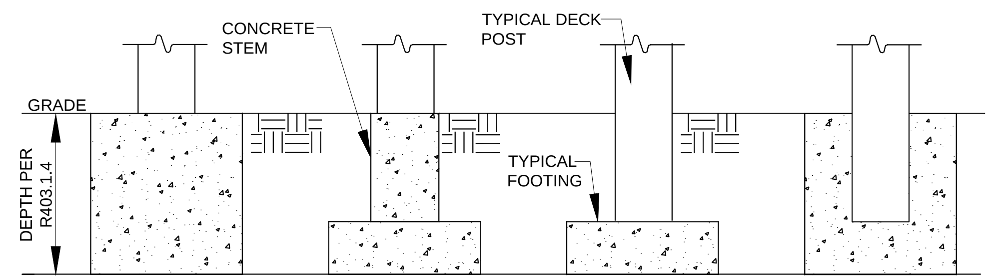


FIGURE R507.8.2
TYPICAL DECK POSTS TO DECK FOOTINGS

Reason: Wood decks are the most prolific structure to be constructed to a residential dwelling, yet there is very little guidance in the IRC regarding the structural capacity of the joists, beams and posts. The existing span tables in Chapter 5 do not address wood decks due to the differences in their design considerations. Some builders and code officials often rely on span tables developed by AHJs or the DCA6 published by the American Wood Council, while others have nothing to refer to.

With the permission of the American Wood Council, we have provided in this proposal their span tables for typical joists and beams and height requirements for typical posts based on the most common wood species and grade used throughout the country. Attachment and bearing requirements are also provided to give the user guidance on how these elements connect. With the existing provisions already in Section 507, the IRC user would be able to design and construct a safe wood deck.

Careful attention was given to ensure these new provisions did not and could not deter the construction of decks composed of other materials and in different configurations and conditions.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt this proposal needs reworking and brought back. There is no criteria for the threaded nails. Language is unclear. There is no provision for the deck post to footing to be raised above grade for moisture protection.

Assembly Action: **None**

Public Comments

Public Comment 2:

Glenn Mathewson, Westminster, CO, representing North American Deck and Railing Association (NADRA) requests Approval as Modified by this Public Comment.

Modify the proposal as follows

R507.1 Decks. Wood-framed decks shall be in accordance with this section or Section R301 for materials and conditions not prescribed herein. . Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. For decks with cantilevered framing members, connections to exterior walls or other framing members, shall be designed and constructed to resist uplift resulting from the full live load specified in Table R301.5 acting on the cantilevered portion of the deck. ~~The use of other grades, species, loading, materials and conditions not described herein shall be permitted be in accordance with Section R301.~~

R507.4 Decking. Maximum allowable spacing for joists supporting ~~wood~~ decking shall be in accordance with Table R507.4. ~~at least a nominal 2-inch (51 mm) in thickness and placed at an angle between 45 and 90 degrees to deck joists spaced a maximum of 24-inches (610 mm) on-center.~~ Wood decking shall be attached to each supporting member with a minimum of (2)8d nails or (2)#8 wood screws.

~~**Exceptions:**~~

~~3. Wood decking with a minimum nominal thickness of 5/4 inches (32 mm) shall be permitted to be installed at 90 degrees to deck joists spaced a maximum of 24 inches (610 mm) on center and not less than 45 degrees to deck joists spaced a maximum of 16 inches (406 mm) on center.~~

~~4. Wood/plastic composite decking in accordance with Section R507.3.~~

Table R507.4
Maximum joist spacing

Material type and nominal size	Maximum on-center joist spacing	
	Perpendicular to joist	Diagonal to joist[a]
5/4-inch thick wood	16 inches	12 inches
2-inch thick wood	24 inches	16 inches
Plastic composite	Per R507.3	Per R507.3

For SI: 1 inch = 25.4 mm
a. Maximum angle of 45 degrees from perpendicular for wood deck boards

R507.5 ~~**Allowable**~~ **Deck joists** ~~**spans.**~~ Maximum allowable spans for wood deck joists, as shown in Figure R507.5, shall be in accordance with Table R507.5. Deck joist shall be permitted to cantilever a maximum of one-fourth of the actual, adjacent joist span.

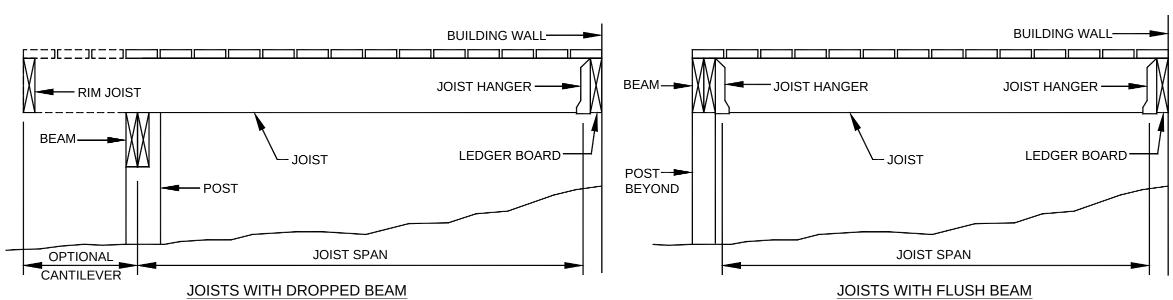


FIGURE R507.5
TYPICAL DECK JOIST SPANS

TABLE R507.5
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft.-in.)

SPECIES[a]	SIZE	SPACING OF DECK JOISTS WITH NO CANTILEVER[b, f] (in.)			SPACING OF DECK JOISTS WITH CANTILEVERS[c] (in.)		
		12	16	24	12	16	24
Southern pine	2 x 6	~~10-4~~ 9-11	~~9-5~~ 9-0	~~7-10~~ 7-7	~~7-1~~ 6-8	~~7-1~~ 6-8	~~7-1~~ 6-8
	2 x 8	~~13-8~~ 13-1	~~12-5~~ 11-10	~~10-2~~ 9-8	~~10-9~~ 10-1	~~10-9~~ 10-1	~~10-2~~ 9-8
	2 x 10	~~17-5~~ 16-2	~~15-10~~ 14-0	~~13-1~~ 11-5	~~15-6~~ 14-6	~~15-6~~ 14-0	~~13-1~~ 11-5

	2 x 12	18-0	~~18–0~~ 16-6	~~15-5~~ 13-6	18-0	~~18-0~~ 16-6	~~15-5~~ 13-6
Douglas fir-larch[d], hem-fir[d] spruce-pine-fir[d]	2 x 6	9-6	8-8	7-2	6-3	6-3	6-3
	2 x 8	12-6	11–1	9-1	9-5	9-5	9-1
	2 x 10	15-8	13–7	11-1	13-7	13-7	11-1
	2 x 12	18-0	15–9	12-10	18-0	15-9	12-10
Redwood, western cedars, ponderosa pine[e], red pine[e]	2 x 6	8-10	8-0	7-0	5-7	5-7	5-7
	2 x 8	11-8	10–7	8-8	8-6	8-6	8-6
	2 x 10	14-11	13–0	10-7	12-3	12-3	10-7
	2 x 12	17-5	15-1	12-4	16-5	15-1	12-4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. No. 2 grade with wet service factor.
b. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360.
c. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220 pound point load applied to end.
d. Includes incising factor.
e. Northern species with no incising factor
f. Cantilevered spans not exceeding the nominal depth of the joist are permitted.

R507.5.1 Lateral restraint at supports. Joist ends and bearing locations shall be provided with lateral restraint to prevent rotation. Where lateral restraint is provided by joist hangers or blocking between joists, their depth shall equal not less than 60 percent of the joist depth. Where lateral restraint is provided by rim joists, they shall be secured to the end of each joist with a minimum of (3) 10d (3” x 0.128”) ~~threaded~~ nails or (3) #10x3 inch (76 mm) long wood screws.

R507.6 Deck Beams. Maximum allowable spans for wood deck beams, as shown in Figure R507.6, shall be in accordance with Table R507.6. Beam plies shall be fastened with two rows of 10d (3” 0.128”) ~~threaded~~ nails minimum at 16 inches (406 mm) on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the actual beam span. Splices of multi-span beams shall be located at interior post locations.

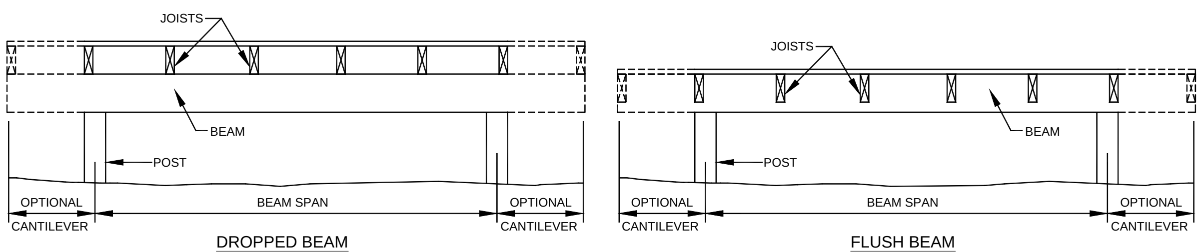


FIGURE R507.6
TYPICAL DECK BEAM SPANS

TABLE R507.6
DECK BEAM SPAN LENGTHS (ft.-in.)[a, b]

SPECIES[c]	SIZE[d]	DECK JOIST SPAN (ft.) LESS THAN OR EQUAL TO:						
		6	8	10	12	14	16	18
Southern pine	2-2x6	~~7-1~~ 6-11	~~6-2~~ 5-11	~~5-6~~ 5-4	~~5-0~~ 4-10	~~4-8~~ 4-6	~~4-4~~ 4-3	~~4-1~~ 4-0
	2-2x8	~~9-2~~ 8-9	~~7-11~~ 7-7	~~7-1~~ 6-9	~~6-6~~ 6-2	~~6-0~~ 5-9	~~5-7~~ 5-4	~~5-3~~ 5-0
	2-2x10	~~11-10~~ 10-4	~~10-3~~ 9-0	~~9-2~~ 8-0	~~8-5~~ 7-4	~~7-9~~ 6-9	~~7-3~~ 6-4	~~6-10~~ 6-0
	2-2x12	~~13-11~~ 12-2	~~12-0~~ 10-7	~~10-9~~ 9-5	~~9-10~~ 8-7	~~9-1~~ 8-0	~~8-6~~ 7-6	~~8-0~~ 7-0
	3-2x6	~~8-7~~ 8-2	~~7-8~~ 7-5	~~6-11~~ 6-8	~~6-3~~ 6-1	~~5-10~~ 5-8	~~5-5~~ 5-3	~~5-2~~ 5-0
	3-2x8	~~11-4~~ 10-10	~~9-11~~ 9-6	~~8-11~~ 8-6	~~8-1~~ 7-9	~~7-6~~ 7-2	~~7-0~~ 6-8	~~6-7~~ 6-4
	3-2x10	~~14-5~~ 13-0	~~12-10~~ 11-3	~~11-6~~ 10-0	~~10-6~~ 9-2	~~9-9~~ 8-6	~~9-1~~ 7-11	~~8-7~~ 7-6
	3-2x12	~~17-5~~ 15-3	~~15-1~~ 13-3	~~13-6~~ 11-10	~~12-4~~ 10-9	~~11-5~~ 10-0	~~10-8~~ 9-4	~~10-1~~ 8-10
Douglas fir-larch[e], hem-fir[e], spruce-pine-fir[e], redwood, western cedars,	3x6 or2-2x6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3x8 or 2-2x8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3x10 or 2-2x10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3x12 or 2-2x12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4x6	6-5	5-6	4-11	4-6	4-2	3-11	3-8

ponderosa pine[f], red pine[f]	4x8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4x10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4x12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3-2x6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3-2x8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3-2x10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3-2x12	13-11	12-1	10-9	9-10	9-1	8-6	8-1

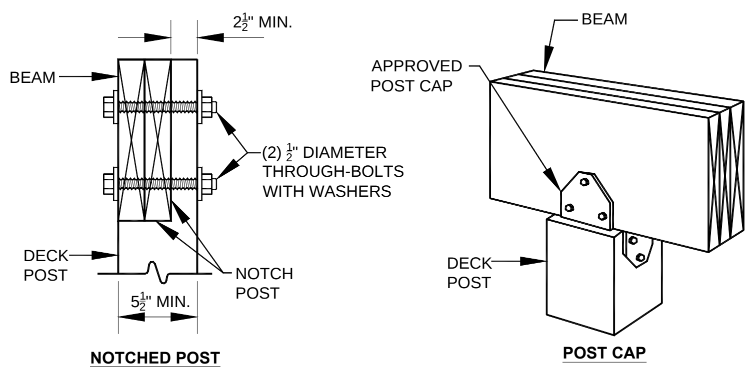
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220 pound point load applied at the end.
b. Beams supporting deck joists from one side only.
c. No 2 grade, wet service factor.
d. Beam depth shall be greater than or equal to depth of joists with a flush beam condition.
e. Includes incising factor.
f. Northern species with no incising factor.

R507.7 Deck joist and deck beam bearing. The ends of each joist and beam shall have not less than 1.5 inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on concrete or masonry for the entire width of the beam. Joist framing into the side of a ledger board or beam shall be supported by approved joist hangers. Joists bearing on a beam shall be connected to the beam to resist lateral displacement. ~~Beam bearing at deck posts shall be in accordance with Section R507.8.1.~~

R507.~~8~~ 7.1 Deck post to deck beam. Deck beams shall be attached to deck posts in accordance with Figure R507.8.1 or by other equivalent means capable ~~Post to beam connections shall be constructed~~ to resist lateral displacement. Manufactured post-to-beam connectors shall be sized for the post and beam sizes. All bolts shall have washers under the head and nut.

Exception: Where deck beams bear directly on footings in accordance with Section R507.8.2



For SI: 1 inch = 25.4 mm

FIGURE R507.8.1
DECK BEAM TO DECK POST

R507.8 Deck posts. For single level wood-framed decks with beams sized in accordance with Table R507.6, deck post size shall be ~~a minimum nominal 6x6 with a maximum height of 14 feet (5486 mm) measured to the underside of the beam.~~ in accordance with Table R507.8.

~~**Exception:** Nominal 4x4 or 4x6 posts shall be permitted with a maximum height of 8 feet (2438 mm).~~

Table R507.8
Deck Post Height

Deck Post Size	Maximum Height
4x4	8'
4x6	8'
6x6	14'

a. Measured to the underside of the beam.

R507.8.2 Deck post to deck footing. Posts shall bear on footings in accordance with Section R403 and Figure R507.8.2. Posts shall be restrained to prevent lateral displacement at the bottom support. Such lateral restraint shall be provided by manufactured connectors installed in accordance with Section R507 and the manufacturers' installation instructions or a minimum post embedment of 12-inches in surrounding soils or concrete piers.

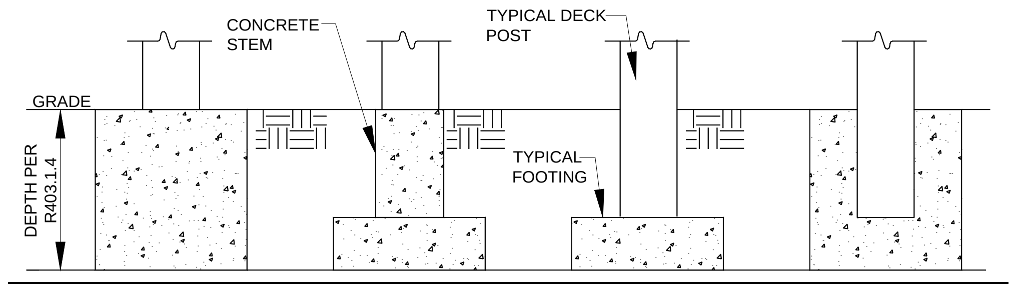


FIGURE R507.8.2
TYPICAL DECK POSTS TO DECK FOOTINGS

R317.1.4 Wood columns. Wood columns shall be approved wood of natural decay resistance or approved pressure-preservative-treated wood.

Exceptions:

1. Columns exposed to the weather or in basements when supported by concrete piers or metal pedestals projecting 1 inch (25.4 m) above a concrete floor or 6 inches above exposed earth and the earth is covered by an approved impervious moisture barrier.
2. Columns in enclosed crawl spaces or unexcavated areas located within the periphery of the building when supported by a concrete pier or metal pedestal at a height more than 8 inches from exposed earth and the earth is covered by an impervious moisture barrier.
3. <u>Deck posts supported by concrete piers or metal pedestals projecting a minimum of 1 inch above a concrete floor or 6 inches above exposed earth.</u>

Commenter's Reason: There is no method in which any typical, wood-framed, exterior deck can be built under the prescriptive provisions of the IRC. Decks have notoriously never been address comprehensively in any building standard in our country, and therefore there are a great variety of construction methods that have long been in practice. An informal and open group of professionals and organizations have been working together to recognize this variety and develop well-rounded provisions suitable for the IRC. It hasn't and won't be easy or quick. The provisions proposed in the original RB264-13 represented what could generally be agreed upon by the majority, however, testimony during the hearings on this and other deck-related proposals drew doubt from the committee that industry-wide agreement had been met.

RB264-13, in this public comment, has been expanded and re-written to recognize further consensus from the discussion group, to better present code provisions, and to address opposition testimony from the committee hearings.

The decking provisions have been rewritten to better describe the angled vs. perpendicular conditions. The new table proposed, R507.4, mirrors the organization and language of another long-standing IRC table for lumber floor sheathing, R503.1.

The post-sizing provisions have also been presented in table form for better presentation of the information.

Concerns regarding Figure R507.8.2 and the lack of a projection of the foundations above grade level were brought up during the hearing and were recognized in this public comment. It was agreed by the proponents of this comment that foundation details are not the appropriate location for provisions regarding the decay resistance of wood members. To better clarify the relationship between the height of footing and the decay resistance of the posts, a third exception specifically addressing decks was added to the current provisions for post (column) decay resistance, R317.1.4, "Wood columns"

Span tables were updated to the new design values for southern pine, and other minor clarifications were made throughout the proposal.

Final Hearing Results

RB264-13	**AMPC2**

Code Change No: RB265-13

Original Proposal

Section(s): R507.2, Table 507.2, R507.2.1, R507.2.2, R507.2.3 (NEW)

Proponent: Glenn Mathewson, North American Deck and Railing Association, representing The Colorado Chapter of the International Code Council, (GlennMathewson@nadra.org)

Revise as follows:

R507.2 Deck leger connection to band joist. ~~For decks supporting a total design load of 50 pounds per square foot (2394 Pa) [40 pounds per square foot (1915 Pa) live load plus 10 pounds per square foot (479 Pa) dead load], the connection between a deck ledger of pressure-preservative-treated Southern Pine, incised pressure-preservative-treated Hem-Fir, or *approved* decay-resistant species, and a 2-inch (51mm) nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with ½-inch (12.7 mm) lag screws or bolts with washers in accordance with Table R507.2. Lag screws, bolts and washers shall be hot-dipped galvanized or stainless steel.~~ Deck ledger connections to band joists shall be in accordance with this section and Table R507.2, Table R507.2.1, Figure R507.2.1(1) and Figure R507.2.1(2). For other grades, species, connection details, and loading conditions, decks shall be designed in accordance with section R301.

~~**R507.2.1 Placement of lag screws or bolts in deck ledgers and band joists.** The lag screws or bolts in deck ledgers and band joists shall be placed in accordance with Table R507.2.1 and Figures R507.2.1(1) and R507.2.1 (2).~~

R507.2.1 Ledger details. Deck ledgers installed in accordance with section R507.2 shall be a minimum 2 x 8 nominal, pressure-preservative-treated or approved, naturally durable, No. 2 grade or better lumber. Deck ledgers installed in accordance with section R507.2 shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

~~**R507.2.2 Alternate deck ledger connections.** Deck ledger connections not conforming to Table R507.2 shall be designed in accordance with accepted engineering practice. Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck ledgers shall not be supported on stone or masonry veneer.~~

R507.2.2 Band joist details. Band joists attached by a ledger in accordance with section R507.2 shall be a minimum 2-inch-nominal, solid-sawn, spruce-pine-fir lumber or a minimum 1 x 9.5 dimensional, Douglas fir, laminated veneer lumber. Band joists attached by a ledger in accordance with section R507.2 shall be fully supported by a wall or sill plate below.

R707.2.3 Ledger to band joist fastener details. Fasteners used in deck ledger connections in accordance with Table R507.2 shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table R507.2.1 and Figure R507.2.1(1) and Figure R507.2.1(2).

TABLE R507.2
~~FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER AND A 2-INCH-NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST~~[~~c, f, g~~]
DECK LEDGER CONNECTION TO BAND JOIST[c, d, e]
(Deck live load = 40 psf, deck dead load = 10 psf, snow load <= 40 psf)

	JOIST SPAN

~~JOIST SPAN~~	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
Connection details	**On-center spacing of fasteners**~~[d, e]~~						
½ inch diameter lag screw with $^{15}/_{32}$ inch maximum sheathing[a]	30	23	18	15	13	11	10
½ inch diameter bolt with $^{15}/_{32}$ inch maximum sheathing	36	36	34	29	24	21	19
½ inch diameter bolt with ~~$^{15}/_{32}$~~ 1 inch maximum sheathing ~~and ½ inch washers~~~~[b, h]~~ [b]	36	36	29	24	21	18	16

For SI: 1 inch =n 25.4 mm, 1 foot = 304.8 mm. 1 pound per square foot = 0.0479 kPa.

a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.

~~b. The maximum gap between the face of the ledger board and face of the wall sheathing shall be ½ inch.~~

b. Up to ½-inch thickness of stacked washers shall be permitted to substitute for up to ½-inch of allowable sheathing thickness.

c. Ledgers shall be flashed in accordance with Section R703.8 to prevent water from contacting the house band joist.

~~d. Lag screws and bolts shall be staggered in accordance with Section R507.2.1~~

~~e. Deck ledger shall be minimum 2 x 8 pressure-preservative-treated No. 2 grade lumber, or other approved materials as established by standard engineering practice.~~

~~f. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1-inch-thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.~~

~~g. A minimum 1 x 9 1/2 Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2-inch nominal band joist~~

~~h~~ d. Wood structural panel ~~sheathing~~, gypsum board ~~sheathing~~, fiberboard, lumber, or foam sheathing ~~not exceeding 1 inch in thickness~~ shall be permitted. ~~The maximum distance between the face of the ledger board and the face of the band joist shall be 1 inch.~~

e. Snow load shall not be assumed to act concurrently with live load.

Reason: The prescriptive ledger bolting provisions are very specific, yet difficult to understand and somewhat contradictory between the language in Section R507.2 and that of Table R507.2. Overall, this code modification proposal does not intend to change the application of the current provisions.

--Footnote “h” is the only place where the description of the type of sheathing permitted is provided. However, footnote “h” is only referenced in one of the three connection methods in the table. This has been corrected to reflect that the various sheathing types are allowed under all methods by placing the footnote reference in the main title of the table.

--Fiberboard (“black celotex®” or “thermoply® for example) and lumber sheathing (diagonal wood sheathing) is likely to be encountered in deck construction on existing homes. The current provision provides a blanket approval of “foam sheathing” which includes varying compositions and performance levels without regard. Under that consideration, fiberboard and lumber should certainly be acceptable up to the same maximum thickness.

--Footnote "b" and "h" are discussing the same topic but with different points of references. This is confusing, and has been corrected.

--Why list various engineered wood products in footnote f and reference what we already know about engineered alternatives. This is unnecessary text. They are alternatives and need to be approved under R104.11 or R301.

--In the current language, the description of allowable species for ledger material is not consistent between the section language, table title and table footnotes. The Section refers to decay resistant properties of PPT pine or hem-fir, and then continues with an ambiguous reference to “approved decay-resistant species” leaving it to the building official to decide. The Table heading, however, refers only to the pine and hem-fir and not the use of decay-resistant species. It is further confused with the references in the table footnotes for use of any PPT, No 2 grade lumber species or engineering. There is no consistency and it is not user friendly. The proposed language makes use of the IRC-defined term “naturally durable lumber” as opposed to “decay-resistant” and clearly explains the materials allowed under this connection method in the body of the code as opposed to footnotes in a table.

--“Rim Board" is a registered trademark of APA. The use of the term "rimboard" in discussions unique to engineered wood products used as band joists infers that said engineered band joist must be one rated by APA. The IRC does not require engineered lumber band joists to be APA rated "Rim Board”. It is simply too similar to a proprietary trademark to be appropriate terminology for the IRC, when the industry- and IRC-wide term “band joist” is available for use.

--The description of the allowable materials for the home’s band joist are described in the Section, the Table title and then again in the footnotes. As with the ledger material, this is now described only in the body of the code section.

--The current language would prohibit the connection of a deck ledger to a band joist that was larger in it's narrow cross-section than 2-inches, thus the term "minimum" has been moved in front of this size description.

Prohibition to supporting beams/girders on ledgers and band joist after the sentence about “engineering practice” and under the heading of “alternate deck ledger connections” is misleading. A design professional should not be prohibited from making such design. The intent has been presented more clearly in this proposal, that simply the fastening schedule does not anticipate concentrated loads from beams.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent's reason is very confusing. The deck provisions are evolving and once these changes are proven the proposal should be reworked and brought back.

Assembly Action: **None**

Public Comments

Public Comment 1:

Glenn Mathewson, MCP, City of Westminster, CO, representing North American Deck and Railing Association and the Colorado Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R507.2 Deck leger connection to band joist. Deck ledger connections to band joists shall be in accordance with this section and Table R507.2, Table R507.2.1, Figure R507.2.1(1) and Figure R507.2.1(2). For other grades, species, connection details, and loading conditions, deck~~s~~ ledger connections shall be designed in accordance with section R301.

R507.2.1 Ledger details. Deck ledgers installed in accordance with section R507.2 shall be a minimum 2 x 8 nominal, pressure-preservative-treated Southern Pine, incised pressure-preservative-treated Hem-Fir, or approved, naturally durable, No. 2 grade or better lumber. Deck ledgers installed in accordance with section R507.2 shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

R507.2.2 Band joist details. Band joists attached by a ledger in accordance with section R507.2 shall be a minimum 2-inch-nominal, solid-sawn, spruce-pine-fir lumber or a minimum 1 x 9.5 dimensional, Douglas fir, laminated veneer lumber. Band joists attached by a ledger in accordance with section R507.2 shall be fully supported by a wall or sill plate below.

R507.2.3 Ledger to band joist fastener details. Fasteners used in deck ledger connections in accordance with Table R507.2 shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table R507.2.1 and Figure R507.2.1(1) and Figure R507.2.1(2).

TABLE R507.2
DECK LEDGER CONNECTION TO BAND JOIST[c, d, e]
(Deck live load = 40 psf, deck dead load = 10 psf, snow load <= 40 psf)

	Joist span						
	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
Connection details	**On-center spacing of fasteners**						
1/2 inch diameter lag screw with ~~15/32~~ 1/2 inch maximum sheathing[a]	30	23	18	15	13	11	10
1/2 inch diameter bolt with ~~15/32~~ 1/2 inch maximum sheathing	36	36	34	29	24	21	19
1/2 inch diameter bolt with 1 inch maximum sheathing [b]	36	36	29	24	21	18	16

For SI: 1 inch =n 25.4 mm, 1 foot = 304.8 mm. 1 pound per square foot = 0.0479 kPa.

a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
b. Up to ½-inch thickness of stacked washers shall be permitted to substitute for up to ½-inch of allowable wood structural panel or lumber sheathing thickness.
c. Ledgers shall be flashed in accordance with section R703.8.
d. Wood structural panel, gypsum board, fiberboard, lumber, or foam sheathing shall be permitted.
e. Snow load shall not be assumed to act concurrently with live load.

Commenter's Reason: During the hearings, the committee expressed concern that the species Southern Pine had been removed from the code language. Though the original proposal did not preclude this species from use, it has been retained from the current 2012 language in this public comment, along with Hem-Fir.

Floor modifications were presented by both the original proponent and opposition in regard to sheathing types, and may have complicated the proposal. Both of the complications that arose during the committee hearing are explained below.

1) Tightening washers over foam sheathing is not sensible and was not tested.

In the original ledger testing that lead to these provisions in the 2009 IRC, only 15/32-inch thick wood structural panels were tested with a stack of ½ inch washers. The current language in the 2012 IRC allows washers over foam sheathing. Retaining this allowance in the proposed modification drew opposition. With that consideration, and some empirical experience, this public comment modification provides limitations to what sheathing may be used with washers. Stacked washers should only be used with wood structural panel or lumber sheathing. The photo below shows how easily a washer can be pressed into foam sheathing with my hand, a result that would be expected from tightening washers over foam and loading the deck.

2) The fastening schedule for the first two rows (lag screws or bolts with 1/2 inch sheathing) currently provides no guidance for what sheathing is allowed.

Opposition to the original proposal did not believe that ledgers should be placed over any 1/2-inch sheathing other than wood structural panels. This was not based on evidence of failure for such conditions, rather that such condition has not been specifically laboratory tested. This is indeed true; the only known laboratory tests on such connection are with wood structural panel. However……shall we throw away decades of real world experience simply from the absence of a specific laboratory facsimile? Decks have been constructed for generations being attached over siding, stucco, brick veneers and whatever else could not be bothered for removal at the time. They used nails in the ledgers, lacked hangers, were attached to cantilevered floors and were often without any flashing. None of this was good, but decks got little attention…until recently. Now we are finding the worst of the worst construction collapsing under load, those old, forgotten decks that have never been maintained beyond a "sand and stain". Rightfully so, the sins of the past are haunting the deck industry. However, we must look at why these decks are failing. I have. It's not properly flashed and lag screwed decks attached to fully supported band joists that are failing…even when attached over siding as they have been (incorrectly) for years. There is no need to take the decking industry from a free-for-all to overbearing regulation. We must find some balance between both; neither one more important than the other. The balance this public comment is asking for is simple. Will a properly flashed ledger attached to a fully supported band joist with lag screws structurally fail because of 1/2 inch of foam in between? We don't see evidence or history to support that it will. As a plan's analyst, I don't want to have to ask what sheathing is hiding behind my customers' homes as I try to verify their proposed lag screw connection and get their permit issued. For this reason, I am maintaining the allowance of any sheathing to be used in any of the connection methods…likely how code administrators are already interpreting it.

Further modifications have also been prompted since the committee action hearings.

The sheathing thickness of 15/32 inch has been changed to ½ inch to accommodate the thickness of common foam sheathing. This is only a 1/32-inch (6.5%) increase in allowable thickness.

Under section R507.2 the reference to "deck" design has been changed to "deck ledger connections". The subject of this section is the ledger connection, not the entire deck.

It is the intention of this commenter to collect and conduct further research on this matter and make it available at www.decktesting.com.

Public Comment 2:

Randall Shackelford, P.E., Simpson Strong-Tie Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE R507.2
DECK LEDGER CONNECTION TO BAND JOIST [~~c, d, e~~ a, b]
(Deck live load = 40 psf, deck dead load = 10 psf, snow load <= 40 psf)

	JOIST SPAN						
	6' and less	**6'1" to 8'**	**8'1" to 10'**	**10'1" to 12'**	**12'1" to 14'**	**14'1" to 16'**	**16'1" to 18'**
Connection details	**On-center spacing of fasteners**						
½ in diameter lag screw with 15/32 inch maximum sheathing[~~a~~ c , d]	30	23	18	15	13	11	10
½ inch diameter bolt with 15/32 inch maximum sheathing[d]	36	36	34	29	24	21	19
½ inch diameter bolt with 1 inch maximum sheathing[~~b~~ e]	36	36	29	24	21	18	16

a. Ledgers shall be flashed in accordance with Section R703.8 to prevent water from contacting the house band joist.
b. Snow load shall not be assumed to act concurrently with live load.
~~a~~ c. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
d. Sheathing shall be wood structural panel or solid sawn lumber.
~~b~~ e. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber, or foam sheathing. Up to ½-inch thickness of stacked washers shall be permitted to substitute for up to ½-inch of allowable sheathing thickness when combined with wood structural panel or lumber sheathing.
~~c. Ledgers shall be flashed in accordance with Section R703.8 to prevent water from contacting the house band joist.~~
~~d. Wood structural panel, gypsum board, fiberboard, lumber, or foam sheathing shall be permitted.~~
~~e. Snow load shall not be assumed to act concurrently with live load.~~

Commenter's Reason: We think Mr. Matthewson and NADRA did a good job of re-organizing the requirements for deck ledger to band joist connection. The deck ledger to band joist connection is the most important connection on a deck and deserves the attention to make sure it is done in a safe manner. With one notable exception, we agree that the proposal simply improves the section without making technical changes. The one area where it appears that a technical change was made is the application of the proposed footnote d, which would allow any type of sheathing between the band joist and the deck ledger. Placement of footnote d at the title of the table applies that note to all three situations.
We went back and reviewed the testing that was performed to develop the existing table in the IRC. There were only three configurations tested: ½" lag screw with 15/32" OSB between the ledger and the band; ½" bolt with 15/32" OSB between the ledger and the band, and ½" bolt with ½" stack of washers and 15/32" OSB between the ledger and the band.
These three cases correspond to the three rows in the ledger table. Based on the testing, the additional gap can only be permitted in the third row of the table. The first two rows must have the ledger directly against wood structural panel sheathing or the band joist.
So we have revised the footnotes to do several things:

1. Re-arrange footnotes c and e so that they are footnotes a and b and they apply to the table title.
2. Add new footnote d that applies to the first two lines so that only wood structural panel or lumber sheathing is permitted between the ledger board and the band joist
3. Combine footnotes b and d from the original proposal into new footnote e, and change the reference so that it only applies to the last line in the table. Additional clarification was added that stacked washers can only be used with wood structural panel or lumber sheathing.

An article published in the December 2005 Building Safety Journal is included showing the basis for the existing table.

- Bibliography: "Wood Bits: Residential Deck Ledger Design". By David M. Carradine, Ph.D.; Donald A. Ph.D., P.E.,; Joseph R. Loferski, Ph.D.; and Frank E. Woeste, Ph.D., P.E.

Final Hearing Results

RB265-13 **AMPC1, 2**

Code Change No: RB267-13

Original Proposal

Section(s): R202, Table R301.5, R311.7.5.4, R311.7.8.1, R311.7.8.4, R312.1.4, R317.4, R317.4.1, R317.4.2, R318.1, R507, R507.3, R507.3.1, R507.3.2 (NEW), R507.3.3 (NEW), R507.3.4 (NEW), R507.3.5 (NEW), INDEX B

Proponent: John Woestman, Kellen Company, representing Composite Lumber Manufacturers Association (CLMA) (jwoestman@kellencompany.com)

Revise as follows:

TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
Uninhabitable attics without storage[b]	10
Uninhabitable attics with limited storage[b, g]	20
Habitable attics and attics served with fixed stairs	30
Balconies (exterior) and decks[e]	40
Fire escapes	40
~~Guardrails~~ Guards and handrails[d]	200[h]
~~Guardrail~~ Guard in-fill components[f]	50[h]
Passenger vehicle garages[a]	50[a]
Rooms other than sleeping room	40
Sleeping rooms	30
Stairs	40[c]

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm^2,
1 pound = 4.45 N.

a. Elevated garage floors shall be capable of supporting a 2,000-pound load applied over a 20-square-inch area.
b. Uninhabitable attics without storage are those where the maximum clear height between joists and rafters is less than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches high by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.
c. Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.
d. A single concentrated load applied in any direction at any point along the top.
e. See Section R502.2.2 for decks attached to exterior walls.
f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.
g. Uninhabitable attics with limited storage are those where the maximum clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1. The attic area is accessible from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches.
2. The slopes of the joists or truss bottom chords are no greater than 2 inches vertical to 12 units horizontal.
3. Required insulation depth is less than the joist or truss bottom chord member depth.
   The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 lb/ft^2.

h. Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

Revise definitions as follows:

PLASTIC COMPOSITE. A generic designation that refers to wood/plastic composites and plastic lumber.

~~**WOOD/PLASTIC COMPOSITE.** A composite material made primarily from wood or cellulose-based materials and plastic.~~

Revise as follows:

R311.7.5.4 Exterior ~~wood~~/plastic composite stair treads. ~~Wood/plastic~~ Plastic composite exterior stair treads shall comply with the ~~provisions~~ requirements of this section and Section R507.3.

R311.7.8.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

Exceptions:

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
2. When handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to ~~guardrail~~ guard, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.

R311.7.8.4 Exterior ~~wood~~/plastic composite handrails. ~~Wood/plastic~~ Plastic composite exterior handrails shall comply with the ~~provisions~~ requirements of Section R507.3.

R312.1.4 Exterior ~~wood~~plastic composite guards. ~~Woodplastic~~ Plastic composite exterior *guards* shall comply with the ~~provisions~~ requirements of ~~Section R317.4~~ Section R507.3.

~~**R317.4 Wood/plastic composites.** Wood/plastic composites used in exterior deck boards, stair treads, handrails and guardrail systems shall bear a *label* indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 7032.~~

~~**R317.4.1 Labeling.** Deck boards and stair treads shall bear a label that indicates compliance to ASTM D 7032 and includes the allowable load and maximum allowable span. Handrails and guardrail systems or their packaging shall bear a label that indicates compliance to ASTM D 7032 and includes the maximum allowable span.~~

~~**R317.4.2 Installation.** Wood/plastic composites shall be installed in accordance with the manufacturer's instructions.~~

R317.4 Plastic composites. Plastic composite exterior deck boards, stair treads, guards, and handrails containing wood, cellulosic or other biodegradable materials shall comply with the requirements of Section R507.3.

R318.1 Subterranean termite control methods. In areas subject to damage from termites as indicated by Table R301.2(1), methods of protection shall be one of the following methods or a combination of these methods:

1. Chemical termiticide treatment, as provided in Section R318.2.
2. Termite baiting system installed and maintained according to the *label*.
3. Pressure-preservative-treated wood in accordance with the provisions of Section R317.1.
4. Naturally durable termite-resistant wood.
5. Physical barriers as provided in Section R318.3 and used in locations as specified in Section R317.1.
6. Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.
7. Plastic composite exterior deck boards, stair treads, guards, and handrails in accordance with the provisions of Section 507.3.4.

Revise as follows:

SECTION R507
EXTERIOR DECKS

~~**R507.3 Wood/plastic composites.** Wood/plastic composites used in exterior deck boards, stair treads, handrails and guardrail systems shall bear a label indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 7032.~~

~~**R507.3.1 Installation of wood/plastic composites.** Wood/plastic composites shall be installed in accordance with the manufacturer's instructions.~~

R507.3 Plastic composite deck boards, stair treads, guards, or handrails. Plastic composite exterior deck boards, stair treads, guards, and handrails shall comply with the requirements of ASTM D7032 and the requirements of Section 507.3.

R507.3.1 Labeling. Plastic composite deck boards and stair treads, or their packaging, shall bear a label that indicates compliance to ASTM D7032 and includes the allowable load and maximum allowable span determined in accordance with ASTM D7032. Plastic or composite handrails and guards, or their packaging, shall bear a label that indicates compliance to ASTM D7032 and includes the maximum allowable span determined in accordance with ASTM D7032.

R507.3.2 Flame Spread Index. Plastic composites deck boards, stair treads, guards, and handrails shall exhibit a flame spread index not exceeding 200 when tested in accordance with ASTM E84 or UL 723 with the test specimen remaining in place during the test.

Exception: Plastic composites determined to be noncombustible.

R507.3.3 Decay resistance. Plastic composite deck boards, stair treads, guards, and handrails, containing wood, cellulosic, or other biodegradable materials shall be decay resistant in accordance with ASTM D7032.

R507.3.4 Termite resistance. Where required by Section 318, plastic composite deck boards, stair treads, guards, and handrails containing wood, cellulosic, or other biodegradable materials shall be termite resistant in accordance with ASTM D7032.

507.3.5 Installation of plastic composites. Plastic composite deck boards, stair treads, guards, and handrails shall be installed in accordance with this code and the manufacturer's instructions.

Revise as follows:

INDEX

B

Building Planning

Reason: This code proposal focuses on plastic composite (i.e. wood /plastic composite or plastic lumber) exterior deck boards, stair treads, guards, and handrails. This proposal:

1. In Section R507.3, incorporates the technical revisions approved for the 2015 IBC for plastic composite exterior deck boards, stair treads, guards, and handrails with text revised to be more clear and concise.
2. Revises the name of the Section 507 to Exterior Decks to help make it clear these requirements apply to exterior construction.
3. Updates / revises pointers in the IRC that point to Section R507.3.
4. Adds a pointer for termite resistance in Section R318.1.
5. Revises all guardrail / guardrails references to guard / guards for consistency of the IRC, and consistency to the IBC.
6. Proposes a definition for "plastic composites" which includes wood / plastic composites and plastic lumber. Deletes the definition of wood / plastic composites as the term is self-explanatory, especially in the context of exterior deck boards, stair treads, guards, and handrails.
7. In R317, refers to requirements in R507.3 and deletes un-needed text.
8. Editorially replaces the word "provisions" with "requirements" as "requirements" seems to convey stronger mandatory actions than "provisions".

ASTM D7032 is currently referenced in R507.3, and this proposal expands specific references to D7032, and expands the scope of materials required to comply with D7032. In addition to requirements in the IRC applicable to deck boards, stair treads, guards, and handrails, D7032 has become the standard to which these plastic lumber and wood /plastic composite exterior deck boards, stair treads, guards, and handrails are tested to evaluate and verify compliance to code requirements.

ASTM D7032 includes deck-related performance evaluations and performance requirements such as flexural tests, bio-degradation tests, fire performance tests, creep recovery tests, mechanical fastener holding tests, and slip resistance tests. The standard also includes consideration of the effects of temperature, moisture, concentrated loads, freeze-thaw resistance tests, UV resistance, and duration of load on deck boards, stair treads, guards, and handrails.

There should be no cost increase to construction as these products comply with these requirements through ICC ES AC174. There may be a slight reduction in the cost of construction as these changes to the IRC are expected to help clarify code requirements.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R318.1 Subterranean termite control methods. In areas subject to damage from termites as indicated by Table R301.2(1), methods of protection shall be one of the following methods or a combination of these methods:

1. Chemical termiticide treatment, as provided in Section R318.2.
2. Termite baiting system installed and maintained according to the *label*.
3. Pressure-preservative-treated wood in accordance with the provisions of Section R317.1.
4. Naturally durable termite-resistant wood.
5. Physical barriers as provided in Section R318.3 and used in locations as specified in Section R317.1.
6. Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.
7. ~~Plastic composite exterior deck boards, stair treads, guards, and handrails in accordance with the provisions of Section 507.3.4.~~

(Portions of code change not shown remain unchanged)

Committee Reason: This change provides a needed clarification and update for wood/plastic composites for use on exterior decks. The modification removes plastic composite as a method of protection from termites.

Assembly Action: **None**

Final Hearing Results

RB267-13 **AM**

Code Change No: RB269-13

Original Proposal

Section(s): R602.1 (NEW), R602.1.5 (NEW), R602.1.6 (NEW), R602.3

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

R602.1 General. Wood and wood-based products used for load-supporting purposes shall conform to the applicable provisions of this section.

~~**R602.1**~~ **R602.1.1** ~~**Identification**~~**.Sawn Lumber.** ~~Load-bearing dimension~~ Sawn lumber ~~for studs, plates and headers~~ shall be identified by a grade mark of ~~a~~ an accredited lumber grading or inspection agency ~~that has been *approved*~~ and have design values certified by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certification of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.

R602.1.5 Wood structural panels. Wood structural panel sheathing shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance Category by a grade mark or certificate of inspection issued by an approved agency.

R602.1.6 Particleboard. Particleboard shall conform to ANSI A208.1. Particleboard shall be identified by the grade mark or certificate of inspection issued by an approve agency.

R602.1.7 Fiberboard. Fiberboard shall conform to ASTM C208. Fiberboard sheathing, when used structurally, shall be identified by an approved agency as conforming to ASTM C208.

R602.3 Design and construction. Exterior walls of wood frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3(2) or in accordance with AF&PA's NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(1) through R602.3(4). Wall sheathing shall be fastened directly to framing members and, when placed on the exterior side of an exterior wall, shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3)~~. Wood structural panel sheathing used for exterior walls shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance Category by a grade mark or certificate of inspection issued by an approved agency~~ and shall conform to the requirements of Table R602.3(3). Wall sheathing used only for exterior wall covering purposes shall comply with Section R703. Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

Reason: The change is intended to clarify the process by which lumber design values are certified and recognized in the code. The current process, which has been used since 1970, relies on the internationally recognized U.S.Department of Commerce Voluntary Product Standard PS20. Because the current format of the section can be incorrectly interpreted to place a number of wood products under the identification requirements of PS20, a new format is proposed that clearly states this standard is only for sawn lumber. The format proposed is nearly identical to what is used in Section 2302 of the International Building Code. Wood products other than sawn lumber have unique manufacturing standards, design value development, and quality control criteria. This new format clarifies that these other wood products must comply with specific product standards. Product standards that are currently buried in Section R602.3, Design and construction, are relocated into R602.1.

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides a needed clean up and clarification of the language to properly address the standards for sawn lumber from other wood products.

Assembly Action: **None**

Final Hearing Results

RB269-13	**AS**

Code Change No: RB271-13

Original Proposal

Section(s): Table R602.3(1), Table R602.3(2), Table R602.3(3), Table R602.3.1, R602.3.5, Table R602.10.1.3, Table R602.10.3(1), Table R602.10.4, R602.10.4.1, Table R602.10.5, Table R602.10.6.1, Table R602.10.6.4, R602.10.6.5.1, R602.10.8.2, R602.12, R612.2, R613.2, Table R613.5(1), Table R613.5(2)

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB); Jay Crandell, P.E., ARES Consulting; Ed Keith, P.E., APA – The Engineered Wood Association

Revise as follows:

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

f. For regions having basic wind speed of ~~110~~ 140 mph or greater, 8d deformed (2½″ × 0.120) nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.
g. For regions having basic wind speed of ~~100~~ 130 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. When basic wind speed is greater than ~~100~~130 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.

(Portions of Table not shown remain unchanged)

TABLE R602.3(2)
ALTERNATE ATTACHMENTS TO TABLE 602.3(1)

g. Specified alternate attachments for roof sheathing shall be permitted for windspeeds less than ~~100~~ 130 mph. Fasteners attaching wood structural panel roof sheathing to gable end wall framing shall be installed using the spacing listed for panel edges.

(Portions of Table not shown remain unchanged)

TABLE R602.3(3)
REQUIREMENTS FOR WOOD STRUCTRUAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES [a,b,c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		~~MAXIMUM~~ ULTIMATE DESIGN WIND SPEED V_{ult} (mph)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind Exposure Category		
							B	C	D
6d Common (2.0" x 0.113")	1.5	24/0	3/8	16	6	12	~~110~~ 140	~~90~~ 130	~~85~~ 115
8d Common (2½" x 0.131")	1.75	24/16	7/16	16	6	12	~~130~~ 170	~~110~~ 140	~~105~~ 135
				24	6	12	~~110~~ 140	~~90~~ 115	~~85~~ 110

For SI: 1 Inch = 25.4 mm, 1 mile per hour = 0.447 m/s.
a. Panel strength axis parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.

b. Table is based on wind pressures acting toward and away from building surfaces per Section R301.2. Lateral bracing requirements shall be in accordance with Section R602.10.
c. Wood structural panels with span ratings of Wall-16 or Wall-24 shall be permitted as an alternate to panels with a 24/0 span rating. Plywood siding rated 16 o.c. or 24 o.c. shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and Plywood siding 16 o.c .shall be used with studs spaced a maximum of 16 inches on center.

TABLE R602.3.1
MAXIMUM ALLOWABLE LENGTH OF WOOD WALL STUDS EXPOSED TO WIND SPEEDS OF ~~100~~ 130 MPH OR LESS IN SEISMIC DESIGN CATEGORIES A, B, C, D_0, D_1 and D_2 [b, c]

(Portions of table not shown remain unchanged)

R602.3.5 Braced wall panel uplift load path. *Braced wall panels* located at exterior walls that support roof rafters or trusses (including stories below top *story*) shall have the framing members connected in accordance with one of the following:

1. Fastening in accordance with Table R602.3(1) where:
1.1. The ~~basic~~ ultimate design wind speed does not exceed ~~90~~ 115 mph (~~40~~ 51 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, or
1.2. The net uplift value at the top of a wall does not exceed 100 plf. The net uplift value shall be determined in accordance with Section R802.11 and shall be permitted to be reduced by 60 plf (86 N/mm) for each full wall above.
2. Where the net uplift value at the top of a wall exceeds 100 plf (146 N/mm), installing *approved* uplift framing connectors to provide a continuous load path from the top of the wall to the foundation or to a point where the uplift force is 100 plf (146 N/mm) or less. The net uplift value shall be as determined in Item 1.2 above.
3. Wall sheathing and fasteners designed in accordance with accepted engineering practice to resist combined uplift and shear forces.

TABLE R602.10.1.3
BRACED WALL LINE SPACING

APPLICATION	CONDITION	BUILDING TYPE	BRACED WALL LINE SPACING CRITERIA	
			Maximum Spacing	Exception to Maximum Spacing
Wind Bracing	~~85 mph to < 110 mph~~ Ultimate Design Wind Speed 100 mph to < 140 mph	Detached, townhouse	60 feet	None

(Portions of Table not shown remain unchanged)

~~**TABLE R602.10.3(1)**~~
~~**BRACING REQUIREMENTS BASED ON WIND SPEED**~~

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON WIND SPEED

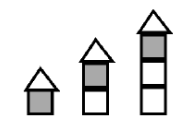
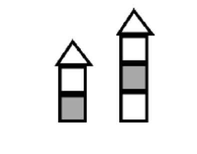
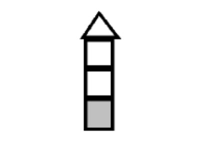
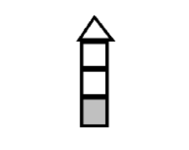
• EXPOSURE CATEGORY B • 30 FOOT MEAN ROOF HEIGHT • 10 FOOT WALL HEIGHTS • 2 BRACED WALL LINES			MINIMUM TOTALLENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Ultimate Design Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing (feet)**	**Method LIB[b]**	**Method GB**	**Methods DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB[c]**	**Methods CS-WSP, CS-G, CS-PF**
≤110		10	3.5	3.5	2.0	1.5
		20	6.0	6.0	3.5	3.0
		30	8.5	8.5	5.0	4.5
		40	11.5	11.5	6.5	5.5
		50	14.0	14.0	8.0	7.0
		60	16.5	16.5	9.5	8.0
		10	6.5	6.5	3.5	3.0
		20	11.5	11.5	6.5	5.5
		30	16.5	16.5	9.5	8.0
		40	21.5	21.5	12.5	10.5
		50	26.5	26.5	15.5	13.0
		60	31.5	31.5	18.0	15.5
		10	NP	9.5	5.5	4.5
		20	NP	17.0	10.0	8.5
		30	NP	24.5	14.0	12.0
		40	NP	32.0	18.5	15.5
		50	NP	39.5	22.5	19.0
		60	NP	46.5	26.5	23.0
≤115		10	3.5	3.5	2.0	2.0
		20	6.5	6.5	3.5	3.5
		30	9.5	9.5	5.5	4.5
		40	12.5	12.5	7.0	6.0
		50	15.0	15.0	9.0	7.5
		60	18.0	18.0	10.5	9.0
		10	7.0	7.0	4.0	3.5
		20	12.5	12.5	7.5	6.5
		30	18.0	18.0	10.5	9.0
		40	23.5	23.5	13.5	11.5
		50	29.0	29.0	16.5	14.0
		60	34.5	34.5	20.0	17.0
		10	NP	10.0	6.0	5.0
		20	NP	18.5	11.0	9.0
		30	NP	27.0	15.5	13.0
		40	NP	35.0	20.0	17.0
		50	NP	43.0	24.5	21.0
		60	NP	51.0	29.0	25.0

TABLE R602.10.3(1)-continued
BRACING REQUIREMENTS BASED ON WIND SPEED

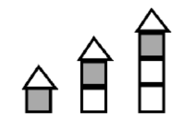
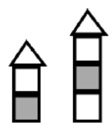
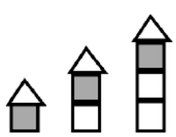
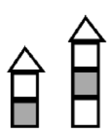
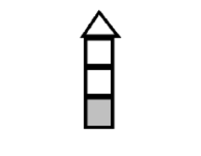
• EXPOSURE CATEGORY B • 30 FOOT MEAN ROOF HEIGHT • 10 FOOT WALL HEIGHTS • 2 BRACED WALL LINES			MINIMUM TOTALLENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Ultimate Design Wind Speed (mph)	Story Location	Braced Wall Line Spacing (feet)	Method LIB[b]	Method GB	Methods DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB[c]	Methods CS-WSP, CS-G, CS-PF
≤120		10	4.0	4.0	2.5	2.0
		20	7.0	7.0	4.0	3.5
		30	10.5	10.5	6.0	5.0
		40	13.5	13.5	8.0	6.5
		50	16.5	16.5	9.5	8.0
		60	19.5	19.5	11.5	9.5
		10	7.5	7.5	4.5	3.5
		20	14.0	14.0	8.0	7.0
		30	20.0	20.0	11.5	9.5
		40	25.5	25.5	15.0	12.5
		50	31.5	31.5	18.0	15.5
		60	37.5	37.5	21.5	18.5
		10	NP	11.0	6.5	5.5
		20	NP	20.5	11.5	10.0
		30	NP	29.0	17.0	14.5
		40	NP	38.0	22.0	18.5
		50	NP	47.0	27.0	23.0
		60	NP	55.5	32.0	27.0
≤130		10	4.5	4.5	2.5	2.5
		20	8.5	8.5	5.0	4.0
		30	12.0	12.0	7.0	6.0
		40	15.5	15.5	9.0	7.5
		50	19.5	19.5	11.0	9.5
		60	23.0	23.0	13.0	11.0
		10	8.5	8.5	5.0	4.5
		20	16.0	16.0	9.5	8.0
		30	23.0	23.0	13.5	11.5
		40	30.0	30.0	17.5	15.0
		50	37.0	37.0	21.5	18.0
		60	44.0	44.0	25.0	21.5
		10	NP	13.0	7.5	6.5
		20	NP	24.0	13.5	11.5
		30	NP	34.5	19.5	17.0
		40	NP	44.5	25.5	22.0
		50	NP	55.0	31.5	26.5
		60	NP	65.0	37.5	31.5

TABLE R602.10.3(1)-continued
BRACING REQUIREMENTS BASED ON WIND SPEED

• EXPOSURE CATEGORY B • 30 FOOT MEAN ROOF HEIGHT • 10 FOOT WALL HEIGHTS • 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Ultimate Design Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing (feet)**	**Method LIB[b]**	**Method GB**	**Methods DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB[c]**	**Methods CS-WSP, CS-G, CS-PF**
<140		10	5.5	5.5	3.0	2.5
		20	10.0	10.0	5.5	5.0
		30	14.0	14.0	8.0	7.0
		40	18.0	18.0	10.5	9.0
		50	22.5	22.5	13.0	11.0
		60	26.5	26.5	15.0	13.0
		10	10.0	10.0	6.0	5.0
		20	18.5	18.5	11.0	9.0
		30	27.0	27.0	15.5	13.0
		40	35.0	35.0	20.0	17.0
		50	43.0	43.0	24.5	21.0
		60	51.0	51.0	29.0	25.0
		10	NP	15.0	8.5	7.5
		20	NP	27.5	16.0	13.5
		30	NP	39.5	23.0	19.5
		40	NP	51.5	29.5	25.0
		50	NP	63.5	36.5	31.0
		60	NP	75.5	43.0	36.5

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 mile per hour = 0.447 m/s.
a. Linear interpolation shall be permitted.
b. Method LIB shall have gypsum board fastened to at least one side with nails or screws in accordance with Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches.
c. Method CS-SFB does not apply where the ultimate design wind speed is greater than 130 mph.

TABLE R602.10.4
BRACING METHODS

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.0175 rad, 1 pound per square foot = 47.8 N/m^2, 1 mile per hour = 0.447 m/s.
a. Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D_0, D_1 and D_2.
b. Applies to panels next to garage door opening when supporting gable end wall or roof load only. May only be used on one wall of the garage. In Seismic Design Categories D_0, D_1 and D_2, roof covering dead load may not exceed 3 psf.
c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R502.5(1). A full height clear opening shall not be permitted adjacent to a Method CS-G panel.
d. Method CS-SFB does not apply in Seismic Design Categories D_0, D_1 and D_2 and in areas where the ultimate design wind speed exceeds ~~100~~ 130 mph.
e. Method applies to detached one- and two-family dwellings in Seismic Design Categories D_0 through D_2 only.

(Portions of Table not shown remain unchanged)

R602.10.4.1 Mixing methods. Mixing of bracing methods shall be permitted as follows:

1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
2. Mixing intermittent bracing methods from *braced wall line* to *braced wall line* within a story shall be permitted. Within Seismic Design Categories A, B and C or in regions where the ~~basic~~ ultimate design wind speed is less than or equal to ~~100~~ 130 mph (~~45~~ 58 m/s), mixing of intermittent

bracing and continuous sheathing methods from *braced wall line* to braced wall line within a story shall be permitted.

3. Mixing intermittent bracing methods along a *braced wall line* shall be permitted in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest value of all intermittent bracing methods used.

4. Mixing of continuous sheathing methods CS-WSP, CS-G and CS-PF along a *braced wall line* shall be permitted.

5. In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing of intermittent bracing methods along the interior portion of a *braced wall line* with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same *braced wall line* shall be permitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3) as adjusted by Tables R602.10.3(2) and R602.10.3(4), respectively. The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the *braced wall line*.

TABLE R602.10.5
MINIMUM LENGTH OF BRACED WALL PANELS

METHOD (See Table R602.10.4)		**MINIMUM LENGTH (inches)**					**CONTRIBUTING LENGTH (inches)**
		Wall Height					
		8 feet	**9 feet**	**10 feet**	**11 feet**	**12 feet**	
ABW	SDC A, B, and C, Ultimate design wind speed <~~110~~ 140 mph	28	32	34	38	42	48
	SDC D_0, D_1 and D_2, Ultimate design wind speed <~~110~~ 140 mph	32	32	34	NP	NP	

(Portions of Table not shown remain unchanged)

TABLE R602.10.6.1
MINIMUM HOLD-DOWN FORCES FOR METHOD ABW BRACED WALL PANELS

SEISMIC DESIGN CATEGORY AND WIND SPEED	**SUPPORTING/ STORY**	**HOLD DOWN FORCE (pounds)**				
		Height Of Braced Wall Panel				
		8 feet	**9 feet**	**10 feet**	**11 feet**	**12 feet**
SDC A, B, and C Ultimate design wind speed <~~110~~ 140 mph	One story	1,800	1,800	1,800	2,000	2,200
	First of two stories	3,000	3,000	3,000	3,300	3,600
SDC D_0, D_1, and D_2 Ultimate design wind speed <~~110~~ 140 mph	One story	1,800	1,800	1,800	NP	NP
	First of two stories	3,000	3,000	3,000	NP	NP

~~**TABLE R602.10.6.4**~~
~~**TENSION STRAP CAPACITY FOR RESISTING WIND PRESSURES**~~
~~**PERPENDICULAR TO METHODS PFH, PFG, AND CS-PF BRACED WALL PANELS**~~

TABLE R602.10.6.4
TENSION STRAP CAPACITY FOR RESISTING WIND PRESSURES PERPENDICULAR TO METHODS PFH, PFG, AND CS-PF BRACED WALL PANELS

MINIMUM WALL STUD FRAMING NOMINAL SIZE AND GRADE	MAXIMUM PONY WALL HEIGHT (feet)	MAXIMUM TOTAL WALL HEIGHT (feet)	MAXIMUM OPENING WIDTH (feet)	TENSION STRAP CAPACITY REQUIRED (pounds)[a,b]					
				Ultimate Design Wind Speed V_{ult} (mph)					
				110	115	130	110	115	130
				Exposure B			Exposure C		
2 X 4 No. 2 Grade	0	10	18	1,000	1,000	1,000	1,000	1,000	1,050
	1	10	9	1,000	1,000	1,000	1,000	1,000	1,750
			16	1,000	1,025	2,050	2,075	2,500	3,950
			18	1,000	1,275	2,375	2,400	2,850	DR
	2	10	9	1,000	1,000	1,475	1,500	1,875	3,125
			16	1,775	2,175	3,525	3,550	4,125	DR
			18	2,075	2,500	3,950	3,975	DR	DR
	2	12	9	1,150	1,500	2,650	2,675	3,175	DR
			16	2,875	3,375	DR	DR	DR	DR
			18	3,425	3,975	DR	DR	DR	DR
	4	12	9	2,275	2,750	DR	DR	DR	DR
			12	3,225	3,775	DR	DR	DR	DR
2 X 6 Stud Grade	2	12	9	1,000	1,000	1,700	1,700	2,025	3,050
			16	1,825	2,150	3,225	3,225	3,675	DR
			18	2,200	2,550	3,725	3,750	DR	DR
	4	12	9	1,450	1,750	2,700	2,725	3,125	DR
			16	2,050	2,400	DR	DR	DR	DR
			18	3,350	3,800	DR	DR	DR	DR

For SI: 1 Inch = 25.4 mm, 1 mile per hour = 0.447 m/s.
a. DR = design required.
b. Straps shall be installed in accordance with manufacturer's recommendations.

R602.10.6.5.1 Length of bracing. The length of bracing along each *braced wall line* shall be the greater of that required by the ultimate design wind speed and *braced wall line* spacing in accordance with Table R602.10.3(1) as adjusted by the factors in the Table R602.10.3(2) or the Seismic Design Category and *braced wall line* length in accordance with Table R602.10.6.5. Angled walls shall be permitted to be counted in accordance with Section R602.10.1.4, and *braced wall panel* location shall be in accordance with Section R602.10.2.2. The seismic adjustment factors in Table R602.10.3(4) shall not be applied to the length of bracing determined using Table R602.10.6.5. In no case shall the minimum total length of bracing in a *braced wall line*, after all adjustments have been taken, be less than 48 inches (1219 mm) total.

R602.10.8.2 Connections to roof framing. Top plates of exterior *braced wall panels* shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of *braced wall panel*s and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the *braced wall panels* shall be permitted to replace the blocking required by this section. Blocking shall not be required over openings in continuously-sheathed *braced wall lines*. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with Section R806.1.

1. For Seismic Design Categories A, B and C and ultimate design wind speeds less than ~~100~~ 130 mph (~~45~~ 58 m/s) where the distance from the top of the *braced wall panel* to the top of the rafters

or roof trusses above is 9¼ inches (235 mm) or less, blocking between rafters or roof trusses shall not be required. Where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses above is between 9¼ inches (235 mm) and 15¼ inches (387 mm), blocking between rafters or roof trusses shall be provided above the *braced wall panel* in accordance with Figure R602.10.8.2(1).

2. For Seismic Design Categories D_0, D_1 and D_2 or <u>ultimate design</u> wind speeds of ~~100~~ <u>130</u> mph (~~45~~ <u>58</u> m/s) or greater, where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses is 15¼ inches (387 mm) or less, blocking between rafters or roof trusses shall be provided above the *braced wall panel* in accordance with Figure R602.10.8.2(1).

3. Where the distance from the top of the *braced wall panel* to the top of rafters or roof trusses exceeds 15¼ inches (387 mm), the top plates of the *braced wall panel* shall be connected to perpendicular rafters or roof trusses above in accordance with one or more of the following methods:

3.1. Soffit blocking panels constructed in accordance with Figure R602.10.8.2(2);

3.2. Vertical blocking panels constructed in accordance with Figure R602.10.8.2(3);

3.3. Full-height engineered blocking panels designed in accordance with the AF&PA WFCM; or

3.4. Blocking, blocking panels, or other methods of lateral load transfer designed in accordance with accepted engineering practice.

R602.12 Simplified wall bracing. Buildings meeting all of the conditions listed in items 1-8 shall be permitted to be braced in accordance with this section as an alternative to the requirements of Section R602.10. The entire building shall be braced in accordance with this section; the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.

1. There shall be no more than two stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.
2. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.
3. Wall height shall not be greater than 10 feet (2743 mm).
4. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.
5. All exterior walls shall have gypsum board with a minimum thickness of ½ inch (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.
6. The structure shall be located where the ~~basic~~ <u>ultimate design</u> wind speed is less than or equal to ~~90~~ <u>115</u> mph (~~40~~ <u>51</u> m/s), and the Exposure Category is A or B.
7. The structure shall be located in Seismic Design Category A, B or C for detached one- and two-family dwellings or Seismic Design Category A or B for townhouses.
8. Cripple walls shall not be permitted in two-story buildings.

R612.2 Performance. Exterior windows and doors shall be designed to resist the design wind loads specified in Table R301.2(2) adjusted for height and exposure in accordance with Table R301.2(3) <u>or determined in accordance with ASCE 7 using the allowable stress design load combinations of ASCE 7. Design wind loads for exterior glazing not part of a labeled assembly shall be permitted to be determined in accordance with Chapter 24 of the *International Building Code.*</u>

R613.2 Applicability limits. The provisions of this section shall control the construction of exterior structural insulated panel walls and interior load-bearing structural insulated panel walls for buildings not greater than 60 feet (18 288mm) in length perpendicular to the joist or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist or truss span and not greater than two stories in height with each wall not greater than 10 feet (3048 mm) high. All exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Structural insulated panel walls constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum <u>ultimate</u> design wind speed <u>(V_{ult})</u> of ~~120~~ <u>155</u> miles per hour (~~54~~ <u>69</u> m/s), Exposure A or B or ~~110~~ <u>140</u> miles per hour (~~49~~ <u>63</u> m/s) Exposure C, and a maximum ground snow load of 70 pounds per foot (3.35 kPa), and Seismic Design Categories A, B and C.

~~TABLE R613.5(1)~~

~~**MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP OR LIGHT-FRAME ROOF ONLY (inches)**~~

TABLE R613.5(1)
MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP OR LIGHT-FRAME ROOF ONLY (inches)

ULTIMATE DESIGN WIND SPEED V_{ult} (mph)		SNOW LOAD (psf)	BUILDING WIDTH (ft)														
			24			28			32			36			40		
			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)		
Exp. B	Exp. C		8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
110	--	20	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		30	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		50	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		70	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	6.5
115	--	20	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		30	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		50	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5
		70	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	DR	4.5	4.5	DR
130	110	20	4.5	4.5	6.5	4.5	4.5	6.5	4.5	4.5	6.5	4.5	4.5	DR	4.5	4.5	DR
		30	4.5	4.5	6.5	4.5	4.5	6.5	4.5	4.5	DR	4.5	4.5	DR	4.5	4.5	DR
		50	4.5	4.5	DR	4.5	4.5	DR	4.5	4.5	DR	4.5	6.5	DR	4.5	DR	DR
		70	4.5	4.5	DR	4.5	DR	DR	4.5	DR	DR	4.5	DR	DR	DR	DR	DR
140	120	20	4.5	6.5	DR	4.5	6.5	DR	4.5	DR	DR	4.5	DR	DR	4.5	DR	DR
		30	4.5	6.5	DR	4.5	DR	DR	4.5	DR	DR	4.5	DR	DR	4.5	DR	DR
		50	4.5	DR	DR	4.5	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR
		70	4.5	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR

For SI: 1 Inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.
DR = design required.

a. Design Assumptions:
Deflection criteria: *L/240.*
Roof load: *7 psf.*
Ceiling load: *5 psf.*
Wind loads based on Table R301.2(2).
Strength axis of facing material applied vertically.

~~**TABLE R613.5(2)**~~
~~**MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP OR LIGHT-FRAME ONE STORY AND ROOF ONLY (inches)**~~

TABLE R613.5(2)
MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP OR LIGHT-FRAME ONE STORY AND ROOF ONLY (inches)

ULTIMATE DESIGN WIND SPEED V_{ult} (mph)		SNOW LOAD (psf)	BUILDING WIDTH (ft)														
			24			28			32			36			40		
			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)		
Exp. B	Exp. C		8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
110	--	20	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	DR	4.5	4.5	DR
		30	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	DR	4.5	6.5	DR
		50	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	DR	4.5	DR	DR	DR	DR	DR
		70	4.5	4.5	6.5	4.5	4.5	DR	4.5	DR	DR	DR	DR	DR	DR	DR	DR
115	--	20	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	DR	4.5	4.5	DR	4.5	DR	DR
		30	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	DR	4.5	6.5	DR	4.5	DR	DR

ULTIMATE DESIGN WIND SPEED V_{ult} (mph)		SNOW LOAD (psf)	BUILDING WIDTH (ft)														
			24			28			32			36			40		
			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)			Wall Height (ft)		
Exp. B	Exp. C		8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
		50	4.5	4.5	6.5	4.5	4.5	DR	4.5	DR	DR	4.5	DR	DR	DR	DR	DR
		70	4.5	4.5	DR	4.5	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR
120	--	20	4.5	4.5	6.5	4.5	4.5	DR	4.5	4.5	DR	4.5	DR	DR	4.5	DR	DR
		30	4.5	4.5	DR	4.5	4.5	DR	4.5	6.5	DR	4.5	DR	DR	DR	DR	DR
		50	4.5	4.5	DR	4.5	DR	DR	4.5	DR	DR	DR	DR	DR	DR	DR	DR
		70	4.5	DR	DR	4.5	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR
130	110	20	4.5	6.5	DR	4.5	DR	DR	4.5	DR	DR	DR	DR	DR	DR	DR	DR
		30	4.5	DR	DR	4.5	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR
		50	4.5	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR
		70	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR

For SI: 1 Inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.
DR = design required.
a. Design Assumptions:
Deflection criteria: *L/240.*
Roof load: *7 psf.*
Ceiling load: *5 psf.*
Second floor live load: *30 psf.*
Second floor dead load: *10 psf.*
Second floor dead load from walls: *10 psf.*
Wind loads based on Table R301.2(2).
Strength axis of facing material applied vertically.

Reason: The purpose of this code change is to bring the wind provisions of the IRC in line with the 2012 IBC and ASCE 7-10. As a result of the schedule changes implemented during the 2009-2010 ICC code development cycle, there was not sufficient time to revise the IRC to fully implement the new ultimate wind speed basis of ASCE 7-10 and the 2012 IBC, due to the extent of prescriptive IRC provisions and tables which are directly related to basic wind speed.. New maps based on the ASCE 7-10 ultimate wind speed data but converted back down to nominal (ASD) basis were provided in the IRC. This has led to a fair amount of confusion among those stakeholders who work with both codes.
A working group of stakeholders including NAHB, the major material associations, ASCE, and the Insurance Institute for Business and Home Safety developed a series of IRC proposals to implement the new ultimate wind speed basis. This proposal updates the Chapter 6 provisions, including triggers in the wall bracing provisions, the wind bracing table, the header strap for the portal frames, and the structural insulated panel applicability limits and design tables. It is noted that the changes necessary to update the appropriate Section R603 cold-formed steel provisions are contained in a separate AISI proposal which comprehensively revises the cold-formed steel provisions. The changes necessary to update the appropriate Section R611 above-grade concrete wall provisions are contained in a separate PCA proposal.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

TABLE R602.3(3)
REQUIREMENTS FOR WOOD STRUCTRUAL PANEL WALL
SHEATHING USED TO RESIST WIND PRESSURES [a,b,c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		~~MAXIMUM~~ ULTIMATE DESIGN WIND SPEED V_{ult} (mph)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind Exposure Category		
							B	C	D
6d Common (2.0" x 0.113")	1.5	24/0	3/8	16	6	12	140	~~130~~ 115	~~115~~ 110
8d Common (2½" x 0.131")	1.75	24/16	7/16	16	6	12	170	140	135
				24	6	12	140	115	110

For SI: 1 Inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. Panel strength axis parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.

b. Table is based on wind pressures acting toward and away from building surfaces per Section R301.2. Lateral bracing requirements shall be in accordance with Section R602.10.

c. Wood structural panels with span ratings of Wall-16 or Wall-24 shall be permitted as an alternate to panels with a 24/0 span rating. Plywood siding rated 16 o.c. or 24 o.c. shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and Plywood siding 16 o.c .shall be used with studs spaced a maximum of 16 inches on center.

(Portions of code change not shown remain unchanged)

Committee Reason: This change updates wind provisions to be consistent with the ASCE provisions. The modification corrects the wind speeds in Table R602.3(3).

Assembly Action: None

Final Hearing Results

RB271-13 AM

Code Change No: RB272-13

Original Proposal

Section(s): Table R602.3(1)

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

Table R602.3(1)
FASTENING SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS
		Roof	
1	Blocking between ceiling joists or rafters to top plate, toe nail	~~3-8d~~ 4-8d box (2½ " x 0.113"); or 3-8d common (2½" x 0.131"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails	—
2	Ceiling joists to top plate, toe nail	~~3-8d~~ 4-8d box~~-~~(2½ " x 0.113"); or 3-8d common (2½" x 0.131"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails	—
3	Ceiling joist not attached to parallel rafter, laps over partitions, face nail	~~3-10d~~ 4-10d box (3"x 0.128"); or 3-16d common (3½" x 0.162"); or 4-3" x 0.131" nails	—
4	Collar tie to rafter, face nail or 1 1/4" x 20 gage ridge strap	~~3-10d~~ 4-10d box (3"x0.128"); or 3-10d common (3" x 0.148"); or 4-3" x 0.131" nails	—
5	Rafter or roof truss to plate, toe nail	3-16d box nails (3½" x 0.135"); or 3-10d common nails (3" x 0.148"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131 nails	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss[j]
6	Roof rafters to ridge, valley or hip rafters~~:~~ ~~toe nail face nail~~	4-16d box (3½ " x 0.135"); or 3-10d common (3½" x 0.148"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails 3-16d box (3½ " x 0.135") 2-16d common (3½" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails	Toenail Endnail
		Wall	
7	Built-up studs—face nail	~~10d (3" x 0.128")~~ 16d common (3½" x 0.162") 10d box (3" x 0.128"); or 3" x 0.131" nails	24" o.c. 16" o.c.
8	Abutting studs at intersecting wall corners, face nail	16d box (3 ½ " x 0.135"); or 3" x 0.131" nails 16d common (3½" x 0.162")	12" o.c. 16" o.c.

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS
9	Built-up header, two pieces with 1/2″ spacer	~~16d (3½″ × 0.135″)~~ 16d common (3½" x 0.162") 16d box (3½" x 0.135")	16″ o.c. along each edge 12" o.c. along each edge
10	Continued header, two pieces	~~16d (3½″ × 0.135″)~~ 16d common (3½" x 0.162") 16d box (3½" x 0.135")	16″ o.c. along each edge 12" o.c. along each edge
11	Continuous header to stud, toe nail	~~4-8d~~ 5-8d box (2½ ″ × 0.113″); or 4-8d common (2½" x 0.131"); or 4-10d box (3" x 0.128")	—
12	Double studs, face nail	~~10d (3″ × 0.128″)~~ 16d common (3½" x 0.162") 10d box (3" x 0.128"); or 3" x 0.131" nails	24″ o.c. 16" o.c.
13	Double top plates, face nail	~~10d (3″ × 0.128″)~~ 16d common (3½" x 0.162") 10d box (3" x 0.128"); or 3" x 0.131" nails	~~24″ o.c.~~ 16" o.c. 12" o.c.
14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	~~8-16d (3 ½ ″ × 0.135″)~~ 8-16d common (3½" x 0.162"); or 12-16d box (3½" x 0.135"); or 12-10d box (3" x 0.128"); or 12-3" x 0.131" nails	—
15	Sole plate to joist or blocking, face nail	~~16d (3½ ″ × 0.135″)~~ 16d common (3½" x 0.162") 16d box (3½" x 0.135"); or 3" x 0.131" nails	16″ o.c. 12" o.c.
16	Sole plate to joist or blocking at braced wall panels	3-16d box (3½″ × 0.135″); or 2-16d common (3½" x 0.162"); or 4-3" x 0.131" nails	16″ o.c.
17	Stud to sole plate, toe nail	~~3-8d~~ 4-8d box (2½″ × 0.113″);or ~~2-16d~~ 3-16d box (3½″ × 0.135″); or 4-8d common (2½" x 0.131"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails	—
18	Top or sole plate to stud, end nail	~~2-16d~~ 3-16d box (3½″ × 0.135″); or 2-16d common (3½" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails	—
19	Top plates, laps at corners and intersections, face nail	~~2-10d~~ 3-10d box (3″ × 0.128″); or 2-16d common (3½" x 0.162"); or 3-3" x 0.131" nails	—
20	1″ brace to each stud and plate, face nail	~~2-8d~~ 3-8d box (2½″ × 0.113″); or 2-8d common (2½" x 0.131"); or 2-10d box (3" x 0.128") 2 staples 1¾″	—
21	1″ × 6″ sheathing to each bearing, face nail	~~2-8d~~ 3-8d box (2½″ × 0.113″); or 2-8d common (2½" x 0.131"); or 2-10d box (3" x 0.128") 2 staples 1¾″	—

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS
22	1″ × 8″ sheathing to each bearing, face nail	~~2-8d~~ 3-8d box (2½″ × 0.113″); or 3-8d common (2½" x 0.131"); or 3-10d box (3" x 0.128") 3 staples 13/4″	—
23	Wider than 1″ × 8″ sheathing to each bearing, face nail	~~3-8d~~ 4-8d box (2½″ × 0.113″); or 3-8d common (2½" x 0.131"); or 3-10d box (3" x 0.128") 4 staples 1¾"	—
Floor			
24	Joist to sill or girder, toe nail	~~3-8d~~ 4-8d box (2½″ × 0.113″); or 3-8d common (2½" x 0.131"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails	—
25	Rim joist to top plate, toe nail (roof applications also)	8d box (2½″ × 0.113″) 8d common (2½" x 0.131"); or 10d box (3" x 0.128"); or 3" x 0.131" nails	4” o.c. 6″ o.c.
26	Rim joist or blocking to sill plate, toe nail	8d box (2½″ × 0.113″) 8d common (2½" x 0.131"); or 10d box (3" x 0.128"); or 3" x 0.131" nails	4” o.c. 6″ o.c.
27	1″ × 6″ subfloor or less to each joist, face nail	~~2~~ 3-8d box (2½″ × 0.113″); or 2-8d common (2½" x 0.131"); or 3-10d box (3" x 0.128") 2 staples 1¾″	—
28	2″ subfloor to joist or girder, blind and face nail	~~2-16d~~ 3-16d box (3½″ × 0.135″); or 2-16d common (3½" x 0.162")	—
29	2″ planks (plank & beam - floor & roof)	~~2-16d~~ 3-16d box (3½″ × 0.135″); or 2-16d common (3½" x 0.162")	at each bearing
30	Built-up girders and beams, 2-inch lumber layers	~~10d (3″ × 0.128″)~~ 20d common (4” x 0.192”); or 10d box (3" x 0.128"); or 3" x 0.131" nails And: 2-20d common (4” x 0.192”); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails	Nail each layer as follows: 32″ o.c. at top and bottom and staggered. ~~Two nails at ends and at each splice.~~ 24” o.c. face nail at top and bottom staggered on opposite sides Face nail at ends and at each splice
31	Ledger strip supporting joists or rafters	~~3-16d~~ 4-16d box (31/2″ × 0.135″); or 3-16d common (3½" x 0.162"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails	At each joist or rafter

(Portions of Table not shown remain unchanged)

Reason: This proposed change seeks greater consistency between the IRC Table R602.3(1) wood frame nailing schedule and IBC Table 2304.9.1, as it will appear in the 2015 edition of the IBC (see S265). This proposed change results in minimum size and number of fasteners per connection to be substantially the same between the IRC and the IBC creating increased consistency of minimum nailing requirements for wood frame construction. Proposed nailing requirements are also clearer because the exact dimensions of commonly used power driven, box, and common nail sizes are shown in the table.
Complete consistency between the actual nailing specified in the two codes is not achieved by this proposal. One reason is because the proposed revisions retain the currently tabulated IRC nail sizes, such as 2-1/2” long x 0.113” diameter box nails, as an option.

While the smaller nail size in the IRC table does not appear in IBC Table 2304.9.1, retention of the smaller nail size was judged as important for continuity from one code edition to another.
In several cases, the IRC minimum nailing remains unchanged by this proposal except for addition of IBC nailing options. For instance, the base nailing of the following remain unchanged: Item 5, Rafter or roof truss to plate; Item 6, Roof rafters to ridge, valley or hip rafters; Item 8, Abutting studs at intersecting wall corners; and Item 16, Sole plate to joist or blocking at braced wall panels. In all other cases, there is an increase in number of smaller nails by 1 or there is a reduced spacing in order to maintain a minimum connection of approximately equal strength to that provided by the IBC nailing. Reference design values in accordance with NDS for wood construction for the various applications are compared in the following Table 1 – Reference Nail Values for Proposed Minimum Nailing. All values are based on normal load duration and calculated assuming framing with Specific Gravity equal to 0.42.

Table 1 – Reference Nail Values for Proposed Minimum Nailing

	DESCRIPTION	NUMBER AND TYPE OF FASTENER		REFERENCE LATERAL VALUE	REFERENCE WITHDRAWAL VALUE
		Roof			
1	Blocking between ceiling joists or rafters to top plate, toe nail	4-8d box (2 ½ ” x 0.113”); or 3-8d common (2.5” x 0.131”); or 3-10d box (3” x 0.128”); or 3-3” x 0.131” nails	--	200 lb 186 lb 195 lb 204 lb	
2	Ceiling joists to top plate, toe nail	4-8d box (2 ½ ” x 0.113”); or 3-8d common (2.5” x 0.131”); or 3-10d box (3” x 0.128”); or 3-3” x 0.131” nails	--	200 lb 186 lb 195 lb 204 lb	72 lb 63 lb 75 lb 78 lb
3	Ceiling joist not attached to parallel rafter, laps over partitions, face nail	4-10d box (3”x0.128”); or 3-16d common (3.5" x 0.162"); or 4-3” x 0.131” nails	—	316 lb 360 lb 328 lb	
4	Collar tie to rafter, face nail or 1 1/4” x 20 gage ridge strap	4 -10d box (3”x0.128”); or 3-10d common (3" x 0.148"); or 4-3” x 0.131” nails	—	316 lb 300 lb 328 lb	
5	Rafter or roof truss to plate, toe nail	3-16d box nails (3 ½” x 0.135”); or 3-10d common nails (3” x 0.148”); or 4-10d box (3" x 0.128"); or 4-3” x 0.131 nails		219 lb 240 lb 260 lb 272 lb	93 lb 87 lb 100 lb 104 lb
6	Roof rafters to ridge, valley or hip rafters	4-16d box (3 ½ ” x 0.135”); or 3-10d common (3.5” x 0.148”); or 4-10d box (3" x 0.128"); or 4-3” x 0.131” nails 3-16d box (3 ½ ” x 0.135”) 2-16d common (3.5” x 0.162”); or 3-10d box (3" x 0.128"); or 3-3” x 0.131” nails	Toenail Endnail	292 lb 240 lb 260 lb 272 lb 198 lb 180 lb 178 lb 185 lb	
		Wall			
7	Built-up studs—face nail	16d common (3.5” x 0.162”) 10d box (3" x 0.128"); or 3” x 0.131” nails	24” o.c. 16” o.c.	60 plf 59 plf 62 plf	
8	Abutting studs at intersecting wall corners, face nail	16d box (3 ½ ” x 0.135”); or 3” x 0.131” nails 16d common (3.5” x 0.162”)	12” o.c. 16” o.c.	88 plf 82 plf 90 plf	
9	Built-up header, two pieces with 1/2″ spacer	16d common (3.5" x 0.162") 16d box (3.5” x 0.135”)	16″ o.c. 12” o.c.	90 plf 88 plf	
10	Continued header, two pieces	16d common (3.5" x 0.162") 16d box (3.5” x 0.135”)	16″ o.c. 12” o.c.	90 plf 88 plf	
11	Continuous header to stud, toe nail	5-8d box (2 ½ ″ × 0.113″); or 4-8d common (2.5" x 0.131"); or 4-10d box (3" x 0.128")	—	250 lb 248 lb 260 lb	
12	Double studs, face nail	16d common (3.5” x 0.162”) 10d box (3" x 0.128"); or 3” x 0.131” nails	24″ o.c. 16” o.c.	60 plf 59 plf 62 plf	
13	Double top plates, face nail	16d common (3.5" x 0.162") 10d box (3" x 0.128"); or 3” x 0.131” nails	16” o.c. 12” o.c.	90 plf 79 plf 82 plf	

14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d common (3.5" x 0.162"); or 12-16d box (3.5" x 0.135"); or 12-10d box (3" x 0.128"); or 12-3” x 0.131” nails	—	960 lb 1056 lb 948 lb 984 lb	
15	Sole plate to joist or blocking, face nail	16d common (3.5" x 0.162") 16d box (3.5" x 0.135"); or 3” x 0.131” nails	16″ o.c. 12” o.c.	90 plf 88 plf 82 plf	
16	Sole plate to joist or blocking at braced wall panels	3-16d box (31/2″ × 0.135″); or 2-16d common (3.5" x 0.162"); or 4-3” x 0.131” nails	16″ o.c.	264 lb 240 lb 328 lb	
17	Stud to sole plate, toe nail	4-8d box (21/2″ × 0.113″);or 3-16d box (31/2″ × 0.135″); or 4-8d common (2.5" x 0.131"); or 4-10d box (3" x 0.128"); or 4-3” x 0.131” nails	—	200 lb 219 lb 248 lb 260 lb 272 lb	
18	Top or sole plate to stud, end nail	3-16d box (31/2″ × 0.135″); or 2-16d common (3.5" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3” x 0.131” nails	—	198 lb 180 lb 178 lb 185 lb	
19	Top plates, laps at corners and intersections, face nail	3-10d box (3″ × 0.128″); or 2-16d common (3.5" x 0.162"); or 3-3" x 0.131" nails	—	237 lb 240 lb 246 lb	
20	1″ brace to each stud and plate, face nail	3-8d box (21/2″ × 0.113″); or 2-8d common (2.5" x 0.131"); or 2-10d box (3" x 0.128") 2 staples 13/4″	--	171 lb 140 lb 136 lb	94.5 lb 73.5 lb 90 lb
21	1″ × 6″ sheathing to each bearing, face nail	3-8d box (21/2″ × 0.113″); or 2-8d common (2.5" x 0.131"); or 2-10d box (3" x 0.128") 2 staples 13/4″	--	171 lb 140 lb 136 lb	94.5 lb 73.5 lb 90 lb
22	1″ × 8″ sheathing to each bearing, face nail	3-8d box (21/2″ × 0.113″); or 3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128") 3 staples 13/4″	--	171 lb 140 lb 136 lb	94.5 lb 73.5 lb 90 lb
23	Wider than 1″ × 8″ sheathing to each bearing, face nail	4-8d box (21/2″ × 0.113″); or 3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128") 4 staples 13/4"	--	228 lb 210 lb 204 lb	126 lb 110 lb 135 lb
		Floor			
24	Joist to sill or girder, toe nail	4-8d box (21/2″ × 0.113″); or 3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails	—	200 lb 186 lb 195 lb 204 lb	
25	Rim joist to top plate, toe nail (roof applications also)	8d box (21/2″ × 0.113″) 8d common (2.5" x 0.131"); or 10d box (3" x 0.128"); or 3" x 0.131" nails	4” o.c. 6″ o.c.	150 plf 124 plf 130 plf 136 plf	
26	Rim joist or blocking to sill plate, toe nail	8d box (2 ½″ × 0.113″) 8d common (2.5" x 0.131"); or 10d box (3" x 0.128"); or 3" x 0.131" nails	4” o.c. 6″ o.c.	150 plf 124 plf 130 plf 136 plf	
27	1″ × 6″ subfloor or less to each joist, face nail	3-8d box (21/2″ × 0.113″); or 2-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128") 2 staples 13/4″	--	171 lb 140 lb 136 lb	94.5 lb 73.5 lb 90 lb
28	2″ subfloor to joist or girder, blind and face nail	3-16d box (31/2″ × 0.135″); or 2-16d common (3.5" x 0.162")	—	264 lb 240 lb	
29	2″ planks (plank & beam - floor & roof)	3-16d box (31/2″ × 0.135″); or 2-16d common (3.5" x 0.162")	at each bearing	264 lb 240 lb	
30	Built-up girders and beams, 2-inch lumber layers	20d common (4” x 0.192”); or 10d box (3" x 0.128"); or 3" x 0.131" nails And:	32″ o.c. 24” o.c. Face nail	108 plf 79 plf 82 plf	

		2-20d common (4” x 0.192”); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails	at ends and each splice	288 lb 237 lb 246 lb	
31	Ledger strip supporting joists or rafters	4-16d box (31/2″ × 0.135″); or 3-16d common (3.5" x 0.162"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails	At each joist or rafter	352 lb 360 lb 316 lb 328 lb	
Remainder or Table Unchanged					

In addition to increasing the number of smaller nails to approximate the IBC prescribed nailing for consistency, the number of nails and spacing was considered in view of loads resisted by the prescribed fastening. For example, the stud to plate connection is evaluated against wind loads as follows:
110 mph wind, exposure B (pressure is 29.1 psf per ASCE 7 and Table R301.2(2))
10 ft stud height and stud spacing of 2 ft o.c. (tributary area is 5 ft x 2 ft = 10 ft^2)
Connection load is 29.1 psf x 10 ft^2 = 291 lb
2 -16d box (3.5” x 0.135”) design value adjusted for wind = 211 lb < 291 lb (No good)
3 -16d box (3.5” x 0.135”) design value adjusted for wind = 317 lb > 291 lb (ok)
Low resistance of IRC minimum nailing relative to loads is found in connection details such as sole plate to joist and top plate to top plate, particularly where loads are based on the upper end of IRC limits (e.g. wind pressures associated with 110 mph Exposure B and 10’ stud heights). In many cases, it is observed that the increased strength of the IBC minimum fastening provides a better match to loads than the IRC fastening schedule. However, it is also noted that some minimum nailing requirements are recommended as good practice and are not strictly associated with a standard minimum load or calculation basis.

Cost Impact: The code change will increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides compatibility with the fastening schedule in the IBC. Also, provides easy reference for the building official to verify fasteners used on the job.

Assembly Action: **None**

Final Hearing Results

RB272-13 **AS**

Code Change No: RB273-13

Original Proposal

Section(s): Table R602.3(1)

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER[b,c,e]	SPACING OF FASTENERS	
			Edges (inches)[i]	Intermediate supports (inches)[c,e]
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing <u>(See Table R602.3(3) for wood structural panel *exterior* wall sheathing to wall framing)</u>				

(Portions of Table not shown remain unchanged)

Reason: This proposal clarifies the code as to the attachment requirements for wood structural panel exterior wall sheathing. The column heading in Table R602.3(1) provides wall attachment requirements for *interior* applications only. The attachment requirements for *exterior* applications vary with the wind loading on the walls and are located in Table R602.3(3). As Table R602.3(3) is relatively new, it can be seen that the <u>proper</u> attachment for *exterior* wood structural panel sheathing application could be easily overlooked, as the *exterior* recommendation used to be a part of this table as well. Note also that the attachment schedule for interior wood structural panel sheathing in Table R602.3(1) is NOT conservative in that for many configurations more nails are required to resist the applied wind loads.

Note that this is not a technical change. It simply clarifies the existing intent of the code by providing proper references.

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change clarifies the difference for fastening of interior and exterior WSP.

Assembly Action: **None**

Final Hearing Results

RB273-13	**AS**

Code Change No: RB274-13

Original Proposal

Section(s): Table R602.3(1), Table R602.10.3(4)

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a,b,c]	SPACING OF FASTENERS
14	Double top ~~plates~~ plate splice for SDCs A-D_2 with seismic braced wall line spacing < 25' - a, minimum 24-inch offset of end joints~~,~~ and face nail in lapped area on each side of the splice	8-16d (3-1/2" x 0.135")	-
	Double top plate splice SDCs D_0, D_1, or D_2; and braced wall line spacing >= 25' – a minimum 24" offset of end joints and face nail in lapped area on each side of the splice.	12-16d (3-1/2" x 0.135")	-

(Portions of Table not shown remain unchanged)

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

c. The length-to width ratio for the floor/roof *diaphragm* shall not exceed 3:1. The top plate lap splice nailing shall be ~~a minimum of 12-16d nails on each side of the splice~~ in accordance with Table R602.3(1), item 14.

(Portions of Table not shown remain unchanged)

Reason: The IRC has two separate requirements for double top plate splices. In the existing 2012 IRC Table R602.3(1), Item 14, the requirement for the double top plate splice is a minimum 24 inches offset at the splice between the top and bottom plates, attached with (8) 16d nails. This is in conflict with the requirement in Table R602.10.3(4), Footnote c. This footnote requires the use of (12) 16d nails on each side of the splice. To correct this conflict, this proposal splits Item 14 of R602.3(1) into two separate line items, to differentiate the appropriate number of nails. In addition, the language was cleaned up to indicate that the fasteners are required on each side of the splice location.

A corresponding change is proposed for Footnote c of Table R602.10.3(4) referring the user back to Table R602.3(1) for splice-plate attachment guidance.

We understand that there is a code change proposal being forwarded that will completely rewrite this table of the code. If this proposal is recommended for approval, we will work with the proponents of the rewrite to insure this is incorporated seamlessly.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change adds clarity by removing the top plate splice nailing for seismic from the footnote into the fastener schedule.

Assembly Action: **None**

Final Hearing Results

RB274-13 **AS**

Code Change No: RB275-13

Original Proposal

Section(s): Table R602.3(1)

Proponent: Jay Crandell, ARES Consulting, representing Foam Sheathing Committee / American Chemistry Council (Jcrandell@aresconsulting.biz)

Revise as follows:

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS
17	~~Stud to~~ Top or sole plate to stud, toe nail	3-8d ($2^1/_2$″ × 0.113″) or 2-16d ($3^1/_2$″ × 0.135″)	— —

(Portions of Table not shown remain unchanged)

Reason: A similar proposal was approved for the 2015 IBC (S267-11/12) to correct an inconsistency in the conventional connection table. The code already provides a toenail connection option for the stud to bottom (sole) plate connection. This code change proposal makes requirements consistent for connection of the stud to the top plate and uses the same wording for consistency of terms. Toe nail connections provide a better uplift load path than end nails, so this option should be provided for both ends of the stud, not just at the bottom end of the stud. End nail connections are already included for both top or sole plate to stud connections in line item 18 of the existing table.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change adds a needed toe nail connection for the top plate stud.

Assembly Action: **None**

Final Hearing Results

RB275-13	**AS**

Code Change No: RB276-13

Original Proposal

Section(s): Table R602.3 (1)

Proponent: Brian Johnson, representing self

Revise as follows:

TABLE 602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a,b,c]	SPACING OF FASTENERS
		Floor	
30	Joist to Band Joist	3 – 16d common (3 ½ “ x 0.162”) 4 – 3” x 0.131” nails 4 – 3” x 14 gage staples	face nail

(Portions of Table not shown remain unchanged)

Reason: Text is taken directly from item #29 from the IBC prescriptive connection table, Table 2304.9.1; IRC does not list a nailing requirement for this item. The desire is to have IBC 2308 and IRC be essentially similar.

I believe this nailing is typically done by framers, so the addition to the code is merely to aid inspectors, and thus will not increase the cost of construction.

If the tables were split into two different tables at the separation between floor and sheathing nailing, it would not require the entire list every time a new correction is added.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE 602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a,b,c]	SPACING OF FASTENERS
		Floor	
30	~~Joist to Band Joist~~ Band or Rim Joist to Joist	3 – 16d common (~~3 ½~~ 3.5“ x 0.162”) or 4 -10 box (3” x 0.128), or 4 – 3” x 0.131” nails, or 4 – 3” x 14 gage staples, 7/16” crown	~~face~~ end nail

(Portions of Table not shown remain unchanged)

Committee Reason: This change adds a needed connection detail that is compatible with the IBC. The modifications add clarity, permits box nails and clarifies the description of the building elements.

Assembly Action: **None**

Final Hearing Results

RB276-13 **AM**

Code Change No: RB278-13

Original Proposal

Section(s): Table R602.3(1)

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

Revise as follows:

Table R602.3(1)
FASTENING SCHEDULE ~~FOR STRUCTURAL MEMBERS~~

~~ITEM~~	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER [a, b, c]	SPACING AND LOCATION ~~OF FASTENERS~~
		Roof	
1	Blocking between ceiling joists or rafters to top plate~~, toe nail~~	3-8d (2 ½ " x 0.113")	at each end, toe nail
2	Ceiling joists to top plate~~, toe nail~~	3-8d (2 ½ " x 0.113")	per joist, toe nail
3	Ceiling joist not attached to parallel rafter laps over partitions~~, face nail~~ (see Section R802.3.1, R802.3.2, Table R802.5.1(9))	3-10d (3" x 0.128")	Face nail
4	Ceiling joist attached to parallel rafter (heel joint) (see Section R802.3.1, R802.3.2, Table R802.5.1(9))	Per Table R802.5.1(9)	Face nail
~~4~~5	Collar tie to rafter, ~~face nail~~ or 1 1/4" x 20 gage ridge strap to rafter	3-10d (3" x 0.128")	Face nail
~~5~~6	Rafter or roof truss to plate~~, toe nail~~	3-16d box nails (3 ½" x 0.135"); or 3-10d common nails (3" x 0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss [j]
~~6~~7	Roof rafters to ridge, valley or hip rafters: or, roof rafter to minimum 2-inch ridge beam ~~toe nail face nail~~	4-16d (3 ½ " x 0.135") 3-16d (3 ½ " x 0.135")	Toe nail End nail
		Wall	
~~7~~8	~~Built-up studs—face nail~~ Stud to stud (not at braced wall panels)	10d (3" x 0.128")	24" o.c. face nail
~~8~~9	~~Abutting studs at intersecting wall corners, face nail~~ Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	16d (3 ½ " x 0.135")	12" o.c. face nail
~~9~~10	~~Built-up header, two pieces with 1/2" spacer~~ Built-up header (2-inch to 2-inch header)	16d (3 1/2" × 0.135")	16" o.c. ~~along~~ each edge face nail
~~10~~	~~Continued header, two pieces~~	~~16d (3 1/2" × 0.135")~~	~~16" o.c. along each edge~~
11	Continuous header to stud~~, toe nail~~	4-8d (2 ½ " × 0.113")	Toe nail
~~12~~	~~Double studs, face nail~~	~~10d (3" × 0.128")~~	~~24" o.c.~~
~~13~~12	~~Double top plates, face nail~~ Top plate to top plate	10d (3" × 0.128")	24" o.c. face nail
~~14~~13	~~Double top plates, minimum 24-inch offset of end joints, face nail in lapped area~~ Top plate to top plate, at end	8-16d (3 ½ " × 0.135")	Face nail on each side of end joint (minimum 24" lap splice length

	joints		each side of end joint)
~~15~~14	~~Sole plate to joist or blocking, face nail~~ Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d (3 ½ " × 0.135")	16" o.c. face nail
~~16~~15	~~Sole plate to joist or blocking at braced wall panels~~ Bottom plate to joist, rim joist, band joist or blocking at braced wall panels	3-16d (3 1/2" × 0.135")	16" o.c. face nail
~~17~~16	Stud to ~~sole~~ bottom plate~~, toe nail~~	3-8d (2 1/2" × 0.113") or 2-16d (3 1/2" × 0.135")	Toe nail End nail
~~18~~17	Top or ~~sole~~ bottom plate to stud~~, end nail~~	2-16d (3 1/2" × 0.135")	End nail
~~19~~18	Top plates, laps at corners and intersections~~, face nail~~	2-10d (3" × 0.128")	Face nail
~~20~~19	1" brace to each stud and plate~~, face nail~~	2-8d (2 1/2" × 0.113") 2 staples 1 3/4"	Face nail --
~~21~~20	1" × 6" sheathing to each bearing~~, face nail~~	2-8d (2 1/2" × 0.113") 2 staples, 1" crown, 16 ga., 1 3/4" long	Face nail --
~~22~~	~~1" × 8" sheathing to each bearing, face nail~~	~~2-8d (2 1/2" × 0.113")~~ ~~3 staples 1 3/4"~~	~~--~~ ~~--~~
~~23~~21	~~Wider than 1" × 8" sheathing to each bearing, face nail~~ 1" x 8" and wider sheathing to each bearing	1"x 8": 2-8d (2 1/2" × 0.113") 3 staples, 1" crown, 16 ga., 1 3/4" long Wider than 1"x 8": 3-8d (2 1/2" × 0.113") 4 staples, 1" crown, 16 ga., 1 3/4" long	Face nail --
Floor			
~~24~~22	Joist to sill, top plate, or girder~~, toe nail~~	3-8d (2 1/2" × 0.113")	Toe nail
~~25~~23	~~Rim joist to top plate, toe nail (roof applications also)~~Rim joist, band joist, or blocking to sill or top plate (roof application also)	8d (2 1/2" × 0.113")	6" o.c. toe nail
~~26~~	~~Rim joist or blocking to sill plate, toe nail~~	~~8d (2 ½" × 0.113")~~	~~6" o.c.~~
~~27~~24	1" × 6" subfloor or less to each joist~~, face nail~~	2-8d (2 1/2" × 0.113") 2 staples, 1" crown, 16 ga., 1 3/4" long	Face nail
~~28~~25	2" subfloor to joist or girder~~, blind and face nail~~	2-16d (3 1/2" × 0.135")	Blind and face nail
~~29~~26	2" planks (plank & beam - floor & roof)	2-16d (3 1/2" × 0.135")	at each bearing, face nail
~~30~~27	Built-up girders and beams, 2-inch lumber layers	10d (3" × 0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.
~~31~~28	Ledger strip supporting joists or rafters	3-16d (3 1/2" × 0.135")	At each joist or rafter, face nail
29	Joist to band joist or rim joist	4-10d (3" x 0.128")	End nail
30	Bridging to joist	2-10d (3" x 0.128")	Each end, toenail
ITEM	**DESCRIPTION OF BUILDING MATERIALS**	**DESCRIPTION OF FASTENER[b,c,e]**	**SPACING OF FASTENERS** **Edges (inches)[i]** / **Intermediate supports[c,e] (inches)**

Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing				
~~32~~31	3/8" - 1/2"	6d common (2" × 0.113") nail (subfloor wall)[j] 8d common (2 1/2" × 0.131") nail (roof)[f]	6	12[g]
~~33~~32 **~~34~~33**	19/32" - 1" 1 1/8" - 1 1/4"	8d common nail (2 1/2" × 0.131") 10d common (3" × 0.148") nail; or 8d (2 1/2" × 0.131") deformed nail	6 6	12[g] 12
Other wall sheathing [h]				
~~35~~34	1/2" structural cellulosic fiberboard sheathing	1 1/2" galvanized roofing nail, 7/16" ~~crown or~~ head diameter, or 1" crown staple 16 ga., 1 1/4" long	3	6
~~36~~35	25/32" structural cellulosic fiberboard sheathing	1 3/4" galvanized roofing nail, 7/16" ~~crown~~ head diameter, or 1" crown staple 16 ga., 1 1/2" long	3	6
~~37~~36	1/2" gypsum sheathing [d]	1 1/2" galvanized roofing nail; staple galvanized, 1 1/2" long; 1 1/4 screws, Type W or S	7	7
~~38~~37	5/8" gypsum sheathing [d]	1 3/4" galvanized roofing nail; staple galvanized, 1 5/8" long; 1 5/8" screws, Type W or S	7	7
Wood structural panels, combination subfloor underlayment to framing				
~~39~~38	3/4" and less	6d deformed (2" × 0.120") nail; or 8d common (2 1/2" × 0.131") nail	6	12
~~40~~39	7/8" - 1"	8d common (2 1/2" × 0.131") nail; or 8d deformed (2 1/2" × 0.120") nail	6	12
~~41~~40	1 1/8" - 1 1/4"	10d common (3" × 0.148") nail; or 8d deformed (2 1/2" × 0.120") nail	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 Ksi = 6.895 MPa.

a. All nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less.

b. Staples are 16 gage wire and have a minimum 7/16-inch on diameter crown width.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. For regions having basic wind speed of 110 mph or greater, 8d deformed (21/2" × 0.120) nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.

g. For regions having basic wind speed of 100 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. When basic wind speed is greater than 100 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.

h. Gypsum sheathing shall conform to ASTM C 1396 and shall be installed in accordance with GA 253. Fiberboard sheathing shall conform to ASTM C 208.

i. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at all floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

j. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

This proposed change is the second part of an effort by the ICC Building Code Action Committee to create a consistent format for the conventional wood frame fastener schedules in the IBC and the IRC. The revised descriptions in this proposed change were approved in the corresponding Table 2304.9.1 of the IBC (see S265). The row descriptions and organization of the IBC table (and now proposed in this IRC table) will be substantially the same, allowing for ease of use.

Complete consistency between the actual fastening specified in the two codes was beyond the scope of the committee work. In the approved IBC table some changes were made in order to provide alternatives currently permitted in the IRC, and to establish some common nail equivalents. No substantial changes are proposed to the IRC fastening, since the existing table generally permits the substitution of box nails for common nails, and the current fastening is well established. Rather, changes have been limited to the ordering, modification, addition, or combining of the fastening descriptions for clarity and consistency.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee feels this does not add clarity. The committee prefers RB272-13.

Assembly Action: None

Public Comments

Public Comment 2:

Randall Shackelford, Simpson Strong-Tie Company, requests Approval as Modified by this Public Comment.

Table R602.3(1)
FASTENING SCHEDULE

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER [a, b, c]	SPACING AND LOCATION
		Roof	
1	Blocking between ceiling joists or rafters to top plate	3-8d (2 ½ " x 0.113")	~~at each end~~ toe nail
2	Ceiling joists to top plate	3-8d (2 ½ " x 0.113")	per joist, toe nail
3	Ceiling joist not attached to parallel rafter laps over partitions ~~-~~(see Section R802.3.1, R802.3.2, Table R802.5.1(9))	3-10d (3" x 0.128")	Face nail
4	Ceiling joist attached to parallel rafter (heel joint) (see Section R802.3.1, R802.3.2, Table R802.5.1(9))	Per Table R802.5.1(9)	Face nail
5	Collar tie to rafter, or 1 1/4" x 20 gage ridge strap to rafter	3-10d (3" x 0.128")	Face nail each rafter
6	Rafter or roof truss to plate	3-16d box nails (3 ½" x 0.135"); or 3-10d common nails (3" x 0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss [j]
7	Roof rafters to ridge, valley or hip rafters: or, roof rafter to minimum 2-inch ridge beam	4-16d (3 ½ " x 0.135") 3-16d (3 ½ " x 0.135")	Toe nail End nail
		Wall	
8	Stud to stud (not at braced wall panels)	10d (3" x 0.128")	24" o.c. face nail
9	Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	16d (3 ½ " x 0.135")	12" o.c. face nail
10	Built-up header (2-inch to 2-inch header with ½" spacer)	16d (3 ½" × 0.135")	16" o.c. along each edge, face nail
11	Continuous header to stud	4-8d (2 ½ " × 0.113")	Toe nail
12	Top plate to top plate	10d (3" × 0.128")	24" o.c. face nail
13	Top plate to top plate, at end joints	8-16d (3 ½ " × 0.135")	Face nail on each side of end joint (minimum 24" lap splice length each side of end joint)
14	Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d (3 ½ " × 0.135")	16" o.c. face nail

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER [a, b, c]	SPACING AND LOCATION
15	Bottom plate to joist, rim joist, band joist or blocking at braced wall panels	3-16d (31/2" × 0.135")	3 each 16", face nail
16	Stud to bottom plate	3-8d (21/2" × 0.113") or 2-16d (31/2" × 0.135")	Toe nail End nail
17	Top ~~or bottom~~ plate to stud	2-16d (31/2" × 0.135")	End nail
18	Top plates, laps at corners and intersections	2-10d (3" × 0.128")	Face nail
19	1" brace to each stud and plate	2-8d (21/2" × 0.113") 2 staples 13/4"	Face nail --
20	1" × 6" sheathing to each bearing	2-8d (21/2" × 0.113") 2 staples, 1" crown, 16 ga., 13/4"long	Face nail --
21	1" x 8" and wider sheathing to each bearing	1"x 8": 2-8d (21/2" × 0.113") 3 staples, 1" crown, 16 ga., 13/4" long Wider than 1"x 8": 3-8d (21/2" × 0.113") 4 staples, 1" crown, 16 ga., 13/4" long	Face nail --
	Floor		

Commenter's Reason: We support the BCAC's reorganization of this table for consistency with the IBC's fastening for Conventional Construction. There are just a few items that we think can be improved.

- Line 1, for blocking between roof members, the toe nails are to the top plate along the length of the blocking, not at each end into the ceiling joist or rafter. The purpose of the blocking is to transfer shear forces into the top plate, and the toenailing has to be into the top plate to do this.
- Line 5, the fastening of the collar tie or ridge strap has to be into *each* rafter, not just a total of three nails.
- Line 10, the fastening of the built-up header uses 16d 3-1/2" long nails, so the minimum thickness of the built-up header must be 3-1/2". Therefore there must be a spacer, so we propose restoring the words "with ½" spacer".
- Line 10, the nails are installed "along" each edge, so we propose restoring that word to the fastener location.
- Line 15, the fastening at braced wall panels requires that three 16d nails be installed every 16". We propose adding "3 each" to remove the possibility for interpreting this as requiring only one nail every 16" o.c.
- Line 17, the fastening of stud to bottom plate is already covered in the previous line, so it can be deleted here.

Final Hearing Results

RB278-13 **AMPC2**

Code Change No: RB279-13

Original Proposal

Section(s): Table R602.3(1)

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTRUAL MEMBERS

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER[b, c, e]	SPACING OF FASTENERS	
			Edges (inches)i	Intermediate supports[c, e] (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing				
32	3/8″ - ½″	6d common (2″ × 0.113″) nail (subfloor wall)[j] 8d common (2 ½″ × 0.131″) nail (roof)[f]	6	12[g]

~~f. For regions having basic wind speed of 110 mph or greater, 8d deformed (2 ½″ × 0.120) nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.~~

(Portions of Table not shown remain unchanged)

Reason: Footnote "f" is proposed for deletion to remove a conflict with wind limitations of R301.2.1.1. The remainder of Table R602.3(1) and footnotes remain unchanged by this proposal.

Currently, R301.2.1.1 states that "The wind provisions of this code shall not apply to the design of buildings where wind design is required in accordance with Figure R301.2(4)B or where the basic wind speed from Figure R301.2(4)A equals or exceeds 110 miles per hour (49 m/s)." In areas where basic wind speed equals or exceeds 110 mph, design is required in accordance with various standards which include the Wood Frame Construction Manual (WFCM). Footnote "f" could potentially cause confusion and misapplication of the prescribed nailing (6" at edges and 12" at intermediate supports) in 110 mph and greater areas. For example, nail spacing for sheathing attachment at the perimeter edge zone could be as small as 4" at edges and 4" at intermediate supports when determined in accordance WFCM Table 3.10 for 140 mph, Exposure B (equivalent to IRC 110 mph, Exposure B).

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change deletes a redundant footnote that is already addressed in the code text. This will avoid potential confusion.

Assembly Action: **None**

Final Hearing Results

RB279-13 **AS**

Code Change No: RB280-13

Original Proposal

Section(s): Table R602.3(2), Chapter 44

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement* and Self

Revise as follows:

TABLE R602.3(2)
ALTERNATE ATTACHMENTS TO TABLE R602.3(1)

Nominal Material Thickness (inches)	Description of Fasteners and Length (inches)	Spacing of Fasteners	
		Edges (inches)	Body of panel (inches)
Floor underlayment; plywood-hardboard-particleboard[f]-fiber-cement[h]			
Fiber-cement			
¼	3d, corrosion-resistant, ring shank nails (finished flooring other than tile)	3	6
	Staple 18 ga., $^7/_8$ long, ¼ crown (finished flooring other than tile)	3	6
	1¼ long x .121 shank x .375 head diameter corrosion-resistant (galvanized or stainless steel) roofing nails (for tile finish)	8	8
	1¼ long, No. 8 x .375 head diameter, ribbed wafer-head screws (for tile finish)	8	8

h. Fiber-cement underlayment shall conform to ASTM C1288 or ISO 8336, Category C

Add new standard to Chapter 44 as follows:

ISO

ISO 8336 – Fibre-Cement Flat Sheets – Products Specification and Test Methods

Reason: The current table clearly limits the allowable type of permitted underlayment to wood panel-type product. The table as currently worded restrains trade by prohibiting the use of another approved type of underlayment. The inclusion of a reference to "fiber-cement" clarifies an alternative recognized product permitted in this type of Code-compliant subfloor/underlayment application (see ICC-ES ESR-1381 [reference Section 4.3], ESR-2280 [reference Sections 4.2.2.1 and 4.2.3.1 and Table 3], and ESR-2292 [reference Section 4.2]).

IBC Table 722.6.2(4) has, as a result of the Group A IBC Code Hearings, been revised to recognize fiber-cement underlayment in subfloor/underlayment combination. The addition of the new referenced ISO standard and "product category" were also approved during the Group A IBC Code Hearings. This proposed revision brings the two building codes (IBC & IRC) and the applicable code sections and standards references into general alignment by allowing fiber-cement underlayment in subfloor/underlayment combination applications.

Performance requirements of ISO 8336, *Fibre-cement flat sheets – Product specification and test methods*, have been harmonized with the performance requirements of ASTM C1288, *Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets*. Fiber-cement producers in Mexico, Central and South America, Europe, Asia, Australia and New Zealand currently manufacture and test their fiber-cement products for compliance with ISO 8336. The inclusion of this Standard reference in the IRC will permit manufacturers worldwide to demonstrate product compliance to IRC requirements. The addition of a reference to ISO 8336 in the Code removes a barrier to trade.

Cost Impact: The code change proposal will not increase the cost of construction because the proposed addition of fiber-cement underlayment to the table footnote only provides for the choice and use of a type of underlayment currently used in this type of application and permitted in ICC-ES Evaluation Service Reports.

Analysis: A review of the standard proposed for inclusion in the code, ISO 8336 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ISO8336 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: Approved based on the committee's previous action on RB256-13 and RB257-13. Also, makes the IRC consistent with the IBC.

Assembly Action: **None**

Final Hearing Results

RB280-13	**AS**

Code Change No: RB281-13

Original Proposal

Section(s): Table R602.3(5)

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association

Revise as follows:

TABLE R602.3(5)
SIZE, HEIGHT AND SPACING OF WOOD STUDS[a]

a. Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall. Increases in unsupported height are permitted where ~~justified by analysis~~ in compliance with exception 2 of Section R602.3.1 or designed in accordance with accepted engineering practice.

(Portions of Table not shown remain unchanged)

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The BCAC discussed what was inferred by "…where justified by analysis." meant. The conclusion was that this footnote should say that stud wall can be increased above 10 feet when the wall is compliant with exception 2 of Section R602.3.1 – in which case an engineered solution is not required.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change removes ambiguous language and adds clarity to the footnote.

Assembly Action: **None**

Public Comments

Public Comment:

Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE R602.3(5)
SIZE, HEIGHT AND SPACING OF WOOD STUDS[a]

a. Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall. Bearing walls shall be sheathed on at least one side or bridging shall be installed not greater than 4 feet apart measured vertically from either end of the stud. Increases in unsupported height are permitted where in compliance with exception 2 of Section R602.3.1 or designed in accordance with accepted engineering practice.

(Portions of Table not shown remain unchanged)

Commenter's Reason: This proposal was ***approved as submitted***. The ICC Building Code Action committee (BCAC) submits this public comment address an omission.

The stud table, Table R602.3(5), assumes there is gypsum wall board or sheathing applied to at least one side of the studs to stabilize weak axis bending. It came to our attention that this is not explicit in the other sections of the code, though it is implied. This further modification addresses the possible omission. Without wall finish on at least one side, the studs would not be within the L / d limit required by the AWC/AF&PA NDS and the buckling capacity of the studs in the weak direction could be exceeded.

Final Hearing Results

RB281-13	**AMPC**

Code Change No: RB283-13

Original Proposal

Section(s): R602.3.1, Table R602.3.1

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

Revise as follows:

R602.3.1 Stud size, height and spacing. The size, height and spacing of studs shall be in accordance with Table R602.3(5).

Exceptions:

1. Utility grade studs shall not be spaced more than 16 inches (406 mm) on center, shall not support more than a roof and ceiling, and shall not exceed 8 feet (2438 mm) in height for exterior walls and load-bearing walls or 10 feet (3048 mm) for interior nonload-bearing walls.
2. ~~Studs more than 10 feet in height which are in accordance with Table R602.3.1.~~
Where snow loads do not exceed 25 pounds per square foot, walls exposed to wind loads of 100 mph or less shall be permitted over 12 feet tall for either supporting a roof load with not more than 6' of tributary length, or for a gable end wall. The studs shall be a minimum 2x6 at 16 inches on center with a maximum height of 18 feet or 2x6 at 12 inches on center with a maximum height of 20 feet. Openings shall be permitted with jack studs supporting the header in accordance with Section R602.7 and double king studs outboard of the jacks on each side of the opening. If any portion of the two-story wall is required to be a qualified braced wall panel to achieve compliance with Section R602.10.2 for either floor, then the wall shall be designed by a registered design professional in accordance with the International Building Code.

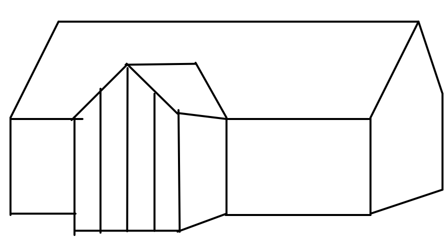
~~TABLE R602.3.1~~
~~MAXIMUM ALLOWABLE LENGTH OF WOOD STUDS EXPOSE TO WIND SPEEDS OF 100 MPH OR LESS IN SEISMIC DESIGN CATEGORIES A, B, C, D_0, D_1, and D_2 [b,c]~~

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

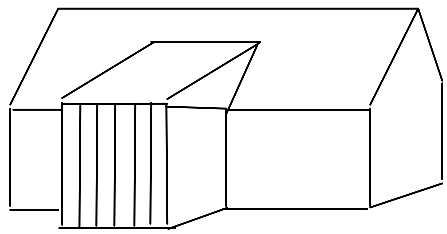
Table R602.3.1 has been the source of a lot of confusion. The footnote b is seldom read or understood. This change is submitted to:

1. Eliminate the table - the source of the confusion
2. Provide clarification as to where it can be applied (see the three options below)
3. Write in code language the requirements for when tall studs can be used.
4. To say that you cannot use these tall studs where the wall is an integral part of the wall bracing system.

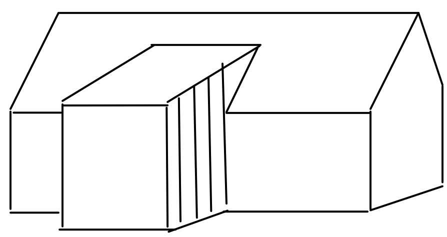
Tall studs could be used for two-story gable ended wall supporting nothing more than self weight.



Tall studs could be used for a two-story projection where the roof framing runs perpendicular to the wall so long as the overbuilt roof has a trib length of 6’ or less



Tall studs could be used for a two-story projection where the roof framing runs parallel to the wall such that it was supporting nothing more than self weight



Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The reason is unclear and the revision will not add any clarity to the code provisions. This would remove the use of the prescriptive design in the WFCM and require an engineered design.

Assembly Action: None

Public Comments

Public Comment:

Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

R602.3.1 Stud size, height and spacing. The size, height and spacing of studs shall be in accordance with Table R602.3(5).

Exceptions:

1. Utility grade studs shall not be spaced more than 16 inches (406 mm) on center, shall not support more than a roof and ceiling, and shall not exceed 8 feet (2438 mm) in height for exterior walls and load-bearing walls or 10 feet (3048 mm) for interior nonload-bearing walls.
2. ~~Studs more than 10 feet in height which are in accordance with Table R602.3.1.~~ Where snow loads are less than or equal to 25 pounds per square foot, and the ultimate design wind speed is less than or equal to 130 mph, 2x6 studs supporting a roof load with not more than 6’ of tributary length shall have a maximum height of 18 feet where spaced at 16 inches on center, or 20 feet where spaced at 12 inches on center. Studs shall be minimum No. 2 grade lumber.

~~**TABLE R602.3.1**~~
~~**MAXIMUM ALLOWABLE LENGTH OF WOOD STUDS EXPOSE TO WIND SPEEDS OF 100 MPH OR LESS IN SEISMIC DESIGN CATEGORIES A, B, C, D_0, D_1, and D_2[b,c]**~~

Commenter's Reason: The ICC Building Code Action Committee (BCAC) is submitting this public comment to address the code development committee's concerns.

1. The BCAC expressed in the original code change that the table could be more clearly understood in text rather than in table format. The code development committee disagreed. The BCAC has rewritten the text to make it even more clear.

2. This public comment removes reference to the IBC and engineered design so that design in accordance with WFCM is still permitted.

3. The reason the original code change proposal was written was because the footnote b to the table is frequently missed or applied incorrectly.
The basic stud table only allows studs to be 10 feet tall.
The exception in the wall bracing section will allow studs to be 12 feet tall.
Studs can go to 20 feet when the footnote b to Table R602.3.1 is applied, namely walls can carry a maximum of 6' of tributary width.

Final Hearing Results

RB283-13	AMPC

Code Change No: RB284-13

Original Proposal

Section(s): R602.3.2

Proponent: Edward L. Keith, P.E., APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R602.3.2 Top plate. Wood stud walls shall be capped with a double top plate installed to provide overlapping at corners and intersections with bearing partitions. End joints in top plates shall be offset at least 24 inches (610 mm). Joints in plates need not occur over studs. Plates shall be not less than 2-inches (51 mm) nominal thickness and have a width at least equal to the width of the studs.

~~**Exception:** A single top plate may be installed in stud walls, provided the plate is adequately tied at joints, corners and intersecting walls by a minimum 3-inch by 6-inch by a 0.036-inch-thick (76 mm by 152 mm by 0.914 mm) galvanized steel plate that is nailed to each wall or segment of wall by six 8d nails on each side provided the rafters or joists are centered over the studs with a tolerance of no more than 1 inch (25 mm). The top plate may be omitted over lintels that are adequately tied to adjacent wall sections with steel plates or equivalent as previously described.~~

<u>**Exception:** A single top plate used as an alternative to a double top plate shall comply with the following:</u>

1. <u>The top plate shall be tied at corners an intersecting walls with a 3-inch by 6-inch by 0.036-inch-thick (76 mm by 152 mm by .0914 mm) galvanized steel plate or equivalent.</u>
2. <u>The steel plate tie at corners and intersecting walls shall be natiled to each wall or segment of wall with six 8d (2-1/2" x 0.113") nails on each side of the joint.</u>
3. <u>Splices in the top plate at butt joints shall be tied with a 3-inch by 12-inch by 0.036-inch-thick (76 mm by 304 mm by 0.914 mm) galvanized steel plate or equivalent.</u>
4. <u>The steel plate tie at butt joints shall be nailed to each segment of wall with twelve 8d (2-1/2" x 0.113") nails on each side of the joint.</u>
5. <u>The rafters or joists shall be centered over the studs with a tolerance of not more than 1-inch (25 mm).</u>
6. <u>Omission of the top plate is permitted over headers where the headers are adequately tied to adjacent wall sections in accordance with Items 1 and 2 for header connections at corners and intersections, and Items 3 and 4 for header connections made along a single wall line.</u>

Reason: This is a companion item to S284-12/13 <u>adopted</u> in Portland in the October Final Action Hearing.

Item 14 of the 2012 IRC Table R602.3(1) establishes the minimum capacity required to insure an adequate tension splice in top plates. Aside from simply providing continuity between wall segments, the top-plate splice also acts as a tension tie (often called a collector or drag strut) to distribute the roof and floor shear loads into the bracing elements often spaced as much as 20 feet apart. Assuming spruce-pine-fir top plates the Table R602.3(1), item 14 requires a top-plate splice with eight 16d box nails on each side of the splice. In accordance with the NDS Table 11N, assuming SPF plates and a duration of load of 1.6 for lateral loads, the design capacity of the item 14 connection is (88 lb/nail x 8 nails x 1.6 dol =) 1126 lbs.

While sufficient for intersections and corners the *3-inch by 6-inch by a 0.036-inch-thick (76 mm by 152 mm by 0.914 mm) galvanized steel plate that is nailed to each wall or segment of wall by six 8d nails on each side…"* only provides about 600 lbf tension capacity (NDS Table 11P, SPF framing, box nails: 60 lbf/nail x 6 nails x 1.6 dol = 576 lbf). This is about ½ of what is requires in Table R602.3(1), item 14. As such, the splice plate requirement for in-line butt joints in single top plate systems should be twice what is currently required:

"…<u>at least the equivalent of 3-inch by 12-inch by a 0.036-inch-thick (76 mm by 304 mm by 0.914 mm) galvanized steel plate that is nailed to each wall or segment of wall by twelve 8d (2-1.2" x 0.113") nails on each side…</u>"

As a matter of clarification the type of nail to be used was described as only the penny-weight was specified. This is in keeping with current code style guidelines. I also specified which splice type was appropriate for headers when present. As these are neither corners nor intersections, it is clear that the butt-joint splice was the appropriate reference.

In addition, the reference to “a minimum” was deleted in favor of “at least the equivalent of” as it seemed more appropriate. “Lintels” was also changed in favor of “headers”, as lintels is a term more often associated with concrete construction where headers is more commonly used in wood construction.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This change needs additional work based on the committee’s previous action on RB274-13. The proponent will submit a public comment and bring back to the public comment hearing.

Assembly Action: **None**

Public Comments

Public Comment:

Edward L. Keith, representing APA – The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R602.3.2 Top plate. Wood stud walls shall be capped with a double top plate installed to provide overlapping at corners and intersections with bearing partitions. End joints in top plates shall be offset at least 24 inches (610 mm). Joints in plates need not occur over studs. Plates shall be not less than 2-inches (51 mm) nominal thickness and have a width at least equal to the width of the studs.

~~**Exception:** A single top plate used as an alternative to a double top plate shall comply with the following:~~

1. ~~The top plate shall be tied at corners an intersecting walls with a 3-inch by 6-inch by 0.036-inch-thick (76 mm by 152 mm by .0914 mm) galvanized steel plate or equivalent.~~
2. ~~The steel plate tie at corners and intersecting walls shall be nailed to each wall or segment of wall with six 8d (2-1/2” x 0.113”) nails on each side of the joint.~~
3. ~~Splices in the top plate at butt joints shall be tied with a 3-inch by 12-inch by 0.036-inch-thick (76 mm by 304 mm by 0.914 mm) galvanized steel plate or equivalent.~~
4. ~~The steel plate tie at butt joints shall be nailed to each segment of wall with twelve 8d (2-1/2” x 0.113”) nails on each side of the joint.~~
5. ~~The rafters or joists shall be centered over the studs with a tolerance of not more than 1-inch (25 mm).~~
6. ~~Omission of the top plate is permitted over headers where the headers are adequately tied to adjacent wall sections in accordance with Items 1 and 2 for header connections at corners and intersections, and Items 3 and 4 for header connections made along a single wall line.~~

Exceptions: A single top plate used as an alternative to a double top plate shall comply with the following:

1. The single top plate shall be tied at corners, intersecting walls, and at in-line splices in straight wall lines in accordance with Table R602.3.2.
2. The rafters or joists shall be centered over the studs with a tolerance of not more than 1-inch (25 mm).
3. Omission of the top plate is permitted over headers where the headers are adequately tied to adjacent wall sections in accordance with Table R602.3.2.

TABLE R602.3.2
SINGLE TOP-PLATE SPLICE CONNECTION DETAILS.

CONDITION	TOP-PLATE SPLICE LOCATION			
	Corners and Intersecting Walls		Butt Joints in Straight Walls	
	Splice Plate Size	Min. Nails Each Side of Joint	Splice Plate Size	Min. Nails Each Side of Joint
Structures in SDC A – C; and in SDC D_0, D_1 and D_2 with braced wall line spacing less than 25 feet	3” x 6” x 0.036” galvanized steel plate or equivalent	(6) 8d box(2-1/2” x 0.113”) nails	3’ x 12” x 0.036” galvanized steel plate or equivalent	(12) 8d box (2-1/2” x 0.113”) nails
Structures in SDC D_0, D_1 and D_2, with braced wall line spacing greater than or equal to 25 feet:	3” by 8” by 0.036” galvanized steel plate or equivalent	(9) 8d box (2-1/2” x 0.113”) nails	3’ x 16” x 0.036” galvanized steel plate or equivalent	(18) 8d box (2-1/2” x 0.113”) nails

For SI: 1 inch = 25.4mm. 1 foot = 304.8mm.

Commenter's Reason: The original code change proposal is a companion item to S284-12/13 adopted in Portland in the October Final Action Hearing. Item 14 of the 2012 IRC Table R602.3(1) establishes the minimum capacity required to insure an adequate tension splice when using a single top plate splice. We, as the proponents, asked for disapproved to permit us to alter this proposal to account for the second *double* top plate splice added to Table R602.3(1) via RB274-13. RB274-13 recognized the increased *double* top plate attachment requirements for higher seismic SDCs and when the braced wall spacing is 25 feet or greater. This new requirement for double top plate splices at in-line joints and at corners or intersections increases the required nailing by 50%.

As such, the *single* top plate splice requirements also increase by 50% when splices occur in SDC D_0, D_1 and D_2 with braced wall line spacing greater than or equal to 25 feet. With the addition of the high seismic double top plate requirement in IRC Table R602.3(1) as a result of RB274-13, it became necessary to ensure that the same capacity could be obtained by the prescriptive single top-plate splice provisions in Section R602.3.2. This Public Comment adds the single top plate splice requirements for SDC D_0, D_1 and D_2 with braced wall line spacing greater than or equal to 25 feet.

Final Hearing Results

RB284-13 **AMPC**

Code Change No: RB285-13

Original Proposal

Section(s): Figure R602.7.2

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

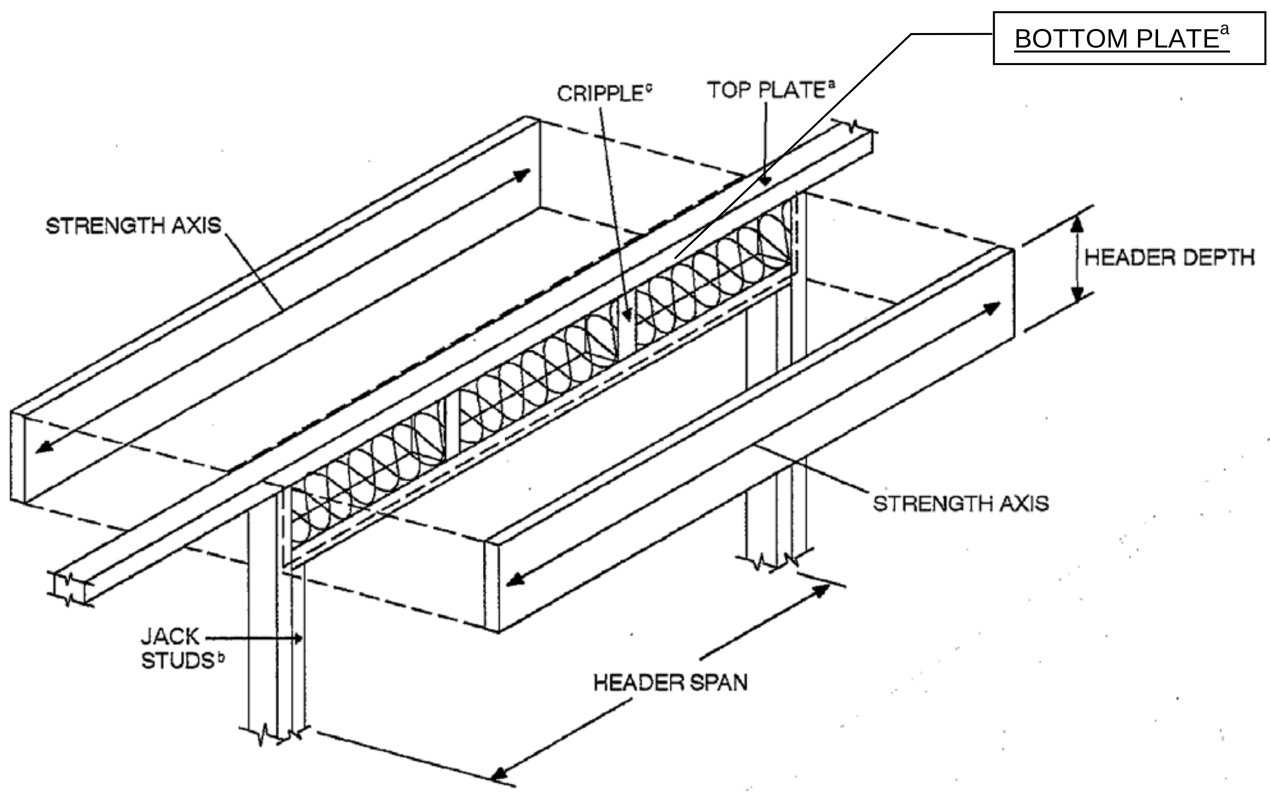


FIGURE R602.7.2
TYPICAL WOOD STRUCTURAL PANEL BOX HEADER CONSTRUCTION

a. The top <u>and bottom</u> plate<u>s</u> shall be continuous ~~over~~ <u>at</u> header location.

(Portions of Figure not shown remain unchanged)

Reason: This proposal requires that the bottom plate, as defined by part I of this proposal, be continuous at the header locations as well as the top plate. The bottom plate acts as a tension cord in a box beam and it is important that it be continuous. In fact, it is more important for gravity loads that the bottom plate to be continuous than it is for top plate continuity. This proposal requires both important elements of the box beam to be continuous so that under wind uplift loads the top chord will be continuous as well.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The following is errata that was not posted to the ICC website (The line from "Bottom Plate" has been shifted):

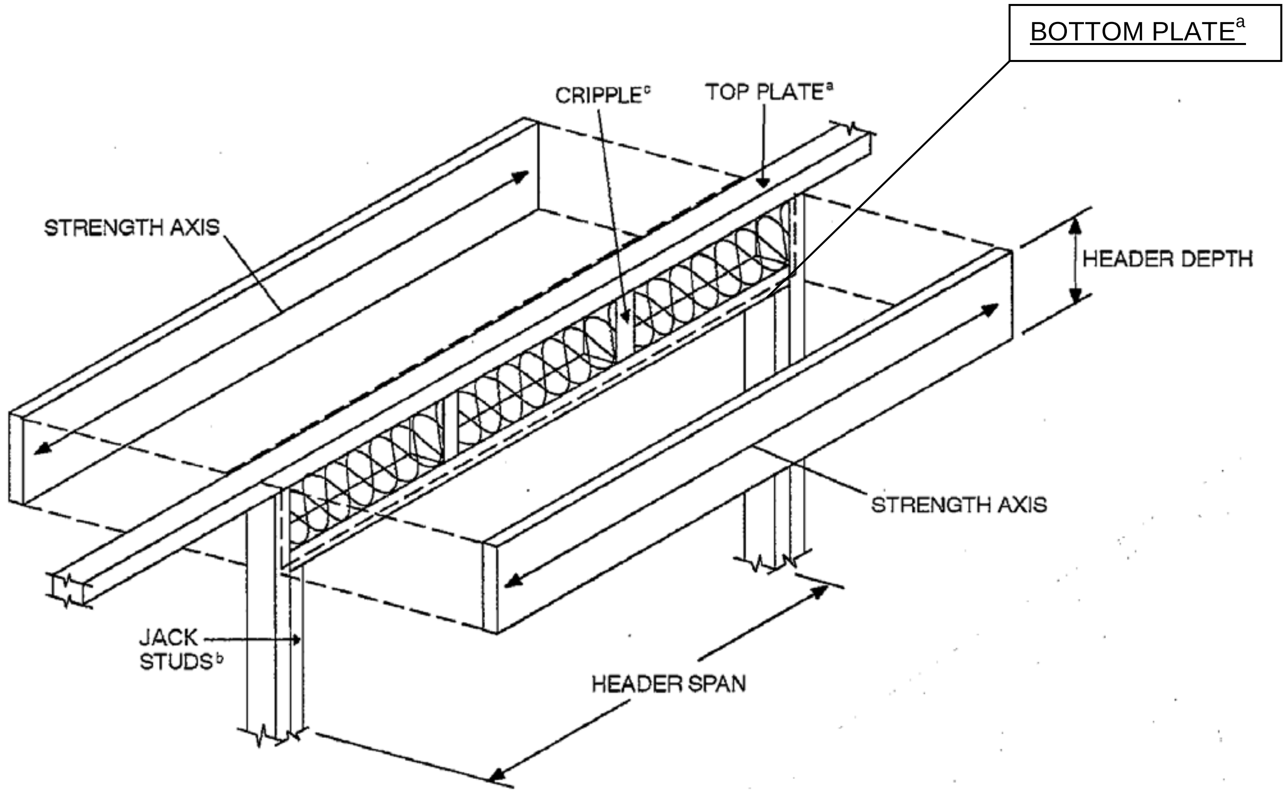


FIGURE R602.7.2
TYPICAL WOOD STRUCTURAL PANEL BOX HEADER CONSTRUCTION

a. The top and bottom plates shall be continuous ~~over~~ at header location.

(Portions of Figure not shown remain unchanged)

Committee Action: **Approved as Submitted**

Committee Reason: The change provides for continuity of the bottom plate for different loading conditions.

Assembly Action: **None**

Final Hearing Results

RB285-13 **AS**

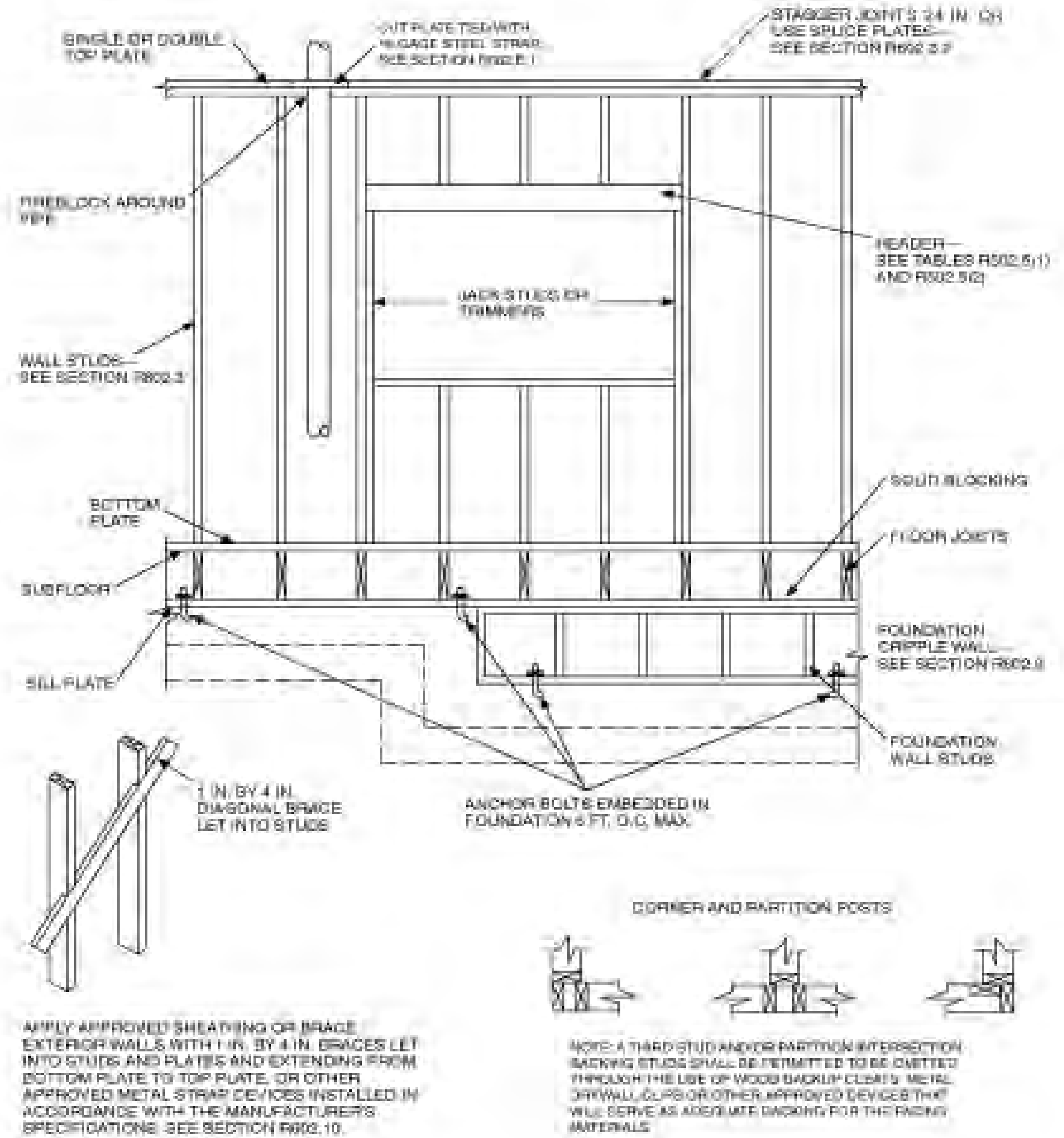
Code Change No: RB286-13

Original Proposal

Section(s): Figure R602.3(2), R602.7.4 (New)

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

Revise as follows:



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.3(2)
FRAMING DETAILS

<u>602.7.4 Supports for headers.</u> <u>Headers shall be supported on each end with one or more jack studs in accordance with Table R502.5(1) or Table R502.5(2). A king stud shall be adjacent to the jack stud on each end of the header and nailed at each end of the header with 4-16d nails.</u>

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The code is silent about how headers should be supported to prevent header rotation. The king studs should be used to stabilize the header with nails on each end.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

602.7.4 Supports for headers. Headers shall be supported on each end with one or more jack studs in accordance with Table R502.5(1) or Table R502.5(2), or approved framing anchors.. A king stud shall be installed ~~adjacent to the jack stud~~ on each end of the header and face nailed at each end of the header with 4-16d nails (3.5” x 0.135”).

Committee Reason: Approval was based upon the proponent’s published reason and the modification. The modification adds clarity for the header supports.

Assembly Action: None

Public Comments

Public Comment:

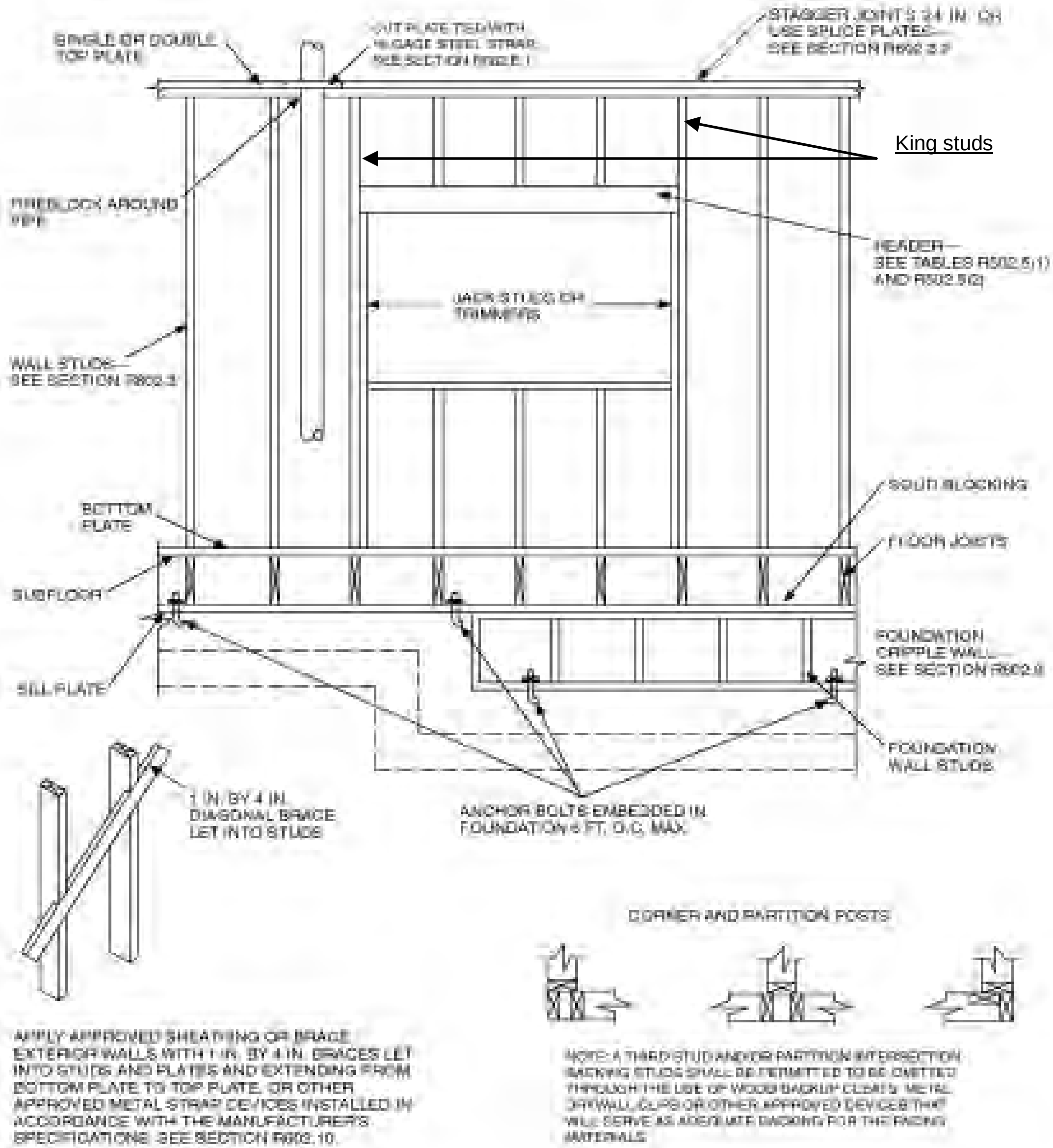
Dennis Pitts, American Wood Counctil, requests Approval as Modified by this Public Comment.

Further Modify the proposal as follows:

602.7.4 Supports for headers. Headers shall be supported on each end with one or more jack studs or with approved framing anchors in accordance with Table R502.5(1) or Table R502.5(2) ~~, or approved framing anchors~~. ~~A king stud shall be installed~~ The full height stud adjacent to ~~on~~ each end of the header ~~and~~ shall be ~~face~~ end nailed ~~at~~ to each end of the header with 4-16d nails (3.5”x 0.135”). The minimum number of full height studs at each end of a header shall be in accordance with Table R602.7.4.

TABLE R602.7.4
MINIMUM NUMBER OF FULL HEIGHT STUDS
AT EACH END OF HEADERS IN EXTERIOR WALLS

Header Span (feet)	Maximum Stud Spacing (in.) per Table R602.3(5)	
	16	24
≤ 3’	1	1
4’	2	1
8’	3	2
12’	5	3
16’	6	4



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.3(2)
FRAMING DETAILS

Replace "KING STUDS" with "FULL HEIGHT STUDS ADJACENT TO HEADER – SEE SECTION R602.7.4"

Commenter's Reason: During the Committee Hearings, several proposals were approved with varying requirements for full height stud at ends of headers (i.e. RB286, RB287 and RB288). This public comment intends to provide consistency in requirements. Separate public comments to RB287 and RB288 are proposed to allow coordination with proposed revisions in this public comment.

Proposed modifications utilize the term "full height stud" in lieu of "king stud" to be more consistent with terminology currently used in the IRC and Wood Frame Construction Manual (WFCM). The minimum number of full height studs is based on header span and maximum stud spacing in order to maintain the number of studs displaced by the opening over which the header spans. The current requirement for only one full-height at each end of longer headers is appropriate for shorter header spans but inadequate for longer header spans.

The maximum stud spacing per Table R602.3(5) is specifically listed in the column heading to make clear that the maximum stud spacing, not actual stud spacing, is the determining factor for the number of required full height studs at each end of the header. In construction, actual stud spacing is often 16” on center; however, the maximum stud spacing often permitted in the IRC is 24” on center. If the actual stud spacing is used and is less than the maximum stud spacing per Table R602.3(5), the required number of full height studs at each end of the header would be over-estimated.

Final Hearing Results

RB286-13	**AMPC**

Code Change No: RB287-13

Original Proposal

Section(s): R602.7, R602.7.1, Table R602.7.1, Table R602.7.1(2) (NEW)

Proponent: Jay Crandell, P.E., ARES Consulting, representing self (jcrandell@aresconsulting.biz)

Revise as follows:

R602.7 Headers. For header spans see Tables R502.5(1), R502.5(2), and R602.7.1(1).

R602.7.1 Single member headers. Single headers shall be framed with a single flat 2-inch-nominal (51 mm) member or wall plate not less in width than the wall studs on the top and bottom of the header in accordance with Figures R602.7.1(1) and R602.7.1(2). The number of king studs required at each end of a single member header shall comply with Table R602.7.1(2). The total number of king studs provided at both ends of a single member header need not exceed the number of layout studs displaced by the wall opening.

TABLE R602.7.1(1)
SPANS FOR MINIMUM No.2 GRADE SINGLE HEADER[a, b, c, f]

SINGLE HEADERS SUPPORTING	SIZE	WOOD SPECIES	GROUND SNOW LOAD (psf) ≤ 20[d]			30			50		
			Building Width (feet)[e]								
			20	28	36	20	28	36	20	28	36
Roof and ceiling	2 × 8	Spruce-Pine-Fir	4-10	4-2	3-8	4-3	3-8	3-3	3-7	3-0	2-8
		Hem-Fir or Southern Pine	5-1	4-4	3-10	4-6	3-10	3-5	3-9	3-2	2-10
		Douglas-Fir ~~or Southern Pine~~	5-3	4-6	4-0	4-7	3-11	3-6	3-10	3-3	2-11
	2 × 10	Spruce-Pine-Fir or Southern Pine	6-2	5-3	4-8	5-5	4-8	4-2	4-6	3-11	3-1
		Hem-Fir	6-6	5-6	4-11	5-8	4-11	4-4	4-9	4-1	3-7
		Douglas-Fir ~~or Southern Pine~~	6-8	5-8	5-1	5-10	5-0	4-6	4-11	4-2	3-9
	2 × 12	Spruce-Pine-Fir or Southern Pine	7-6	6-5	5-9	6-7	5-8	4-5	5-4	3-11	3-1
		Hem-Fir	7-10	6-9	6-0	6-11	5-11	5-3	5-9	4-8	3-8
		Douglas-Fir ~~or Southern Pine~~	8-1	6-11	6-2	7-2	6-1	5-5	5-11	5-1	4-6
Roof, ceiling and one center-bearing floor	2 × 8	Spruce-Pine-Fir	3-10	3-3	2-11	3-9	3-3	2-11	3-5	2-11	2-7
		Hem-Fir or Southern Pine	4-0	3-5	3-1	3-11	3-5	3-0	3-7	3-0	2-8
		Douglas-Fir ~~or Southern Pine~~	4-1	3-7	3-2	4-1	3-6	3-1	3-8	3-2	2-9

SINGLE HEADERS SUPPORTING	SIZE	WOOD SPECIES	GROUND SNOW LOAD (psf)								
			≤ 20[d]			30			50		
			Building Width (feet)[e]								
			20	28	36	20	28	36	20	28	36
	2 × 10	Spruce-Pine-Fir or Southern Pine	4-11	4-2	3-8	4-10	4-1	3-6	4-4	3-7	2-10
		Hem-Fir	5-1	4-5	3-11	5-0	4-4	3-10	4-6	3-11	3-4
		Douglas-Fir ~~or Southern Pine~~	5-3	4-6	4-1	5-2	4-5	4-0	4-8	4-0	3-7
	2 × 12	Spruce-Pine-Fir or Southern Pine	5-8	4-2	3-4	5-5	4-0	3-6	4-9	3-6	2-10
		Hem-Fir	5-11	4-11	3-11	5-10	4-9	4-2	5-5	4-2	3-4
		Douglas-Fir ~~or Southern Pine~~	6-1	5-3	4-8	6-0	5-2	4-10	5-7	4-10	4-3
Roof, ceiling and one clear span floor	2 × 8	Spruce-Pine-Fir	3-5	2-11	2-7	3-4	2-11	2-7	3-3	2-10	2-6
		Hem-Fir or Southern Pine	3-7	3-1	2-9	3-6	3-0	2-8	3-5	2-11	2-7
		Douglas-Fir ~~or Southern Pine~~	3-8	3-2	2-10	3-7	3-1	2-9	3-6	3-0	2-9
	2 × 10	Spruce-Pine-Fir or Southern Pine	4-4	3-7	2-10	4-3	3-6	2-9	4-2	3-4	2-7
		Hem-Fir	4-7	3-11	3-5	4-6	3-10	3-3	4-4	3-9	3-1
		Douglas-Fir ~~or Southern Pine~~	4-8	4-0	3-7	4-7	4-0	3-6	4-6	3-10	3-5
	2 × 12	Spruce-Pine-Fir or Southern Pine	4-11	3-7	2-10	4-9	3-6	2-9	4-6	3-4	2-7
		Hem-Fir	5-6	4-3	3-5	5-6	4-2	3-3	5-4	3-11	3-1
		Douglas-Fir ~~or Southern Pine~~	5-8	4-11	4-4	5-7	4-10	4-3	5-6	4-8	4-2

For SI: 1 inch=25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.
b. Table is based on a maximum roof-ceiling dead load of 15 psf.
c. The header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header in lieu of the required jack stud.
d. The 20 psf ground snow load condition shall apply only when the roof pitch is 9:12 or greater. In conditions where the ground snow load is 30 psf or less and the roof pitch is less than 9:12, use the 30 psf ground snow load condition.
e. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
f. The header shall bear on a minimum of one jack stud at each end.

TABLE R602.7.1(2)
NUMBER OF KING STUDS REQUIRED AT EACH END OF A SINGLE MEMBER HEADER[a]

STUD SIZE	OPENING WIDTH (FEET)	BASIC WIND SPEED (MPH) & EXPOSURE CONDITION																	
		85/B			90/B			100/B, 85/C			110/B, 90/C, 85/D			120/B, 100/C, 90/D			130/B, 110/C, 100/D		
		WALL HEIGHT (FEET)																	
		8	9	10	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
2x4	2	1	1	2	1	1	2	1	2	2	2	2	2	2	2	3	2	2	3
	3	1	2	2	1	2	2	2	2	2	2	2	3	2	3	3	2	3	4
	4	1	2	2	2	2	2	2	2	3	2	3	3	2	3	4	3	3	4
	6	2	2	3	2	2	3	2	3	3	3	3	4	3	4	5	4	4	5

STUD SIZE	OPENING WIDTH (FEET)	BASIC WIND SPEED (MPH) & EXPOSURE CONDITION																	
		85/B			90/B			100/B, 85/C			110/B, 90/C, 85/D			120/B, 100/C, 90/D			130/B, 110/C, 100/D		
		WALL HEIGHT (FEET)																	
		8	9	10	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
	8	2	3	3	2	3	3	3	3	4	3	4	5	4	5	6	4	5	7
	10	2	3	4	3	3	4	3	4	5	4	5	6	4	6	7	5	6	8
2x6	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2
	4	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2
	6	1	1	1	1	1	2	1	2	2	1	2	2	2	2	2	2	2	3
	8	1	1	2	1	2	2	2	2	2	2	2	2	2	2	3	2	3	3
	10	1	2	2	1	2	2	2	2	2	2	2	3	2	3	3	3	3	4

For SI: 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 1.609 km/h.

a. Table is based on minimum Stud grade Spruce-Pine-Fir (South) lumber.

Reason: This proposal provides king stud requirements for wall openings spanned by single member headers to ensure structural integrity to compensate for removal of full-height layout studs over the span of the wall opening. The number of king studs required is based on wind loading only because the jack stud required with single member headers supports gravity loading (as is the case with the header requirements in Chapter 5). This proposal is in response to discussions with a concerned code official subsequent to approval of the single member header provisions last code cycle. The changes to renumbered Table R602.7.1(1) are intended to align with Southern Pine design value changes forthcoming for the respective single member header sizes.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This is a needed change that addresses the issue of king studs at single headers.

Assembly Action: **None**

Public Comments

Public Comment:

Dennis Pitts, American Wood Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

R602.7.1 Single member headers. Single headers shall be framed with a single flat 2-inch-nominal (51 mm) member or wall plate not less in width than the wall studs on the top and bottom of the header in accordance with Figures R602.7.1(1) and R602.7.1(2) and face nailed to the top and bottom of the header with 10d box nails (3” x 0.128”) spaced 12” o.c.

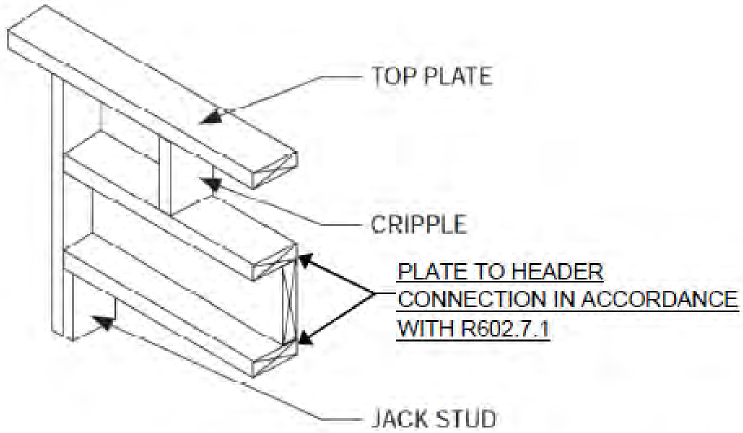


FIGURE R602.7.1(1)
SINGLE MEMBER HEADER IN EXTERIOR BEARING WALL

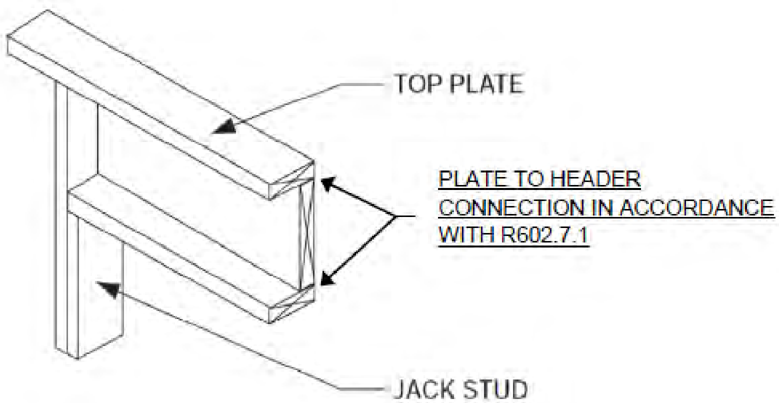


FIGURE R602.7.1(2)
ALTERNATIVE SINGLE MEMBER HEADER WITHOUT CRIPPLE

Commenter's Reason: This proposal specifies nailing of the plates to the header as a means of bracing the header to limit development of out-of-plane buckling under gravity loads. The specified nailing matches recommended nailing for double top plate connections in accordance with RB272 (which was approved as submitted). Additional labeling of the referenced single ply header figure is provided to clarify location of intended nailing between plates and header.

Replacement of RB287 (which was recommended for approval as submitted) is being proposed with this public comment to remove inconsistencies and duplication resulting from two other proposals as follows:

a) RB286 (approved as modified) addresses full-height stud requirements for all headers – not just single ply headers. Retention of full-height stud requirements in RB287 as approved by the IRC committee will result in inconsistent full-height stud requirements for support of single ply headers relative to multi-ply headers.

b) RB252 (approved as submitted) corrects spans for single ply headers to account for Southern Pine design values changes and incorporates single ply header spans in the existing header table. Retention of single ply header spans in RB287 as approved by the IRC committee will result in inconsistent header spans from those in the approved as modified version of RB252 to reflect new Southern Pine design values.

Final Hearing Results

RB287-13	**AMPC**

Code Change No: RB288-13

Original Proposal

Section(s): R602.7, R602.7.2 (NEW), Table R602.7.2(1) (NEW), Table R602.7.2(2) (NEW), Table R602.7.3(1) (NEW), R602.7.3(2) (NEW), Figure R602.7.2 (NEW)

Proponent: Vladimir Kochkin, NAHB Research Center, Inc. (vkochkin@nahbrc.org), Jay H. Crandell, P.E., ARES Consulting (jcrandell@aresconsulting.biz)

Revise as follows:

R602.7 Headers. For header spans and number of jack studs required, see Tables R502.5(1), R502.5(2)~~,~~ ~~and~~. For single member header requirements, refer to Section R602.7.1. For rim board header requirements, refer to Section R602.7.2.

R602.7.2 Rim Board Headers. Rim board header size, material, and span shall be in accordance with Tables R602.7.2(1) and R602.7.2(2). Rim board headers shall be constructed in accordance with Figure R602.7.2 and shall be supported at each end by king studs. The number of king studs required to support each end of a rim board header shall comply with greater number from Table R602.7.3(1) and Table R602.7.3(2). For 2x6 walls with a single top plate and for 2x4 walls, the number of king studs shall not be less than two at each end of a two-ply rim board header. The total number of king studs provided at both ends of the rim board header need not exceed the number of layout studs displaced by the wall opening. Each ply of built-up king studs shall be face-nailed to the adjacent ply with 2-10d (3” x 0.128”) nails at 16 inches on center. Rim board headers supporting concentrated loads, such as reactions from floor or roof girders or wall opening framing above the rim board header, shall be designed.

TABLE R602.7.2(1)
MAXIMUM ALLOWABLE SPANS FOR SINGLE-PLY RIM BOARD HEADERS[a,b]

RIM HEADERS SUPPORTING:	SIZE	WOOD SPECIES OR TYPE[d]	GROUND SNOW LOAD (psf)								
			≤ 20[e]			30			50		
			Building Width (feet)								
			20[f]	28	36	20	28	36	20	28	36
Roof, ceiling, and wall	2x10	SPF-S, SYP	5-7	4-11	4-5	5-1	4-5	3-8	4-3	3-3	2-7
		HF	5-11	5-2	4-8	5-3	4-7	4-2	4-6	3-11	3-2
		DF	6-1	5-4	4-9	5-5	4-9	4-3	4-8	4-0	3-7
	2x12	SPF-S, SYP	6-10	5-8	4-7	5-11	4-6	3-8	4-3	3-3	2-7
		HF	7-2	6-3	5-6	6-5	5-5	4-5	5-2	3-11	3-2
		DF	7-4	6-5	5-10	6-7	5-9	5-2	5-8	4-11	4-4
	1-1/8”x 9-1/2”	Engr. Wood	4-5	3-10	3-6	3-11	3-5	3-1	3-4	2-11	2-7
	1-1/8”x 11-7/8”		5-6	4-10	4-4	4-11	4-4	3-11	4-2	3-8	3-2
	1-1/4”x 9-1/2”	Engr. Wood	6-4	5-7	5-0	5-9	5-0	4-6	4-10	4-3	3-9
	1-1/4”x 11-7/8”		7-7	6-8	6-0	6-10	5-11	5-4	5-10	5-0	4-5
Roof, ceiling, wall, and one center-bearing floor[c]	2x10	SPF-S, SYP	4-11	4-1	3-3	4-10	3-11	3-2	4-4	3-2	2-6
		HF	5-1	4-5	3-11	5-0	4-4	3-9	4-6	3-10	3-1
		DF	5-3	4-6	4-0	5-2	4-5	4-0	4-8	4-0	3-7
	2x12	SPF-S, SYP	5-6	4-1	3-3	5-4	3-11	3-2	4-4	3-2	2-6
		HF	6-3	5-0	3-11	6-1	4-9	3-9	5-3	3-10	3-1
		DF	6-5	5-6	4-11	6-3	5-5	4-10	5-8	4-10	4-3
	1-1/8”x 9-1/2”	Engr. Wood	3-10	3-3	2-11	3-9	3-3	2-11	3-5	2-11	2-6
	1-1/8”x 11-7/8”		4-9	4-1	3-8	4-8	4-0	3-7	4-3	3-7	3-1
	1-1/4”x 9-1/2”	Engr. Wood	5-6	4-9	4-3	5-5	4-8	4-2	4-11	4-2	3-9
	1-1/4”x 11-7/8”		6-7	5-8	5-1	6-6	5-7	5-0	5-10	5-0	4-3
Roof, ceiling, wall and one clear span floor[c]	2x10	SPF-S, SYP	4-4	3-3	2-7	4-3	3-2	2-6	4-0	2-11	2-4
		HF	4-7	3-11	3-1	4-6	3-9	3-0	4-4	3-7	2-10
		DF	4-8	4-0	3-7	4-7	4-0	3-6	4-6	3-10	3-5
	2x12	SPF-S, SYP	4-5	3-3	2-7	4-3	3-2	2-6	4-0	2-11	2-4
		HF	5-4	3-11	3-1	5-2	3-9	3-0	4-10	3-7	2-10
		DF	5-8	4-11	4-4	5-7	4-10	4-2	5-6	4-8	3-11
	1-1/8”x 9-1/2”	Engr. Wood	3-5	2-11	2-7	3-4	2-11	2-7	3-3	2-10	2-6
	1-1/8”x 11-7/8”		4-3	3-8	3-2	4-2	3-7	3-1	4-1	3-6	2-11
	1-1/4”x 9-1/2”	Engr. Wood	4-11	4-3	3-9	4-10	4-2	3-8	4-9	4-1	3-7
	1-1/4”x 11-7/8”		5-10	5-0	4-4	5-9	4-11	4-2	5-7	4-10	3-11

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.
b. Table is based on a maximum roof-ceiling dead load of 15 psf, floor dead load of 10 psf, and floor live load of 40 psf.
c. Floor joists framing into rim header shall be attached to the rim header using joist hangers sized to support the joist bearing load or an approved design.
d. Solid sawn wood rim members shall be minimum No. 2 grade. Engineered wood rim members shall meet or exceed the following material design properties and comply with applicable usage limitations in accordance with the manufacturer's approved data:
   1-1/8” members: F_b=600 psi, F_v=270 psi, E=550,000 psi, $F_{c,perp}$=550 psi
   1-1/4” members: F_b=1,130 psi, F_v=355 psi, E=660,750 psi, $F_{c,perp}$=680 psi
e. The 20 psf ground snow load condition shall apply only when the roof pitch is 9:12 or greater. In conditions where the ground snow load is 30 psf or less and the roof pitch is less than 9:12, use the 30 psf ground snow load condition.
f. To determine the allowable span for rim board headers parallel to floor joists and supporting non-load bearing walls above, use table column for 20 psf ground snow load and 20 ft building width with “roof, ceiling, and wall” support condition.

TABLE R602.7.2(2)
MAXIMUM ALLOWABLE SPANS FOR TWO-PLY RIM BOARD HEADERS[a,b]

RIM HEADERS SUPPORTING:	SIZE	WOOD SPECIES OR TYPE[d]	GROUND SNOW LOAD (psf)								
			≤ 20[e]			30			50		
			Building Width (feet)								
			20[f]	28	36	20	28	36	20	28	36
Roof, ceiling, and wall	2-2x10	see Table R502.5(1)									
	2-2x12	see Table R502.5(1)									
	(2)1-1/8”x 9-1/2”	Engr. Wood	6-3	5-5	4-11	5-7	4-11	4-5	4-9	4-2	3-8
	(2)1-1/8”x 11-7/8”		7-9	6-10	6-2	7-0	6-1	5-6	5-11	5-2	4-7
	(2)1-1/4”x 9-	Engr.	8-4	7-8	7-1	7-9	7-1	6-4	6-11	6-0	5-4

RIM HEADERS SUPPORTING:	SIZE	WOOD SPECIES OR TYPE[d]	GROUND SNOW LOAD (psf)								
			≤ 20[e]			30			50		
			Building Width (feet)								
			20[f]	28	36	20	28	36	20	28	36
	1/2” (2)1-1/4”x 11-7/8”	Wood	10-5	9-5	8-6	9-8	8-5	7-7	8-2	7-1	6-5
Roof, ceiling, wall, and one center-bearing floor[c]	2-2x10	see Table R502.5(1)									
	2-2x12	see Table R502.5(1)									
	(2)1-1/8”x 9-1/2” (2)1-1/8”x 11-7/8”	Engr. Wood	5-5 6-9	4-8 5-10	4-2 5-2	5-4 6-8	4-7 5-8	4-1 5-1	4-9 6-0	4-1 5-1	3-8 4-7
	(2)1-1/4”x 9-1/2” (2)1-1/4”x 11-7/8”	Engr. Wood	7-7 9-4	6-9 8-0	6-0 7-2	7-6 9-2	6-7 7-10	5-11 7-0	6-11 8-3	5-11 7-1	5-3 6-3
Roof, ceiling, wall and one clear span floor[c]	2-2x10	see Table R502.5(1)									
	2-2x12	see Table R502.5(1)									
	(2)1-1/8”x 9-1/2” (2)1-1/8”x 11-7/8”	Engr. Wood	4-10 6-0	4-2 5-9	3-8 4-7	4-9 5-11	4-1 5-1	3-7 4-6	4-7 5-9	3-11 4-11	3-6 4-4
	(2)1-1/4”x 9-1/2” (2)1-1/4”x 11-7/8”	Engr. Wood	7-0 8-4	6-0 7-1	5-4 6-4	6-10 8-2	5-11 7-0	5-3 6-3	6-8 7-11	5-9 6-10	5-1 5-11

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.
b. Table is based on a maximum roof-ceiling dead load of 15 psf, floor dead load of 10 psf, and floor live load of 40 psf.
c. Floor joists framing into rim header shall be attached to the rim header using joist hangers sized to support the joist bearing load or an approved design.
d. For solid sawn wood, refer to Table R502.5(1). Engineered wood rim members shall meet or exceed the following material design properties and comply with applicable usage limitations in accordance with the manufacturer’s approved data and usage limitations:
   1-1/8” members: F_b=600 psi, F_v=270 psi, E=550,000 psi, $F_{c,perp}$=550 psi
   1-1/4” members: F_b=1,130 psi, F_v=355 psi, E=660,750 psi, $F_{c,perp}$=680 psi
e. The 20 psf ground snow load condition shall apply only when the roof pitch is 9:12 or greater. In conditions where the ground snow load is 30 psf or less and the roof pitch is less than 9:12, use the 30 psf ground snow load condition.
f. To determine the allowable span for rim board headers parallel to floor joists and supporting non-load bearing walls above, use table column for 20 psf ground snow load and 20 ft building width with “roof, ceiling, and wall” support condition.

TABLE R602.7.3(1)
NUMBER OF KING STUDS REQUIRED FOR GRAVITY LOAD RESISTANCE[a]

KING POST SUPPORTING:	OPENING WIDTH (FEET)	2x4 FRAMING									2x6 FRAMING								
		GROUND SNOW LOAD (PSF)									GROUND SNOW LOAD (PSF)								
		≤ 20[b]			30			50			≤ 20			30			50		
		BUILDING WIDTH (FEET)									BUILDING WIDTH (FEET)								
		20[c]	28	36	20	28	36	20	28	36	20	28	36	20	28	36	20	28	36
Roof, ceiling, and wall	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	3	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1
	4	1	1	2	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1
	6	2	2	2	2	2	3	2	3	3	1	1	1	1	1	1	1	2	2
	8	2	2	3	2	3	3	3	4	5	1	1	2	1	2	2	2	2	2
	10	2	3	3	3	3	4	4	5	6	1	2	2	1	2	2	2	2	3
	12	3	3	4	3	4	5	4	5	6	1	2	2	2	2	2	2	3	3
Roof, ceiling, wall, and one center-bearing floor[c]	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	3	1	1	2	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1
	4	1	2	2	1	2	2	2	2	3	1	1	1	1	1	1	1	1	1
	6	2	2	3	2	2	3	2	3	4	1	1	2	1	1	2	1	2	2
	8	2	3	4	2	3	4	3	4	5	1	2	2	1	2	2	2	2	2
	10	3	4	4	3	4	5	3	5	6	2	2	2	2	2	2	2	2	3
	12	3	4	5	3	4	5	4	5	7	2	2	3	2	2	3	2	3	3
Roof, ceiling, wall and one clear span floor[c]	2	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1
	3	1	2	2	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1
	4	2	2	3	2	2	3	2	2	3	1	1	1	1	1	1	1	1	2
	6	2	3	4	2	3	4	2	3	4	1	2	2	1	2	2	1	2	2
	8	3	4	5	3	4	5	3	4	5	2	2	2	2	2	2	2	2	3
	10	3	5	6	4	5	6	4	5	6	2	2	3	2	2	3	2	3	3
	12	4	5	7	4	5	7	4	6	7	2	3	3	2	3	3	2	3	4

For SI: 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

a. Table is based on minimum Stud grade Spruce-Pine-Fir (South) lumber, a maximum roof-ceiling dead load of 15 psf, floor dead load of 10 psf, and floor live load of 40 psf.

b. The 20 psf ground snow load condition shall apply only when the roof pitch is 9:12 or greater. In conditions where the ground snow load is 30 psf or less and the roof pitch is less than 9:12, use the 30 psf ground snow load condition.

c. To determine the required number of king studs for rim board headers parallel to floor joists and supporting non-load bearing walls above, use table column for 20 psf ground snow load and 20 ft building width with “roof, ceiling, and wall” support condition.

TABLE R602.7.3(2)
NUMBER OF KING STUDS REQUIRED FOR WIND LOAD RESISTANCE[a]

STUD SIZE	OPENING WIDTH (FEET)	BASIC WIND SPEED (MPH) & EXPOSURE CONDITION																	
		85/B			90/B			100/B, 85/C			110/B, 90/C, 85/D			120/B, 100/C, 90/D			130/B, 110/C, 100/D		
		WALL HEIGHT (FEET)																	
		8	9	10	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
2x4	2	1	1	2	1	1	2	1	2	2	2	2	2	2	2	3	2	2	3
	3	1	2	2	1	2	2	2	2	2	2	2	3	2	3	3	2	3	4
	4	1	2	2	2	2	2	2	2	3	2	3	3	2	3	4	3	3	4
	6	2	2	3	2	2	3	2	3	3	3	3	4	3	4	5	4	4	5
	8	2	3	3	2	3	3	3	3	4	3	4	5	4	5	6	4	5	7
	10	2	3	4	3	3	4	3	4	5	4	5	6	4	6	7	5	6	8
	12	3	3	4	3	4	5	4	5	6	4	5	7	5	6	7	6	7	8
2x6	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2
	4	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2
	6	1	1	1	1	1	2	1	2	2	1	2	2	2	2	2	2	2	3

STUD SIZE	OPENING WIDTH (FEET)	BASIC WIND SPEED (MPH) & EXPOSURE CONDITION																	
		85/B			90/B			100/B, 85/C			110/B, 90/C, 85/D			120/B, 100/C, 90/D			130/B, 110/C, 100/D		
		WALL HEIGHT (FEET)																	
		8	9	10	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
	8	1	1	2	1	2	2	2	2	2	2	2	2	2	2	3	2	3	3
	10	1	2	2	1	2	2	2	2	2	2	2	3	2	3	3	3	3	4
	12	2	2	2	2	2	2	2	2	3	2	3	3	2	3	4	3	4	4

For SI: 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 1.609 km/h.

a. Table is based on minimum Stud grade Spruce-Pine-Fir (South) lumber.

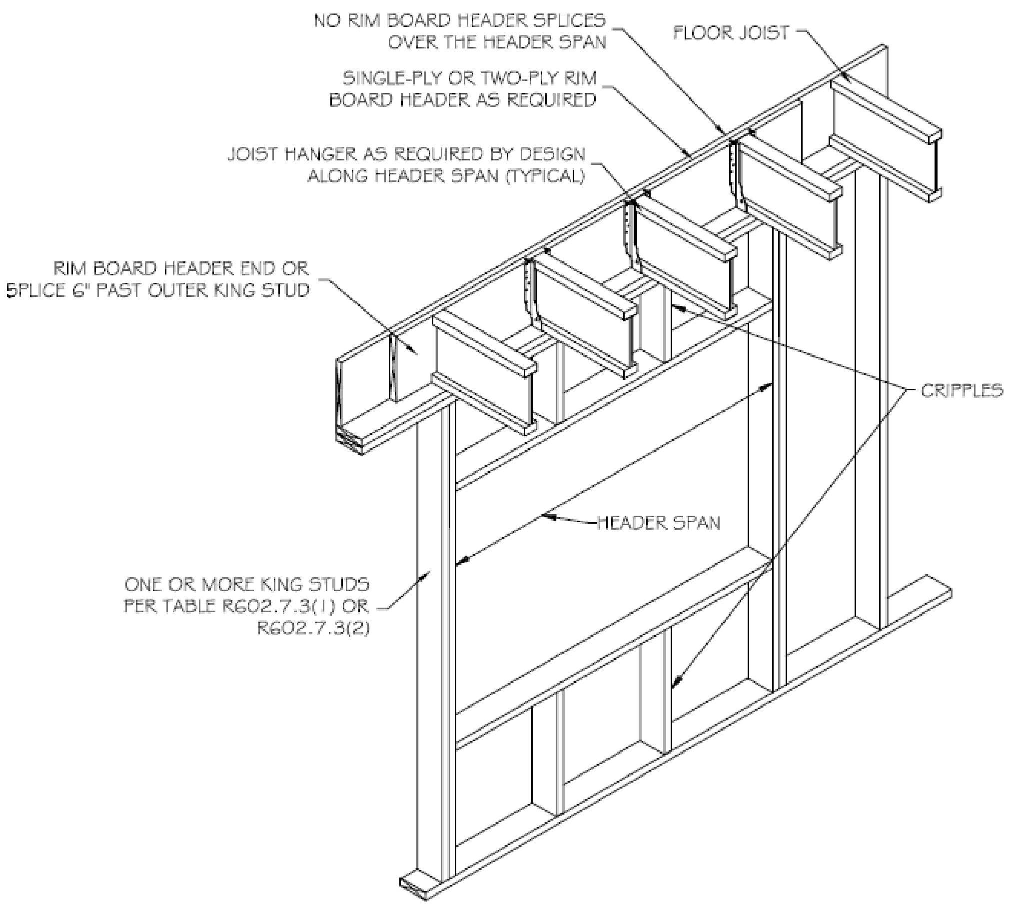


FIGURE R602.7.2
RIM BOARD HEADER CONSTRUCTION

Reason: This proposal adds a rim board header option to promote more resource and energy efficient wall framing. The analysis of rim board headers for this proposal is based on the same methodology applied for the existing IRC provisions for single headers and is consistent with header analysis as applied in the Wood Frame Construction Manual (WFCM). Both solid sawn and engineered wood members are included. King stud requirements are added to ensure adequate support of rim board headers and out-of-plane wind load resistance as this type of header construction uses only king studs which serve as jamb or trimmer studs for the wall opening below.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This is a much needed change because rim board headers are more energy efficient and it brings advanced framing technique in the code. The opponent will work with the proponent to bring back a public comment to address the changes in the modification that was disallowed.

Assembly Action: **None**

Public Comments

Public Comment:

Dennis Pitts, American Wood Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

R602.7.2 Rim Board Headers. Rim board header size, material, and span shall be in accordance with Table R602.7.1 for single-ply rim board headers and Table R502.5(1) for two-ply rim board headers. Rim board headers shall be constructed in accordance with Figure R602.7.2 and shall be supported at each end by full height studs. The number of full height studs at each end shall not be less than the number of studs displaced by half of the header span based on the maximum stud spacing in accordance with Table R602.3(5). Rim board headers supporting concentrated loads shall be designed in accordance with accepted engineering practice.

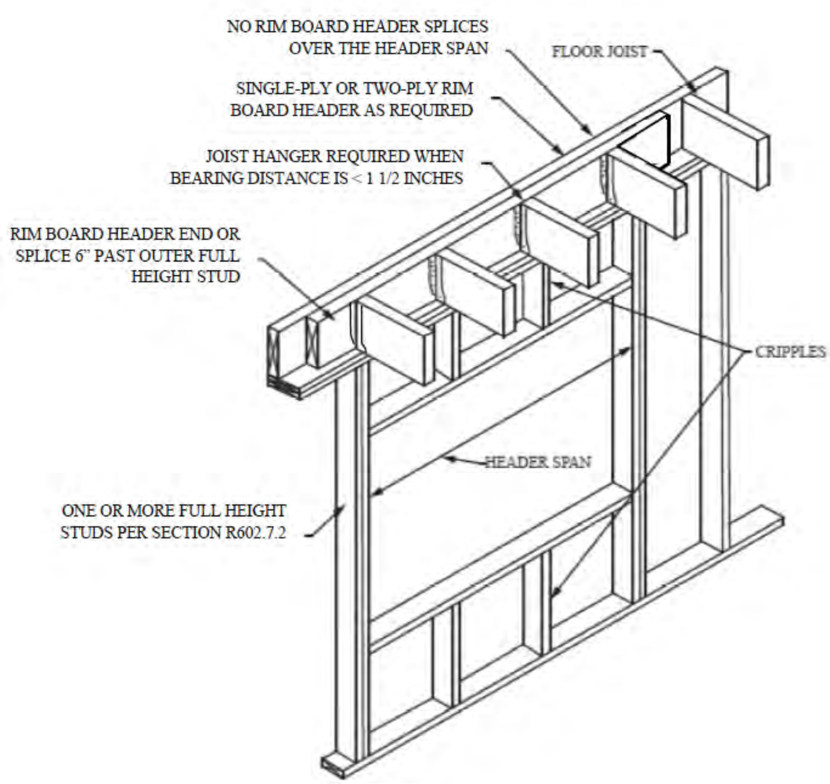


FIGURE R602.7.2
RIM BOARD HEADER CONSTRUCTION

Commenter's Reason: This public comment replaces RB288 (which was recommended for approval as submitted) with simplified requirements for sawn lumber rim board headers based on referencing existing header tables updated by Committee action on RB250 (which was approved as modified), RB252 (which was approved as submitted), and RB286 (which was approved as modified).

Committee action on RB250 and RB252 establishes updated header spans for single ply and multi ply headers to account for changes in Southern Pine design values. Those header spans are equally applicable to rim board headers without required duplication of span information in separate rim board header tables. Reference to existing header tables removes unwarranted inconsistencies in tabulated spans and simplifies the code. It should be noted that RB252-13 combines Tables R602.7.1 and R502.5(1) into a single table R602.7(1). That change will necessitate the reference in the first sentence of this proposal to be changed to “Rim board header size, material, and span shall be in accordance with Table R602.7(1).”

Committee action on RB286 established full height stud requirements. A public comment to RB286 accounts for varying required number of full height studs based on header span and maximum stud spacing. This public comment is based on the same approach for determining the number of full height studs to support the rim board header and greatly simplifies the code while ensuring adequate full height stud support of rim board headers.

Importantly, this public comment is applicable to only sawn lumber rim board headers. Spans for engineered rim board headers are not included in this public comment because standardized design values across manufacturers are not available and in some cases engineered rim boards are not permitted to span over openings. A modification proposed at the hearing in Dallas by the proponent was ruled out of order. The committee indicated that they wanted a public comment to make the corrections even though the floor modification was ruled out of order. AWC has worked with the proponent to develop this public comment.

Nailing of full height studs it is addressed by minimum nailing for stud to stud connections and is therefore not included in the simplified proposal to avoid unnecessary duplication with the minimum nailing schedule table.

Final Hearing Results

RB288-13 AMPC

Code Change No: RB290-13

Original Proposal

Section(s): R602.10.2.2.1

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D_0, D_1 and D_2. Braced wall panels shall be located at each end of a braced wall line.

Exception: Braced wall panels constructed of Methods WSP or BV-WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a braced wall line provided each end complies with one of the following:

1. A minimum 24-inch wide (610 mm) panel for Methods WSP, CS-WSP, CS-G, and CS-PF~~, and 32-inch wide (813 mm) panel for Method CS-SFB~~ is applied to each side of the building corner as shown in Condition 4 of Figure R602.10.7.
2. The end of each braced wall panel closest to the end of the braced wall line shall have a 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below as shown in Condition 5 of Figure R602.10.7.
3. For Method BV-WSP, hold-down devices shall be provided in accordance with Table R602.10.6.5 at the ends of each braced wall panel.
4. <u>Each end of the braced wall line without a return corner has a Method ABW or PFH located at the corner of the braced wall line. If Method PFH is used the leg of the portal shall be located directly adjacent to the corner of the wall line.</u>

Reason: The change to Exception 1 removes the reference to Method CS-SFB as a method for meeting the alternative corner attachment requirement for SDCs D_0, D_1, and D_2 because IRC Table R602.10.4, Footnote d clearly does not permit the use of CS-SFB in SDCs D_0, D_1, and D_2. This proposal eliminates conflicting language in the IRC and corrects an error in the code.

The addition of Exception 4 provides for the addition of Methods ABW or PFH to a list of methods to provide alternative corner attachment requirements for SDCs D_0, D_1, and D_2. Both Methods ABW and PFH are anchored to the structure below with mechanical hold downs equal to or in excess of the 1,800 lbf required in Exception 2. Method ABW has a *minimum* hold down requirement of 1,800 lbf and the Method PFH has a hold down requirement of 4,200 lbf. (Note that there is a code change proposal for this cycle that will reduce this hold down requirement to 3,500 lbf. If the 3,500 lbf proposal is accepted the above code change proposed above will still be valid.)

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The following is errata that was not posted to the ICC website:

R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D_0, D_1 and D_2. Braced wall panels shall be located at each end of a braced wall line.

Exception: Braced wall panels constructed of Methods WSP or BV-WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a braced wall line provided each end complies with one of the following:

1. A minimum 24-inch wide (610 mm) panel for Methods WSP, CS-WSP, CS-G, and CS-PF~~, and 32-inch wide (813 mm) panel for Method CS-SFB~~ is applied to each side of the building corner as shown in Condition 4 of Figure R602.10.7.
2. The end of each braced wall panel closest to the end of the braced wall line shall have a 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below as shown in Condition 5 of Figure R602.10.7.
3. For Method BV-WSP, hold-down devices shall be provided in accordance with Table R602.10.6.5 at the ends of each braced wall panel.
4. Each end of the braced wall line without a return corner has a Method ABW or PFH located at the corner of the braced wall line. If Method PFH is used the leg of the portal shall be located directly adjacent to the corner of the wall line.

Committee Action: Approved as Modified

Modify the proposal as follows:

R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D_0, D_1 and D_2. Braced wall panels shall be located at each end of a braced wall line.

> **Exception:** Braced wall panels constructed of Methods WSP or BV-WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a braced wall line provided each end complies with one of the following:
>
> 1. A minimum 24-inch wide (610 mm) panel for Methods WSP, CS-WSP, CS-G, and CS-PF is applied to each side of the building corner as shown in Condition 4 of Figure R602.10.7.
> 2. The end of each braced wall panel closest to the end of the braced wall line shall have a 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below as shown in Condition 5 of Figure R602.10.7.
> 3. For Method BV-WSP, hold-down devices shall be provided in accordance with Table R602.10.6.5 at the ends of each braced wall panel.
> 4. ~~Each end of the braced wall line without a return corner has a Method ABW or PFH located at the corner of the braced wall line. If Method PFH is used the leg of the portal shall be located directly adjacent to the corner of the wall line.~~

Committee Reason: Approval was based upon the proponent's published reason and this modification. The modification deletes exception 4 because it is not needed.

Assembly Action: None

Final Hearing Results

RB290-13	**AM**

Code Change No: RB292-13

Original Proposal

Section(s): R602.10.2.2.1

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D0, D1 and D2. Braced wall panels shall be located at each end of a braced wall line.

> **Exception:** Braced wall panels constructed of Methods WSP or BV-WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a braced wall line provided each end complies with one of the following.
>
> 1. A minimum 24-inch-wide (610 mm) panel for Methods WSP, CS-WSP, CS-G, and CS-PF, and 32-inch-wide (813 mm) panel for Method CS-SFB is applied to each side of the building corner as shown in Condition 4 of Figure R602.10.7.
> 2. The end of each braced wall panel closest to the end of the braced wall line shall have an 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below as shown in Condition 5 of Figure R602.10.7.
> 3. ~~For Method BV-WSP, hold-down devices shall be provided in accordance with Table R602.10.6.5 at the ends of each braced wall panel.~~

Reason: The purpose of this code change is to correct a conflict in the code provisions for Method BV-WSP that was brought to our attention by ICC staff. The lowest capacity hold-down specified in Table R602.10.6.5 is 1900 pounds. Therefore, the only case of a Method BV-WSP panel that doesn't automatically qualify for Exception #2 is a single-story house in SDC D0 with veneer up to the tip of a gable. As such, Exception #3 is generally redundant and can be deleted. For that single-story case, either Exception #1 or Exception #2 would apply.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB292-13	**AS**

Code Change No: RB293-13

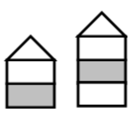
Original Proposal

Section(s): Table R602.10.3(1)

Proponent: Brian Foley, P.E., Fairfax County, VA, representing Virginia Building and Code Officials Association (brian.foley@fairfaxcounty.gov)

Revise as follows:

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON WIND SPEED

• EXPOSURE CATEGORY B • 30 FT MEAN ROOF HEIGHT • 10 FT EAVE TO RIDGE HEIGHT • 10 FT WALL HEIGHT • 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Basic Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing[c] (feet)**	**Method LIB[b]**	**Method GB**	**Methods DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP, ABW, PFH, PFG, CS-SFB[~~c~~d]**	**Methods CS-WSP, CS-G, CS-PF**
< 110[~~c~~d]		10	5.5	5.5	3.0	3.0
		20	10.0	10.0	6.0	5.0
		30	14.5	14.5	8.5	7.0
		40	18.5	18.5	11.0	9.0
		50	23.0	23.0	13.0	11.5
		60	27.5	27.5	15.5	13.5
		10	10.5	10.5	6.0	5.0
		20	19.0	19.0	11.0	9.5
		30	27.5	27.5	16.0	13.5
		40	36.0	36.0	20.5	17.5
		50	44.0	44.0	25.5	21.5
		60	52.5	52.5	30.0	25.5
		10	NP	15.5	9.0	7.5
		20	NP	28.5	16.5	14.0
		30	NP	41.0	23.5	20.0
		40	NP	53.0	30.5	26.0
		50	NP	65.5	37.5	32.0
		60	NP	77.5	44.5	37.5

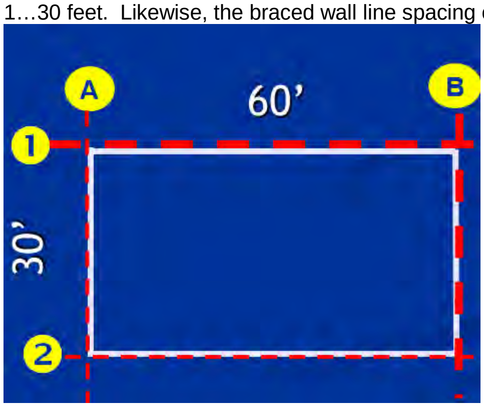
For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.
a. Linear interpolation shall be permitted.
b. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches (203 mm).
c. Where a braced wall line has parallel braced wall lines on one or both sides of differing dimensions, the average dimension shall be permitted to be used for braced wall line spacing.
~~c~~d. Method CS-SFB does not apply where the wind speed is greater than 100 mph.

(Portions of Table not shown remain unchanged)

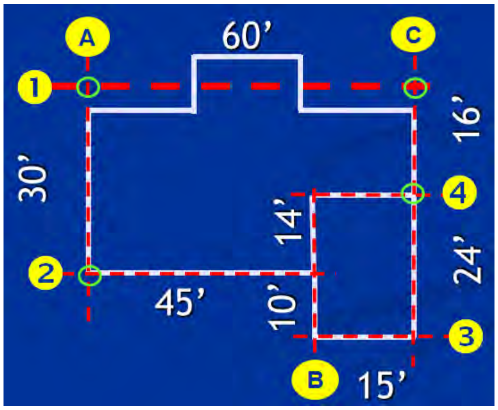
Reason: Table R602.10.3 was developed with the concept of braced wall lines running through the entire building in each plan direction much like the configuration of a simple colonial or ranch house. However, once this table was applied to the reality of today's house designs it was quickly determined that this concept was the exception rather than the rule. The code is silent on what to do when a braced wall line spacing is different on each side Do you use the greater value? If so, you will be required to provide more bracing than would be necessary. Do you use the lessor value? If so you will be providing less bracing than needed.

To formulate the correct approach, members of the former ICC Ad Hoc Committee on Wall Bracing conferred and blessed the approach provided in this proposal. As footnote c describes, you would use an average spacing much like a designer would use a tributary area when calculating the design of a beam or girder.

Consider the BWL layout of this common ranch below. It's a simple exercise to identify the braced wall line spacing of BWL 1…30 feet. Likewise, the braced wall line spacing of BWL A would be 60 feet. In this case, there is only one adjacent parallel BWL.



However, consider the BWL layout of a more complex house below. The next parallel braced wall line to BWL A is BWL C 60 feet away at the top end and BWL B 45 feet away at the bottom end. To find the value to use in Table R602.10.3(1), you would use the average between 60 and 45 which would equal 52.5 feet. If you were to analyze BWL 4, at the left end, the next parallel braced wall lines would be BWL 1 to the top and BWL 2 to the bottom. At the right end the next parallel braced wall line to the top is BWL 1 and BWL 3 to the bottom. To find the average spacing, you would use 16, 14, 16 and 24 feet for an average spacing of 17.5 feet.



The other changes to this table include adding the braced wall panel methods that were unintentionally omitted during the last code change cycle. It was always the intent of Table R602.10.3(1) to include all of the intermittent methods (except LIB and GB) in the same column.

Cost Impact: The code change proposal will not increase the cost of construction. In cases where an AHJ forced users to base their braced wall line spacing on the largest of all spacings, this will have a positive cost impact considering the proposal, if approved, would require less bracing and thus a lower cost impact.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change provides a method to determine the bracing where the braced wall line spacing is different on each side.

Assembly Action: **None**

Final Hearing Results

RB293-13 **AS**

Code Change No: RB295-13

Original Proposal

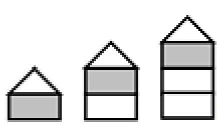
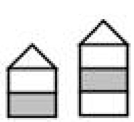
Section(s): Table R602.10.3(1), Table R602.10.3(3), Table R602.10.4

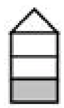
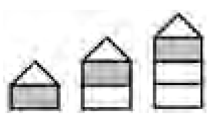
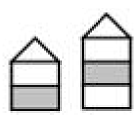
Proponent: Dennis Pitts, American Wood Council, representing American Wood Council (dpitts@awc.org)

Revise as follows:

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON WIND SPEED

• EXPOSURE CATEGORY B • 30 FOOT MEAN ROOF HEIGHT • 10 FOOT EAVE-TO-RIDGE HEIGHT • 10 FOOT WALL HEIGHT • 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Basic Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing** (feet)	**Method LIB[b]**	**Method GB**	**Methods** DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB[c]	**Methods** CS-WSP, CS-G, CS-PF
≤ 85		10	3.5	3.5	2.0	1.5
		20	6.0	6.0	3.5	3.0
		30	8.5	8.5	5.0	4.5
		40	11.5	11.5	6.5	5.5
		50	14.0	14.0	8.0	7.0
		60	16.5	16.5	9.5	8.0
		10	6.5	6.5	3.5	3.0
		20	11.5	11.5	6.5	5.5
		30	16.5	16.5	9.5	8.0
		40	21.5	21.5	12.5	10.5
		50	26.5	26.5	15.0	13.0
		60	31.5	31.5	18.0	15.5
		10	NP	9.0	5.5	4.5
		20	NP	17.0	10.0	8.5
		30	NP	24.5	14.0	12.0
		40	NP	32.0	18.0	15.5
		50	NP	39.0	22.5	19.0
		60	NP	46.5	26.5	22.5
≤ 90		10	3.5	3.5	2.0	2.0

• EXPOSURE CATEGORY B • 30 FOOT MEAN ROOF HEIGHT • 10 FOOT EAVE-TO-RIDGE HEIGHT • 10 FOOT WALL HEIGHT • 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Basic Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing** (feet)	**Method LIB[b]**	**Method GB**	**Methods** DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB[c]	**Methods** CS-WSP, CS-G, CS-PF
		20	7.0	7.0	4.0	3.5
		30	9.5	9.5	5.5	5.0
		40	12.5	12.5	7.5	6.0
		50	15.5	15.5	9.0	7.5
		60	18.5	18.5	10.5	9.0
		10	7.0	7.0	4.0	3.5
		20	13.0	13.0	7.5	6.5
		30	18.5	18.5	10.5	9.0
		40	24.0	24.0	14.0	12.0
		50	29.5	29.5	17.0	14.5
		60	35.0	35.0	20.0	17.0
		10	NP	10.5	6.0	5.0
		20	NP	19.0	11.0	9.5
		30	NP	27.5	15.5	13.5
		40	NP	35.5	20.5	17.5
		50	NP	44.0	25.0	21.5
		60	NP	52.0	30.0	25.5
≤ 100		10	4.5	4.5	2.5	2.5
		20	8.5	8.5	5.0	4.0
		30	12.0	12.0	7.0	6.0
		40	15.5	15.5	9.0	7.5
		50	19.0	19.0	11.0	9.5
		60	22.5	22.5	13.0	11.0
		10	8.5	8.5	5.0	4.5
		20	16.0	16.0	9.0	8.0
		30	23.0	23.0	13.0	11.0
		40	29.5	29.5	17.0	14.5
		50	36.5	36.5	21.0	18.0
		60	43.5	43.5	25.0	21.0

• EXPOSURE CATEGORY B • 30 FOOT MEAN ROOF HEIGHT • 10 FOOT EAVE-TO-RIDGE HEIGHT • 10 FOOT WALL HEIGHT • 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Basic Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing** (feet)	**Method LIB[b]**	**Method GB**	**Methods** DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB[c]	**Methods** CS-WSP, CS-G, CS-PF
		10	NP	12.5	7.5	6.0
		20	NP	23.5	13.5	11.5
		30	NP	34.0	19.5	16.5
		40	NP	44.0	25.0	21.5
		50	NP	54.0	31.0	26.5
		60	NP	64.0	36.5	31.0
< 110[c]		10	5.5	5.5	3.0	3.0
		20	10.0	10.0	6.0	5.0
		30	14.5	14.5	8.5	7.0
		40	18.5	18.5	11.0	9.0
		50	23.0	23.0	13.0	11.5
		60	27.5	27.5	15.5	13.5
		10	10.5	10.5	6.0	5.0
		20	19.0	19.0	11.0	9.5
		30	27.5	27.5	16.0	13.5
		40	36.0	36.0	20.5	17.5
		50	44.0	44.0	25.5	21.5
		60	52.5	52.5	30.0	25.5
		10	NP	15.5	9.0	7.5
		20	NP	28.5	16.5	14.0
		30	NP	41.0	23.5	20.0
		40	NP	53.0	30.5	26.0
		50	NP	65.5	37.5	32.0
		60	NP	77.5	44.5	37.5

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 mile per hour = 0.447 m/s.

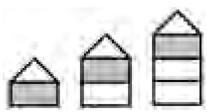
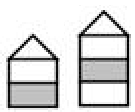
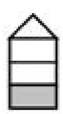
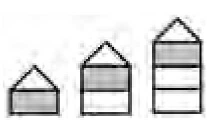
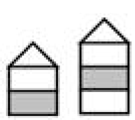
a. Linear interpolation shall be permitted.

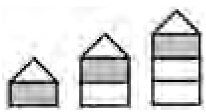
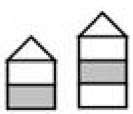
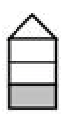
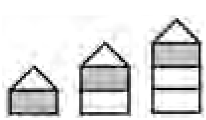
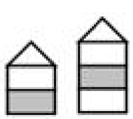
b. Method LIB shall have gypsum board fastened to at least one side with nails or screws in accordance withTable R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches.

~~c. Method CS-SFB does not apply where the wind speed is greater than 100 mph.~~

TABLE R602.10.3(3)
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

- SOIL CLASS D[b]
- WALL HEIGHT = 10 FEET
- 10 PSF FLOOR DEAD LOAD
- 15 PSF ROOF/CEILING DEAD LOAD
- BRACED WALL LINE SPACING ≤ 25 FEET

Seismic Design Category	Story Location	Braced Wall Line Length (feet)	MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a] Method LIB[c]	Method GB	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB[d]	Method WSP	Methods CS-WSP, CS-G
C (townhouses only)		10	2.5	2.5	2.5	1.6	1.4
		20	5.0	5.0	5.0	3.2	2.7
		30	7.5	7.5	7.5	4.8	4.1
		40	10.0	10.0	10.0	6.4	5.4
		50	12.5	12.5	12.5	8.0	6.8
		10	NP	4.5	4.5	3.0	2.6
		20	NP	9.0	9.0	6.0	5.1
		30	NP	13.5	13.5	9.0	7.7
		40	NP	18.0	18.0	12.0	10.2
		50	NP	22.5	22.5	15.0	12.8
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
D_0		10	NP	2.8	2.8	1.8	1.6
		20	NP	5.5	5.5	3.6	3.1
		30	NP	8.3	8.3	5.4	4.6
		40	NP	11.0	11.0	7.2	6.1
		50	NP	13.8	13.8	9.0	7.7
		10	NP	5.3	5.3	3.8	3.2
		20	NP	10.5	10.5	7.5	6.4
		30	NP	15.8	15.8	11.3	9.6
		40	NP	21.0	21.0	15.0	12.8
		50	NP	26.3	26.3	18.8	16.0
		10	NP	7.3	7.3	5.3	4.5
		20	NP	14.5	14.5	10.5	9.0

• SOIL CLASS D[b] • WALL HEIGHT = 10 FEET • 10 PSF FLOOR DEAD LOAD • 15 PSF ROOF/CEILING DEAD LOAD • BRACED WALL LINE SPACING ≤ 25 FEET			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]				
Seismic Design Category	**Story Location**	**Braced Wall Line Length (feet)**	**Method LIB[c]**	**Method GB**	**Methods DWB, SFB, PBS, PCP, HPS, CS-SFB[d]**	**Method WSP**	**Methods CS-WSP, CS-G**
		30	NP	21.8	21.8	15.8	13.4
		40	NP	29.0	29.0	21.0	17.9
		50	NP	36.3	36.3	26.3	22.3
		10	NP	3.0	3.0	2.0	1.7
		20	NP	6.0	6.0	4.0	3.4
		30	NP	9.0	9.0	6.0	5.1
		40	NP	12.0	12.0	8.0	6.8
		50	NP	15.0	15.0	10.0	8.5
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
D_1		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
		10	NP	8.5	8.5	6.0	5.1
		20	NP	17.0	17.0	12.0	10.2
		30	NP	25.5	25.5	18.0	15.3
		40	NP	34.0	34.0	24.0	20.4
		50	NP	42.5	42.5	30.0	25.5
		10	NP	4.0	4.0	2.5	2.1
		20	NP	8.0	8.0	5.0	4.3
		30	NP	12.0	12.0	7.5	6.4
		40	NP	16.0	16.0	10.0	8.5
		50	NP	20.0	20.0	12.5	10.6
D_2		10	NP	7.5	7.5	5.5	4.7
		20	NP	15.0	15.0	11.0	9.4
		30	NP	22.5	22.5	16.5	14.0
		40	NP	30.0	30.0	22.0	18.7
		50	NP	37.5	37.5	27.5	23.4

• SOIL CLASS D[b] • WALL HEIGHT = 10 FEET • 10 PSF FLOOR DEAD LOAD • 15 PSF ROOF/CEILING DEAD LOAD • BRACED WALL LINE SPACING ≤ 25 FEET			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]				
Seismic Design Category	**Story Location**	**Braced Wall Line Length (feet)**	**Method LIB[c]**	**Method GB**	**Methods DWB, SFB, PBS, PCP, HPS, CS-SFB[d]**	**Method WSP**	**Methods CS-WSP, CS-G**
		10	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP
	Cripple wall below one- or two-story dwelling	10	NP	NP	NP	7.5	6.4
		20	NP	NP	NP	15.0	12.8
		30	NP	NP	NP	22.5	19.1
		40	NP	NP	NP	30.0	25.5
		50	NP	NP	NP	37.5	31.9

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

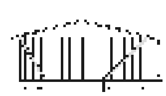
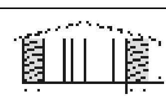
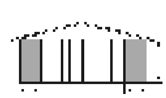
a. Linear interpolation shall be permitted.

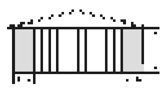
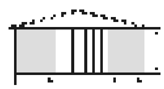
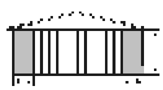
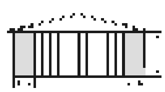
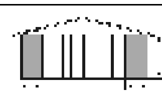
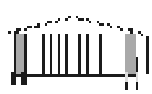
b. Wall bracing lengths are based on a soil site class “D.” Interpolation of bracing length between the S_{ds} values associated with the Seismic Design Categories shall be permitted when a site-specific S_{ds} value is determined in accordance with Section 1613.3 of the *International Building Code*.

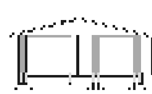
c. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches.

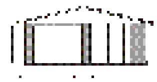
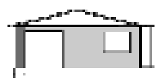
d. ~~Method CS-SFB applies in SDC C only~~. Method CS-SFB does not apply in Seismic Design Categories D_0, D_1 and D_2.

TABLE R602.10.4
BRACING METHODS

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA[a]	
				Fasteners	**Spacing**
Intermittent Bracing Method	**LIB** Let-in-bracing	1 × 4 wood or approved metal straps at 45° to 60° angles for maximum 16² stud spacing		Wood: 2-8d common nails or 3-8d (2$^1/_2$″ long x 0.113″ dia.) nails	Wood: per stud and top and bottom plates
				Metal strap: per manufacturer	Metal: per manufacturer
	DWB Diagonal wood boards	$^3/_4$″(1″ nominal) for maximum 24″ stud spacing		2-8d (2$^1/_2$″ long × 0.113″ dia.) nails or 2 - 1$^3/_4$″ long staples	Per stud
	WSP Wood structural panel (See Section R604)	$^3/_8$″		Exterior sheathing per Table R602.3(3)	6″ edges 12″ field
				Interior sheathing per Table R602.3(1) or R602.3(2)	Varies by fastener

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA[a]	
				Fasteners	Spacing
	BV-WSP[e] Wood Structural Panels with Stone or Masonry Veneer (See Section R602.10.6.5)	7/16″	See Figure R602.10.6.5	8d common (2 1/2″ × 0.131) nails	4″ at panel edges 12″ at intermediate supports 4″ at braced wall panel end posts
	SFB Structural fiberboard sheathing	1/2″ or 25/32″ for maximum 16″ stud spacing		1 1/2″ long × 0.12″ dia. (for 1/2″ thick sheathing) 1 3/4″ long × 0.12″ dia. (for 25/32″ thick sheathing) galvanized roofing nails or 8d common (2 1/2″ long × 0.131″ dia.) nails	3″ edges 6″ field
	GB Gypsum board	1/2″		Nails or screws per Table R602.3(1) for exterior locations Nails or screws per Table R702.3.5 for interior locations	For all braced wall panel locations: 7″ edges (including top and bottom plates) 7″ field
	PBS Particleboard sheathing (See Section R605)	3/8″ or 1/2″ for maximum 16″ stud spacing		For 3/8″, 6d common (2″ long × 0.113″ dia.) nails For 1/2″, 8d common (2 1/2″ long × 0.131″ dia.) nails	3″ edges 6″ field
	PCP Portland cement plaster	See Section R703.6 for maximum 16″ stud spacing		1 1/2″ long, 11 gage, 7/16″ dia. head nails or 7/8″ long, 16 gage staples	6″ o.c. on all framing members
	HPS Hardboard panel siding	7/16″ for maximum 16″ stud spacing		0.092″ dia., 0.225″ dia. head nails with length to accommodate 1 1/2″ penetration into studs	4″ edges 8″ field
	ABW Alternate braced wall	3/8″		See Section R602.10.6.1	See Section R602.10.6.1

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA[a]	
				Fasteners	Spacing
Bracing	**PFH** Portal frame with hold-downs	3/8″		See Section R602.10.6.2	See Section R602.10.6.2

	PFG Portal frame at garage	$^{7}/_{16}$″		See Section R602.10.6.3	See Section R602.10.6.3
Continuous Sheathing Methods	**CS-WSP** Continuously sheathed wood structural panel	$^{3}/_{8}$″		Exterior sheathing per Table R602.3(3)	6″ edges 12″ field
				Interior sheathing per Table R602.3(1) or R602.3(2)	Varies by fastener
	CS-G[b, c] Continuously sheathed wood structural panel adjacent to garage openings	$^{3}/_{8}$″		See Method CS-WSP	See Method CS-WSP
	CS-PF Continuously sheathed portal frame	$^{7}/_{16}$″		See Section R602.10.6.4	See Section R602.10.6.4
	CS-SFB[d] Continuously sheathed structural fiberboard	$^{1}/_{2}$″ or $^{25}/_{32}$″ for maximum 16" stud spacing		$1^{1}/_{2}$″ long × 0.12″ dia. (for $^{1}/_{2}$″ thick sheathing) $1^{3}/_{4}$″ long × 0.12″ dia. (for $^{25}/_{32}$″ thick sheathing) galvanized roofing nails or 8d common ($2^{1}/_{2}$″ long × 0.131″ dia.) nails	3″ edges 6″ field

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.0175 rad, 1 pound per square foot = 47.8 N/m^2, 1 mile per hour = 0.447 m/s.

a. Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D_0, D_1 and D_2.

b. Applies to panels next to garage door opening when supporting gable end wall or roof load only. May only be used on one wall of the garage. In Seismic Design Categories D_0, D_1 and D_2, roof covering dead load may not exceed 3 psf.

c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R502.5(1). A full height clear opening shall not be permitted adjacent to a Method CS-G panel.

d. Method CS-SFB does not apply in Seismic Design Categories D_0, D_1 and D_2 ~~and in areas where the wind speed exceeds 100 mph~~.

e. Method applies to detached one- and two-family dwellings in Seismic Design Categories D_0 through D_2 only.

Reason: Footnote c of Table R602.10.3(1), footnote d of Table R602.10.3(3), and footnote d of Table R602.10.4 were added to the 2012 IRC when provisions for the bracing method designated as Continuously-Sheathed Structural Fiberboard (CS-SFB) were combined with Continuously-Sheathed Wood Structural Panels (CS-WSP). Previous provisions in the 2009 IRC section R602.10.5.4 required CS-SFB used in Seismic Design Categories (SDC) D_0, D_1 and D_2 or regions where the basic wind speed exceeds 100 mph to be designed in accordance with accepted engineering practice and the provisions of the of *IBC*.

With changes to the 2012 IRC section R301.2.1.1 that clarified high-wind thresholds where engineered design and/or use of pre-engineered design provisions, such as those in the WFCM, must be used, Table R602.10.3(1) footnote “c” and the second portion of Table R602.10.4 footnote “d” are not needed. Deletion of these footnotes in combination with changes adopted into 2012 meet the original intent of the 2009 IRC.

The second portion of the change clarifies the intent of Table R602.10.3(3) footnote “d” which could be interpreted to mean that CS-SFB cannot be used in Seismic Design Categories A & B. This literal interpretation would be incorrect.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides additional information and clarity for the use of SFB for wall bracing.

Assembly Action: **None**

Final Hearing Results

RB295-13	**AS**

Code Change No: RB296-13

Original Proposal

Section(s): Table R602.10.3(2), Table R602.10.3(4)

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE R602.10.3(2)
WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON	STORY/ SUPPORTING	CONDITION	ADJUSTMENT FACTOR[a, b] [multiply length from Table R602.10.3(1) by this factor]	APPLICABLE METHODS
1	Exposure category	One-story structure	B	1.00	All methods
			C	1.20	
			D	1.50	
		Two-story structure	B	1.00	
			C	1.30	
			D	1.60	
		Three-story structure	B	1.00	
			C	1.40	
			D	1.70	
2	Roof eave-to-ridge height	Roof only	≤ 5 feet	0.70	
			10 feet	1.00	
			15 feet	1.30	
			20 feet	1.60	
		Roof + 1 floor	≤ 5 feet	0.85	
			10 feet	1.00	
			15 feet	1.15	
			20 feet	1.30	
		Roof + 2 floors	≤ 5 feet	0.90	
			10 feet	1.00	
			15 feet	1.10	
			20 feet	Not permitted	

ITEM NUMBER	ADJUSTMENT BASED ON	STORY/ SUPPORTING	CONDITION	ADJUSTMENT FACTOR[a, b] [multiply length from Table R602.10.3(1) by this factor]	APPLICABLE METHODS
3	Wall height adjustment	Any story	8 feet 9 feet 10 feet 11 feet 412 feet	0.90 0.95 1.00 1.05 1.10	
4	Number of braced wall lines (per plan direction)[c]	Any story	2 3 4 ≥ 5	1.00 1.30 1.45 1.60	
5	Additional 800-pound hold-down device	Top story only	Fastened to the end studs of each braced wall panel and to the foundation or framing below	0.80	DWB, WSP, SFB, PBS, PCP, HPS
6	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.40	DWB, WSP, SFB,PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
7	Gypsum board fastening	Any story	4 inches o.c. at panel edges, including top and bottom plates, and all horizontal joints blocked	0.7	GB

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound = 4.48 N.

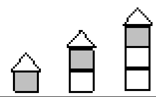
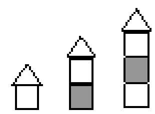
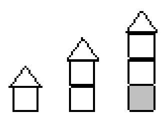
a. Linear interpolation shall be permitted.

b. The total adjustment factor is the product of all applicable adjustment factors.

c. The adjustment factor is permitted to be 1.0 when determining bracing amounts for intermediate braced wall lines provided the bracing amounts on adjacent braced wall lines are based on a spacing and number that neglects the intermediate braced wall line.

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON:	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR[a,b] (Multiply length from Table R602.10.3(~~1~~3) by this factor)	APPLICABLE METHODS
1	Story height (Section 301.3)	Any story	≤10 ft	1.0	All methods
			>10 ft and ≤ 12 ft	1.2	
2	Braced wall line spacing, townhouses in SDC C	Any story	≤35 ft	1.0	
			>35 ft and ≤ 50 ft	1.43	
3	*Braced wall line* spacing, in SDC D_0, D_1, D_2[c]	Any story	> 25 ft and ≤30 ft	1.2	
			>30 ft and ≤ 35 ft	1.4	
4	Wall dead load	Any story	> 8 psf and< 15 psf	1.0	
			<8 psf	0.85	

ITEM NUMBER	ADJUSTMENT BASED ON:	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR [a,b] (Multiply length from Table R602.10.3(~~1~~3) by this factor)	APPLICABLE METHODS
5	Roof/ceiling dead load for wall supporting	Roof only or roof plus one or two stories	≤15 psf	1.0	
		Roof plus one or two stories	>15 psf and ≤ 25 psf	1.1	
		Roof only	>15 psf and ≤ 25 psf	1.2	
6	Walls with stone or masonry veneer, townhouses in SDC C [d,e]			1.0	~~All intermittent and continuous methods~~ All methods
				1.5	
				1.5	
7	Walls with stone or masonry veneer, detached one-and two-family dwellings in SDC D_0-D_2 [d]	Any story		See Table R602.10.6.5	BV-WSP
8	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of *braced wall panel*s	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB

For SI: 1 psf = 47,8 N/m^2.

a. Linear interpolation shall be permitted.

b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.

c. The length-to-width ratio for the floor/roof *diaphragm* shall not exceed 3:1. The top plate lap splice nailing shall be a minimum of 12-16d nails on each side of the splice.

d. Applies to stone or masonry veneer exceeding the first story height. See Section R602.10.6.5 for requirements when stone or masonry veneer does not exceed the first story height.

e. The adjustment factor for stone or masonry veneer shall be applied to all exterior *braced wall lines* and all *braced wall lines* on the interior of the building, backing or perpendicular to and laterally supported veneered walls.

Reason: This proposal corrects a couple of editorial deficiencies in the table that were discovered by APA and ICC Staff while writing the 2012 IRC Bracing Book. These can be seen in the 6th row (using proposed item numbering) where “C” was left out behind SDC in the “Adjustment based on” column. Also in the last column on the right the annotation “All intermittent and continuous methods” was changed to the format used elsewhere in the column. Note also that the proposal references the correct table in the column heading (**Adjustment Factor**…).

Adding item numbers could also be considered an editorial item. This is a format used in other large tables (e.g., Table R602.3(1)) where making reference to a specific entry is relatively difficult.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The following is errata that was not posted to the ICC website:

TABLE R602.10.3(2)
WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON	STORY/ SUPPORTING	CONDITION	ADJUSTMENT FACTOR[a, b] [multiply length from Table R602.10.3(1) by this factor]	APPLICABLE METHODS
3	Wall height adjustment	Any story	8 feet	0.90	
			9 feet	0.95	
			10 feet	1.00	
			11 feet	1.05	
			12 feet	1.10	

(Potions of table not shown remain unchanged)

(Portions of code change not shown remain unchanged)

Committee Action: Approved as Submitted

Committee Reason: This change adds some needed corrections to the table. Also, the addition of item numbers provides ease of use of the table.

Assembly Action: None

Final Hearing Results

RB296-13 **AS**

Code Change No: RB297-13

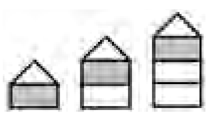
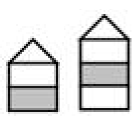
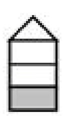
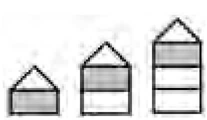
Original Proposal

Section(s): Table R602.10.3(3)

Proponent: Randall Shackelford, Simpson Strong-Tie Company (rshackelford@strongtie.com)

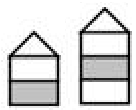
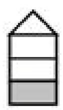
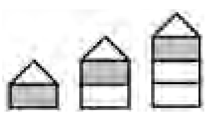
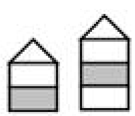
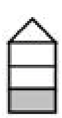
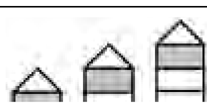
Revise as follows:

TABLE R602.10.3(3)
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

• SOIL CLASS D[b] • WALL HEIGHT = 10 FEET • 10 PSF FLOOR DEAD LOAD • 15 PSF ROOF/CEILING DEAD LOAD • BRACED WALL LINE SPACING ≤ 25 FEET			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]				
Seismic Design Category	**Story Location**	**Braced Wall Line Length (feet)[c]**	**Method LIB[e d]**	**Method GB**	**Methods DWB, SFB, PBS, PCP, HPS, CS-SFB[d e]**	**Method WSP**	**Methods CS-WSP, CS-G**
C (townhouses only)		10	2.5	2.5	2.5	1.6	1.4
		20	5.0	5.0	5.0	3.2	2.7
		30	7.5	7.5	7.5	4.8	4.1
		40	10.0	10.0	10.0	6.4	5.4
		50	12.5	12.5	12.5	8.0	6.8
		10	NP	4.5	4.5	3.0	2.6
		20	NP	9.0	9.0	6.0	5.1
		30	NP	13.5	13.5	9.0	7.7
		40	NP	18.0	18.0	12.0	10.2
		50	NP	22.5	22.5	15.0	12.8
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
D_0		10	NP	2.8	2.8	1.8	1.6
		20	NP	5.5	5.5	3.6	3.1
		30	NP	8.3	8.3	5.4	4.6
		40	NP	11.0	11.0	7.2	6.1

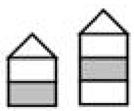
- **SOIL CLASS D[b]**
- **WALL HEIGHT = 10 FEET**
- **10 PSF FLOOR DEAD LOAD**
- **15 PSF ROOF/CEILING DEAD LOAD**
- **BRACED WALL LINE SPACING ≤ 25 FEET**

MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]

Seismic Design Category	Story Location	Braced Wall Line Length (feet)[c]	Method LIB[e d]	Method GB	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB[d e]	Method WSP	Methods CS-WSP, CS-G
		50	NP	13.8	13.8	9.0	7.7
		10	NP	5.3	5.3	3.8	3.2
		20	NP	10.5	10.5	7.5	6.4
		30	NP	15.8	15.8	11.3	9.6
		40	NP	21.0	21.0	15.0	12.8
		50	NP	26.3	26.3	18.8	16.0
		10	NP	7.3	7.3	5.3	4.5
		20	NP	14.5	14.5	10.5	9.0
		30	NP	21.8	21.8	15.8	13.4
		40	NP	29.0	29.0	21.0	17.9
		50	NP	36.3	36.3	26.3	22.3
D_1		10	NP	3.0	3.0	2.0	1.7
		20	NP	6.0	6.0	4.0	3.4
		30	NP	9.0	9.0	6.0	5.1
		40	NP	12.0	12.0	8.0	6.8
		50	NP	15.0	15.0	10.0	8.5
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
		10	NP	8.5	8.5	6.0	5.1
		20	NP	17.0	17.0	12.0	10.2
		30	NP	25.5	25.5	18.0	15.3
		40	NP	34.0	34.0	24.0	20.4
		50	NP	42.5	42.5	30.0	25.5
D_2		10	NP	4.0	4.0	2.5	2.1
		20	NP	8.0	8.0	5.0	4.3

- **SOIL CLASS D[b]**
- **WALL HEIGHT = 10 FEET**
- **10 PSF FLOOR DEAD LOAD**
- **15 PSF ROOF/CEILING DEAD LOAD**
- **BRACED WALL LINE SPACING ≤ 25 FEET**

MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]

Seismic Design Category	Story Location	Braced Wall Line Length (feet)[c]	Method LIB[~~c~~ d]	Method GB	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB[~~d~~ e]	Method WSP	Methods CS-WSP, CS-G
		30	NP	12.0	12.0	7.5	6.4
		40	NP	16.0	16.0	10.0	8.5
		50	NP	20.0	20.0	12.5	10.6
		10	NP	7.5	7.5	5.5	4.7
		20	NP	15.0	15.0	11.0	9.4
		30	NP	22.5	22.5	16.5	14.0
		40	NP	30.0	30.0	22.0	18.7
		50	NP	37.5	37.5	27.5	23.4
		10	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP
	Cripple wall below one- or two-story dwelling	10	NP	NP	NP	7.5	6.4
		20	NP	NP	NP	15.0	12.8
		30	NP	NP	NP	22.5	19.1
		40	NP	NP	NP	30.0	25.5
		50	NP	NP	NP	37.5	31.9

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.

b. Wall bracing lengths are based on a soil site class "D." Interpolation of bracing length between the S_{ds} values associated with the Seismic Design Categories shall be permitted when a site-specific S_{ds} value is determined in accordance with Section 1613.3 of the *International Building Code*.

c. Where the braced wall line length is greater than 50 feet, braced wall lines shall be permitted to be divided into shorter segments having lengths of 50 feet or less, and the amount of bracing within each segment shall be in accordance with this table.

~~c~~ d. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches.

~~d~~ e. Method CS-SFB applies in SDC C only.

Reason: The reason for this code change is to clarify that braced wall line lengths longer than 50 feet are permitted when bracing is determined based on Seismic Design Category.

The bracing amount table (R602.10.3(3)) currently specifies bracing only for braced wall line lengths of up to 50 feet. This gives the impression that braced wall line lengths longer than 50 feet are not permitted.

I do not believe this is the intent of this table.

This goes back to the work of the ICC Wall Bracing Committee when all the bracing amounts were converted from percentages sheathed to actual lengths sheathed. In the 2000-2006 IRC, the amount of bracing was just shown as a percentage of the length of the braced wall line. Theoretically, the braced wall line could be as long as the builder wanted it to be, and the amount of bracing would just go up as the length increased.

In an effort to decrease requirement for math calculations, the Wall Bracing Committee converted all percentages to lengths. I think since the spacing of braced wall lines was limited to a maximum of 50 feet, that number was also chosen as the maximum length of braced wall lines.
Theoretically, since the length of braced wall lines is permitted to be taken as the length between perpendicular braced wall lines, one could already divide up a long braced wall line into shorter braced wall lines with length less than 50 feet. But to avoid confusion, I think it is better to specifically clarify that.

Cost Impact: This proposal could lower costs in jurisdictions that were interpreting this table to limit braced wall line lengths to 50 feet by allowing larger houses to be built using IRC provisions instead of having to be designed.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides clarity for what to do where a building is greater than 50 feet in length.

Assembly Action: **None**

Final Hearing Results

RB297-13 **AS**

Code Change No: RB301-13

Original Proposal

Section(s): Table R602.10.3(4)

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON:	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR [a,b] (Multiply length from Table R602.10.3(3) by this factor.)	APPLICABLE METHODS
Roof/ceiling dead load for wall supporting	1, 2 or 3 story building ~~Roof only or roof plus one or two stories~~	≤ 15 psf	1.0	All methods
	~~Roof plus one or two stories~~ 2 or 3 story building	>15 psf and ≤ 25 psf	1.1	
	~~Roof only~~ 1 story building	>15 psf and ≤ 25 psf	1.2	

(Portions of Table not shown remain unchanged)

Reason: The purpose of this code change is to make this provision of the code clear and unambiguous. The current language is subject to interpretation. The term "roof" reference in the "**STORY/SUPPORTING"** column represents a roof and its supporting walls, i.e., single story. Thus, "roof only" is the roof + walls of a single story, "roof plus one or two stories" is a 2 or 3 story building, and "Roof only plus one or two stories" is a 1, 2 or 3 story building.

Without knowledge of the intent and just reading the entries in the "**STORY/SUPPORTING**" column it would be easy to misinterpret the intent of the code. For example "roof plus one or two stories" *sounds* like a 1 or 2 story building. But the intent of the code is "roof *and supporting walls* plus one or two *additional* stories", or a 2 or 3 story building.

At 15 psf or less 1, 2 or 3 story buildings require no adjustment to the amount of bracing required. Between 15 and a maximum of 25 psf, the adjustment factor depends on the number of stories involved. This portion was not impacted by the proposed change.

We are asking the committee to please support the clarifying language, to better represent the intent of the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON:	STORY/~~SUPPORTING~~	CONDITION	ADJUSTMENT FACTOR [a,b] (Multiply length from Table R602.10.3(3) by this factor.)	APPLICABLE METHODS

(Portions of Table not shown remain unchanged)

Committee Reason: Approval was based upon the proponent's published reason. The modification eliminates a term from the column header that is no longer needed.

Assembly Action: **None**

Final Hearing Results

RB301-13 **AM**

Code Change No: RB302-13

Original Proposal

Section(s): Table R602.10.3(4)

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON:	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR [a,b] [Multiply length from Table R602.10.3(3) by this factor]	APPLICABLE METHODS
Walls with stone or masonry veneer, town-houses in SDC-C [~~d~~,e,f]	(Figure)		1.0	All intermittent and continuous methods
	(Figure)		1.5	
	(Figure)		1.5	

For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.

b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.

c. The length-to-width ratio for the floor/roof *diaphragm* shall not exceed 3:1. The top plate lap splice nailing shall be a minimum of 12-16d nails on each side of the splice.

d. Applies to stone or masonry veneer exceeding the first story height. See Section R602.10.6.5 for requirements when stone or masonry veneer does not exceed the first story height.

e. The adjustment factor for stone or masonry veneer shall be applied to all exterior *braced wall lines* and all *braced wall lines* on the interior of the building, backing or perpendicular to and laterally supported veneered walls.

f. Applies to stone and masonry veneer exceeding the first story height and not extending up into the gable end.

(Portions of Table not shown remain unchanged)

Reason: The purpose of these proposals is to clarify the IRC.

1. The reference to Section R602.10.6.5 in the second portion of Footnote d is clearly applicable to SDCs D_0, D_1 and D_2 only. The above portion of the table is applicable to townhouses in SDC C. It is confusing referencing a footnote, part of which is clearly not relevant. It calls into question the relevant portions of the footnote. As the first portion of footnote d is applicable to townhouses in SDC C, to avoid confusion we propose the relevant information be duplicated in its own Footnote f.
2. The second portion of the proposed footnote adds the gable end to the not-to-extend criteria. The IRC is clear that the line of demarcation between using the standard bracing provisions and the Method BV-WSP is when the brick or masonry veneer extends up past the first story height. It is not clear what to do when the veneer extends up the gable-end wall. The definition of story in Chapter 2 provided below could lead one to believe that the gable–end wall was part of the story below:

   STORY. *That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above.*

   From a structural perspective, however the mass in a gable end-wall can equal or exceed the mass of a veneered second story. For example, a 40-foot wide building with a 12:12 pitch can have gable-end wall that is a maximum of 20 feet tall above the top of the wall below. As the area is triangular the average height of this gable-end wall is 10 feet tall. This is the same mass as a veneered 10 foot second story wall.

   It is clearly NOT the intent of the IRC to permit the standard bracing provisions for only a single story UNLESS the same or larger mass is part of a gable-end wall. The above proposal clarifies the intent of this section with respect to veneered gable-end walls.

   This portion of the proposed change is duplicated in another code change proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based upon the proponent's request for disapproval. There is information missing and a pointer is needed to refer back to the proper code section.

Assembly Action: **None**

Public Comments

Public Comment:

Edward L. Keith, APA – The engineered Wood Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON:	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR [a,b] [Multiply length from Table R602.10.3(3) by this factor]	APPLICABLE METHODS
Walls with stone or masonry veneer, town-houses in SDC-C [d,e~~,f~~]	(Figure)	1.0		All intermittent and continuous methods
	(Figure)	1.5		
	(Figure)	1.5		
Walls with stone or masonry veneer, detached one-and two-family dwellings in SDC $D_0 – D_2$ [d,f]	Any story	See Table R602.10.6.5		BV-WSP

For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.

b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.

c. The length-to-width ratio for the floor/roof *diaphragm* shall not exceed 3:1. The top plate lap splice nailing shall be a minimum of 12-16d nails on each side of the splice.

d. Applies to stone or masonry veneer exceeding the first story height. ~~See Section R602.10.6.5 for requirements when stone or masonry veneer does not exceed the first story height~~.

e. The adjustment factor for stone or masonry veneer shall be applied to all exterior *braced wall lines* and all *braced wall lines* on the interior of the building, backing or perpendicular to and laterally supported veneered walls.

f. ~~Applies to stone and masonry veneer exceeding the first story height and not extending up into the gable end~~. See Section R602.10.6.5 for requirements when stone or masonry veneer does not exceed the first story height

Commenter's Reason: While RB302 accurately reflects the intent of the existing provisions of the 2012 IRC, clarifying the intent has made it evident that there was a hole in the existing provisions. The existing provisions fail to provide guidance on what to do when the brick or stone veneer extends up into the gable end. APA worked with industry to try to fill this hole but was *unable to come up with an agreement* on just how to do so. It was also pointed out that any addition of such new material to the code could be construed as being outside the scope of a Public Comment.

As an agreement was *not to be reached* at this time I am submitting this public comment to only correct the footnote problems currently in the code and described in the original code submittal.

In short, the reference to Section R602.10.6.5 in the second portion of footnote d is clearly applicable to SDCs D_0, D_1 and D_2 only. The table as published in the 2012 IRC has this footnote listed is applicable to townhouses in SDC C, as shown above. It is confusing to the user to have a footnote, part of which is clearly not relevant as it calls into question the relevant portions of the footnote. As the first portion of footnote d is applicable to townhouses in SDC C as well as SDC D+, to avoid confusion we propose to remove the portion of footnote d that is relevant only for SDC D+ and move that SDC D+-only portion to a new footnote (footnote f) and reference this only in SDC D+ row in the table.

The portion of the proposed footnote, "~~and not extending up into the gable end~~" was not part of the original footnote d and was part of the compromise that *could not be achieved* during the interim. It is thus removed, making the proposed change as modified by this Public Comment essentially an editorial clarification of the table.

We recommend overturning the committee's recommendation for denial and approve this much needed footnote clarification.

Final Hearing Results

RB302-13 **AMPC**

Code Change No: RB306-13

Original Proposal

Section(s): R602.10.4.1

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R602.10.4.1 Mixing methods. Mixing of bracing methods shall be permitted as follows:

1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
2. Mixing intermittent bracing methods from *braced wall line* to *braced wall line* within a story shall be permitted. Within Seismic Design Categories A, B and C or in regions where the basic wind speed is less than or equal to 100 mph (45 m/s), mixing of intermittent bracing and continuous sheathing methods from *braced wall line* to *braced wall line* within a story shall be permitted.
3. Mixing intermittent bracing methods along a *braced wall line* shall be permitted in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest value of all intermittent bracing methods used.
4. Mixing of continuous sheathing methods CS-WSP, CS-G and CS-PF along a *braced wall line* shall be permitted. <u>Intermittent methods ABW, PFH, and PFG shall also be permitted to be used along a braced wall line with continuous sheathed methods.</u>
5. In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing of intermittent bracing methods along the interior portion of a *braced wall line* with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same *braced wall line* shall be permitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3) as adjusted by Tables R602.10.3(2) and R602.10.3(4), respectively. The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the *braced wall line*.

Reason: It was never the intent of the Ad Hoc Bracing Committee to restrict the shear wall and portal frame methods (Methods ABW, PFH, and PFG) only for use with the intermittent bracing methods. These three methods have their basis in the alternate bracing methods of the 2006 IRC and were developed principally for use at garage door locations and other locations where full length bracing panels are not practical. Such situations are common to most structures whether intermittent or continuous methods are used. There is no rational reason to restrict their use to intermittent bracing only.

Note that the anchorage requirements of the Methods PFH and ABW meets or exceeds the normally-required anchorage requirements of the continuously sheathed return corner, 800 lbf or 1,800 lbf alternative. If used, the Method PFG portal would have to comply with the corner requirements of Sections R602.10.2.2.1 and/or R602.10.7, as applicable.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change clarifies that intermittent methods ABW, PFH and PFG are permitted with continuous sheathing methods. Adds greater flexibility for design.

Assembly Action: **None**

Final Hearing Results

RB306-13	**AS**

Code Change No: RB307-13

Original Proposal

Section(s): R602.10.4.1

Proponent: Randall Shackelford, P.E., Simpson Strong-Tie Company, Inc., (rshackelford@strongtie.com)

Revise as follows:

R602.10.4.1 Mixing methods. Mixing of bracing methods shall be permitted as follows:

1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
2. Mixing intermittent bracing methods from *braced wall line* to *braced wall line* within a story shall be permitted. <u>In regions</u> within Seismic Design Categories A, B and C ~~or in regions~~ where the basic wind speed is less than or equal to 100 mph (45 m/s), mixing of intermittent bracing and continuous sheathing methods from *braced wall line* to *braced wall line* within a story shall be permitted.
3. Mixing intermittent bracing methods along a *braced wall line* shall be permitted in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest value of all intermittent bracing methods used.
4. Mixing of continuous sheathing methods CS-WSP, CS-G and CS-PF along a *braced wall line* shall be permitted.
5. In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing of intermittent bracing methods along the interior portion of a *braced wall line* with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same *braced wall line* shall be permitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3) as adjusted by Tables R602.10.3(2) and R602.10.3(4), respectively. The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the *braced wall line*.

Reason: The reason for this proposal is to clarify when intermittent and continuous bracing methods can be mixed within a story. I believe the "or" needs to be deleted because the language is too permissive and the sentence needs to be re-written so that the location has to be in SDC A, B, or C <u>and</u> have a basic windspeed ≤ 100 mph.

As currently written, because of the use of the term "or", a structure could be located within Seismic Design Category D_2, but as long as the basic wind speed is less than or equal to 100 mph, it would be permitted to have braced wall lines on the same story with different bracing methods.

That is not the intention of these provisions as they were originally written. The original intent was to limit mixing of intermittent and continuous methods to lower wind and lower seismic areas. In higher hazard areas, it is not advisable to mix braced wall lines of intermittent and continuous bracing methods in the same story because there can be a stiffness difference between the various methods.

The revised wording restores the original intent of this section.

Cost Impact: The main impact of this will be in higher seismic areas where constructing braced wall lines on the same story of intermittent and continuous bracing methods will be clearly prohibited (as it should have been all along). There conceivably could be a slight cost increase if a builder were using intermittent bracing methods with inexpensive sheathing between braces on some walls, and continuous sheathing on other walls on the same story, and had to change all walls to continuous sheathing so a continuous portal frame could be used.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB307-13	**AS**

Code Change No: RB310-13

Original Proposal

Section(s): Table R602.10.5

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE R602.10.5
MINIMUM LENGTH OF BRACED WALL PANELS

METHOD (See Table R602.10.4)		MINIMUM LENGTH[a] (in.) WALL HEIGHT 8 ft	9 ft	10 ft	11 ft	12 ft	CONTRIBUTING LENGTH (in.)
CS-PF	<u>SDC A, B and C</u>	<u>16</u>	<u>18</u>	<u>20</u>	<u>22[e]</u>	<u>24[e]</u>	<u>1.5 x Actual[b]</u>
	<u>SDC D_0, D_1 and D_2</u>	16	18	20	22[e]	24[e]	Actual[b]

(Portions of Table not shown remain unchanged)

Reason: Currently Method PFG (Portal Frame at Garage) is permitted in the 2012 IRC Table R602.10.5 with a 1.5 multiplier to convert the leg length to a length contributing to bracing. The multiplier was permitted because Method PFG was restricted for use in areas of low seismicity (SDCs A, B and C).

Cyclic testing conducted at APA in 2006 of the CS-PF (Continuous Sheathed – Portal Frame) showed that the CS-PF has a design strength at least as high as the PFG tested in a similar manner. Based on the results of this testing it is reasonable to permit the same multiplier to be applied to the Method CS-PF <u>when similarly restricted to areas of low seismicity</u> as is Method PFG.

Please note that the CS-PF portal frame can have a leg length as small at 16 inches, where the PFG has a minimum leg length of 24 inches. What makes the CS-PF perform as well or better than the PFG, even with a shorter leg length, is the fact that the CS-PF has nearly twice as many fasteners as the PFG. It is the fastener interaction between the framing and sheathing that determine the ultimate capacity of this wood-structural-panel/framing bracing system.

Note that the IRC bracing provisions are difficult to meet in many cases as a result of narrow building lots and the aesthetic requirements of modern homes. Areas around garages and picture windows are especially difficult to accommodate and still meet the minimum bracing requirements of the code. Permitting the equal-to-stronger minimum 16-inch CS-PF the same multiplier as the 24-inch PFG is both rational and extremely helpful in making the 2012 IRC bracing provisions viable.

We ask the committee to extend the same multiplier to the 16-inch CS-PF that is applied to the 24-inch PFG <u>when the same use restrictions are applied</u>. This is based on full-scale cyclic load tests described in APA Test Report T2006-29 and NAHB-Research Center Test Report EG5522_08216.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. Also, it provides a useful option for using method CS-PF in low seismic areas.

Assembly Action: **None**

Final Hearing Results

RB310-13 **AS**

Code Change No: RB311-13

Original Proposal

Section(s): Figure R602.10.6.2

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

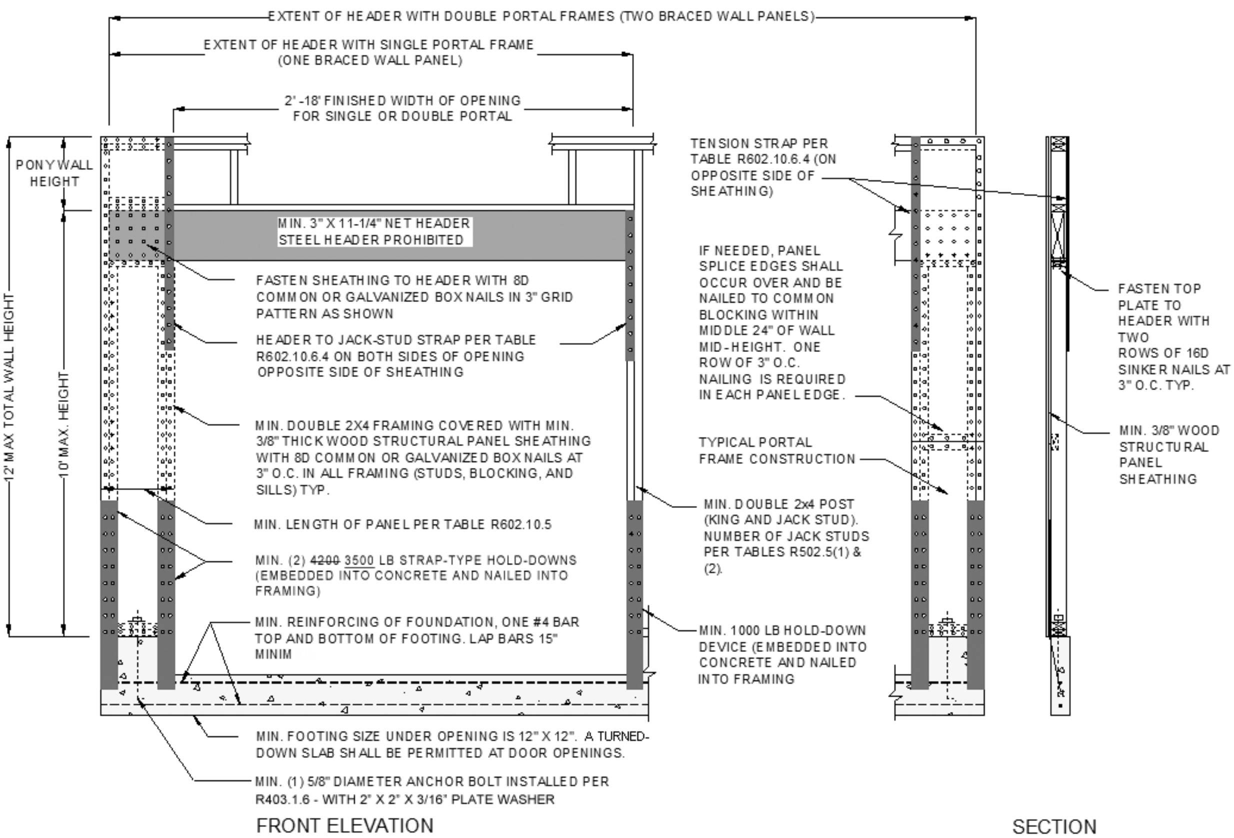


FIGURE R602.10.6.2
METHOD PFH-PORTAL FRAME WITH HOLD-DOWNS

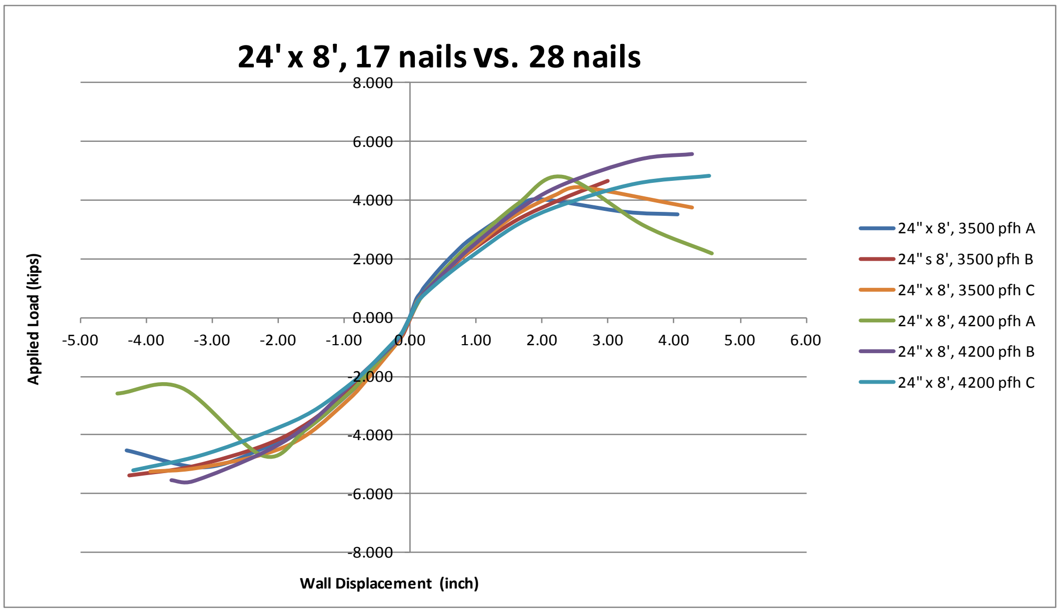
Reason: This is a companion item to S291-12/13 adopted in Portland in the October Final Action Hearing.

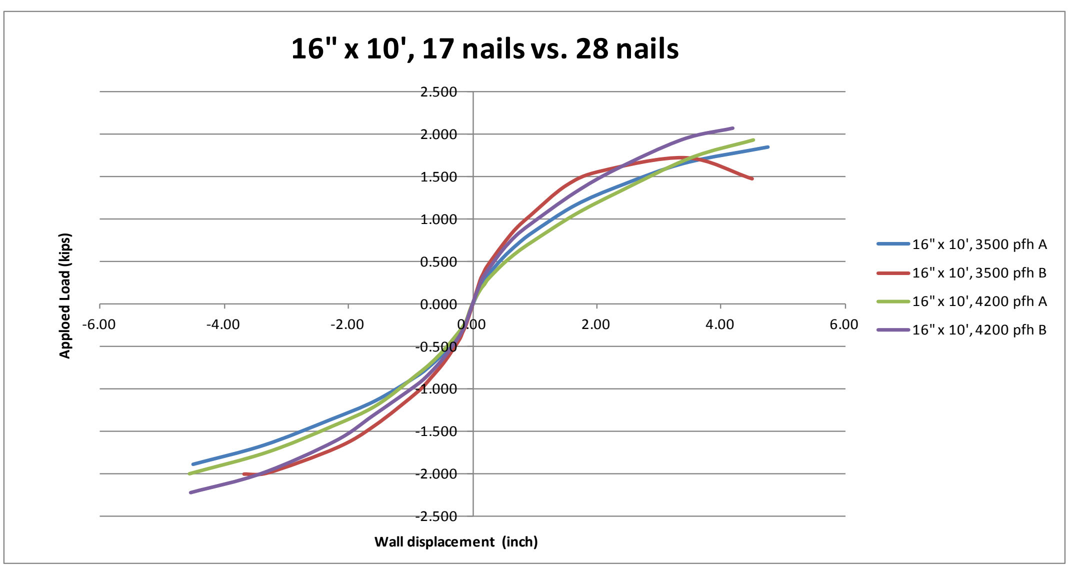
1) There are a couple of types of changes to Figure 2308.9.3.2 proposed. There are both technical changes and editorial changes.

Technical changes: The two technical changes made to the figure are the reduction of the capacity of the portal frame leg tie-down devices from 4200 lbf to 3500 lbf and the removal of the third bottom plate at the portal frame leg. (Note that the third bottom plate we propose to delete is NOT shown in the figure above. The normal strikethrough and underline procedures are difficult to apply to figure changes.)

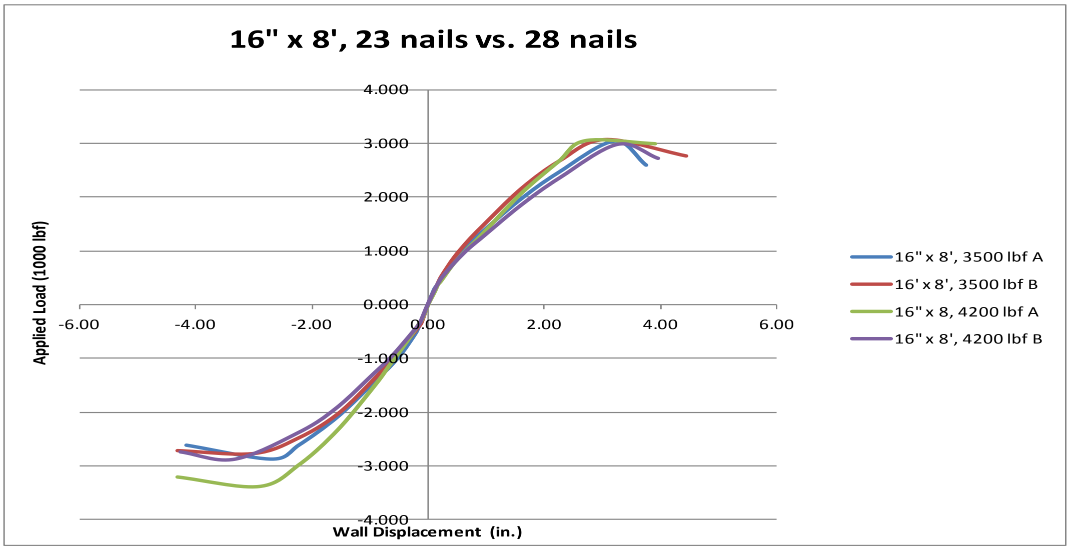
A. The first technical change is the reduction of the tie-down from 4200 lbf to 3500 lbf. The initial testing was conducted on the portal frames utilizing the 4200 lbf hold down because that was what was readily available and in common use by the construction industry. At the time of initial testing, no attempt was made to determine the sensitivity of the system to such a reduction in tie-down capacity. As the initial prescriptive parameters of the portal frame were based on testing, there was no latitude for determining the impact of the industry wide reduction to such tie-downs in response to the cracked-concrete provisions of ACI 318. As such, retesting of the portal frames with both 4200 lbf and 3500 lbf tie-downs was necessary to determine the impact on the performance of the system, if any. Portals with 24-inch wide legs x 8 foot height as well as 16-inch wide x 10 feet high were tested by APA. Pairs of each size were tested with 4200 lbf tie-downs and then retested with 3500 lbf tie-downs. Upon consultation with Simpson Strong-Tie technical personnel it was determined that the 3500 lbf capacity would be simulated by using 17 nails in the 4,200 lb strap. The 4,200 lb capacity of the strap was achieved by filling all 28 holes in the strap even though 21 nails would yield the 4,200 lbf capacities. This was done to simulate actual field installed conditions. The results of these tests as seen below illustrate that the whole portal frame system was relatively insensitive to the reduction in tie-down capacity within the over-nailed 4200 lbf to 3500 lbf range. No attempt was made to determine how low the tie-down capacity could be reduced before an impact on the performance of the portal frames could be seen.

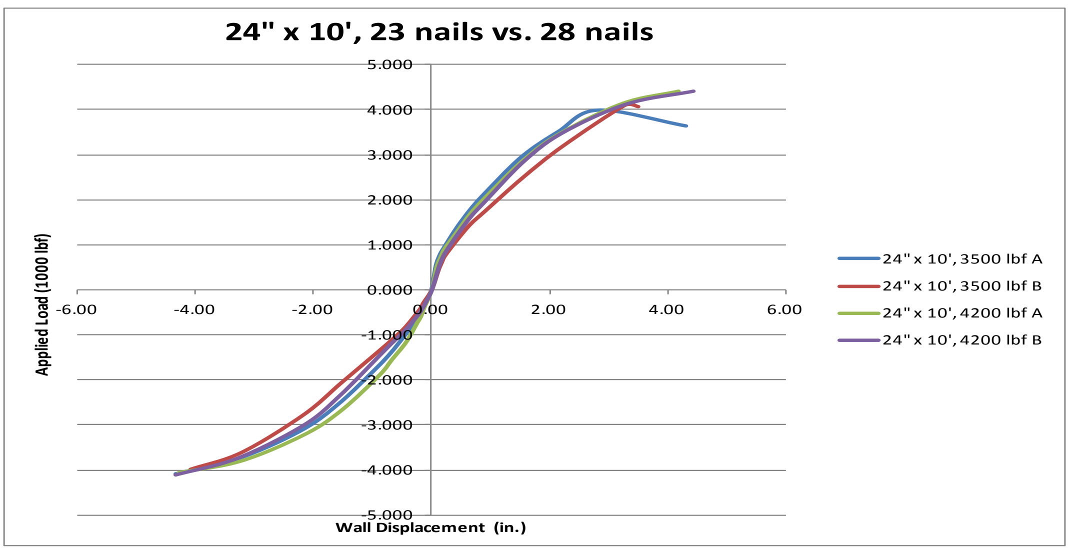
These tests were conducted using the CUREe method, as described in ASTM E2126, with a frequency of 0.5 Hz. The following charts show the backbone curves for the Method PFH portal frames tested with 3500 lbf and 4200 lbf tie-downs at both the 24-inch wide leg portals 8-feet high as well as the 16-inch wide portals 10-feet high. These are the extremes of the possible portal frame geometries from the most rigid (24-inch wide leg portals 8-feet high) to the least rigid (16-inch wide portals 10-feet high).





The results of the above tests agree favorably with previous testing conducted with varying numbers of fasteners as seen below:





B. The second technical change is the removal of the third bottom plate. The attached figure shows the third bottom plate removed from the figure. As mentioned above the original testing was conducted with the third plate in place. The third plate causes numerous difficulties in the field, not the least of which is that the normal length threaded anchors are too short to accommodate the third plate and provide the required depth of penetration into the foundation. This results in inadequate anchor depth-of-embedment or the use of threaded sleeves and all-thread to extend the bolt length to accommodate the third plate. When investigating the change to the 3500 lbf hold down, we utilized this opportunity to run the tests with only double bottom plates. All subsequent testing was done without the third bottom plate. The results of this testing indicated that the third bottom plate has negligible impact on the performance of the portal frames.

It is clear from the backbone curves shown above that the reduction in the capacity of the hold-down strap from 4,200 to 3,500 lbf has no significant impact on the performance of the portal frame. As such, we request that by this public comment, the reference to the hold-down capacity be changed from 4,200 to 3,500 lbf in both the figure and corresponding text.

APA Report T2012L-24 – *Bracing Method Alternative Attachment (IBC), Portal Frame with Hold Downs (Bracing Method PFH) (IRC) – Hold-Down Strap Capacity Variations* is available for free download at apawood.org.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The reduction in the hold-down capacity will provide for the use of readily available hold-downs.

Assembly Action: **None**

Final Hearing Results

RB311-13	**AS**

Code Change No: RB312-13

Original Proposal

Section(s): Figure R602.10.6.2, Figure R602.10.6.3, Figure R602.10.6.4

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

In all three of the figures revise the following annotation directed to the mid-height splice of the portal frame legs.

IF NEEDED, PANEL SPLICE EDGES SHALL OCCUR OVER AND BE NAILED TO COMMON BLOCKING WITHIN THE MIDDLE 24” OF THE ~~WALL MID-~~PORTAL-LEG HEIGHT. ONE ROW OF 3” O.C. NAILING IS REQUIRED IN EACH PANEL EDGE.

Reason: The original intent of the annotation was to place the permissible splice location within a band 24-inches wide located at the center of the portal-frame leg. Due to an unfortunate choice of language in the original development of these two drawings, the stipulation for “within 24” of the wall mid-height” describes a band that is 48-inches wide (24 inches from above to mid-height and 24 inches from below to mid-height. Such an interpretation is far outside of the original intent.

This proposal also changes “wall mid-height” to “portal-leg height”. In the original development of this method the portal-leg height was only different from the wall height by the width of the header so while the original language was not correct (it is the portal-leg height that is important when making the panel splice), a miss-interpretation was not significant. Recent changes to the IRC, however, permit the possibility of placing pony walls over the portals, and/or placing the portals on masonry stem-walls. As the difference between the portal-leg height and the wall height can now be up to 48 inches it is very important properly state the appropriate location for the sheathing splice plate. The center 24 inches of the *portal leg* is the appropriate place for the splice. Request the committee’s approval to clarify the true intent of these provisions.

Note that with approval of this proposal the same annotation will be used in all three of the portal frame figures in the IRC, minimizing confusion and reducing the possibility of misapplication.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides clarity to where the panel splice is to be made.

Assembly Action: **None**

Final Hearing Results

RB312-13	**AS**

Code Change No: RB313-13

Original Proposal

Section(s): Figure R602.10.6.2, Figure R602.10.6.3, Figure R602.10.6.4

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

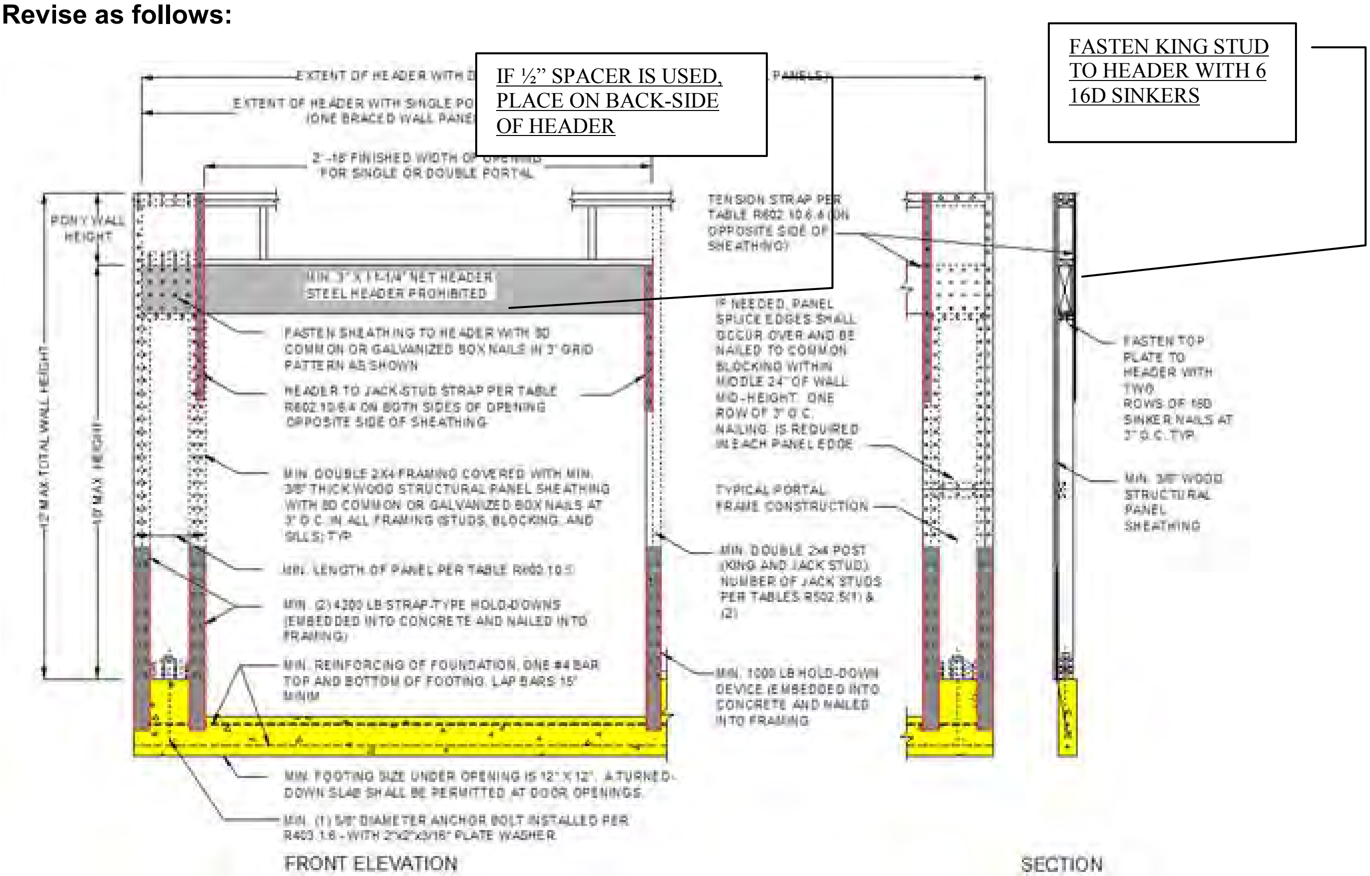


FIGURE R602.10.2
METHOD PFH: PORTAL FRAME WITH HOLD-DOWNS

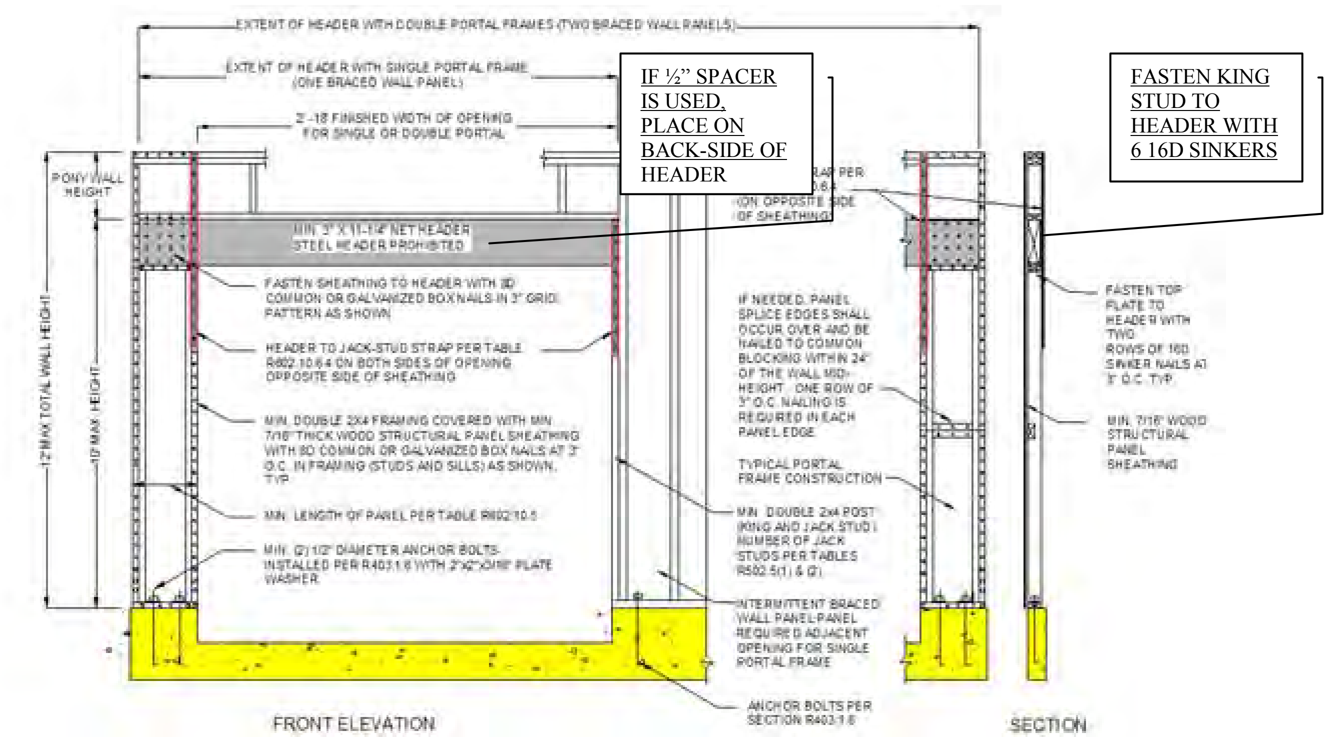


FIGURE R602.10.6.3
METHOD PFG: PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B, AND C

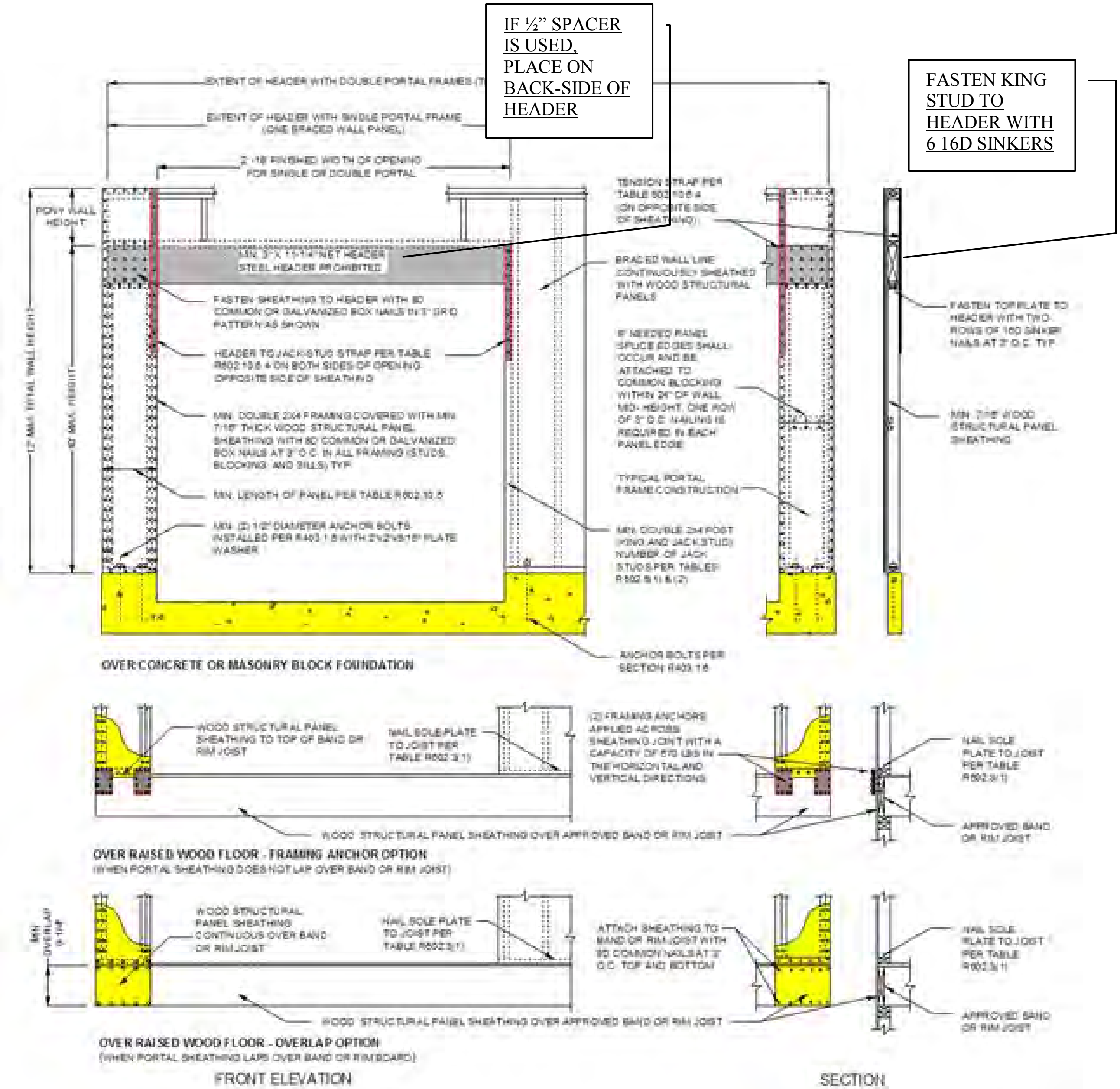


FIGURE R602.10.6.4
METHOD CS-PH; CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

Reason: When the three portal frame figures were homogenized and redrawn by a single source for the 2009 IRC a couple of annotations were inadvertently eliminated from the drawings. The attached proposal replaces these annotations.

The first annotation in all 3 figures states that is a ½-inch spacer is used to develop a built-up header, that the spacer be put on the back-side of the header. This placement insures that the 8d nails used in the grid pattern at the top of the portal leg adequately penetrate the back header to insure proper load distribution. As the spacer offers no structural advantage to the header, its placement behind the built-up header is of no structural consequence.

The second annotation calls out 6 16d sinker nails to attach the king stud to the header at the top of the portal-frame leg. These assemblies were developed and tested with these nails present and this should be reflected in the drawings.

We encourage the committee to vote in favor of this proposal to clarify the intent of these 3 portal-frame figures.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change restores missing notes on the figures that were inadvertently omitted. The notes add clarity and direction for the spacer and fastening of the king stud.

Assembly Action: **None**

Final Hearing Results

RB313-13	**AS**

Code Change No: RB315-13

Original Proposal

Section(s): R602.10.6.5.1

Proponent: Randall Shackelford, P.E., Simpson Strong-Tie Co., Inc. (rshackelford@strongtie.com)

Revise as follows:

R602.10.6.5.1 Length of bracing. The length of bracing along each *braced wall line* shall be the greater of that required by the design wind speed and *braced wall line* spacing in accordance with Table R602.10.3(1) as adjusted by the factors in the Table R602.10.3(2) or the Seismic Design Category and *braced wall line* length in accordance with Table R602.10.6.5. Angled walls shall be permitted to be counted in accordance with Section R602.10.1.4, and *braced wall panel* location shall be in accordance with Section R602.10.2.2. <u>Spacing between *braced wall lines* shall be in accordance with Table R602.10.1.3.</u> The seismic adjustment factors in Table R602.10.3(4) shall not be applied to the length of bracing determined using Table R602.10.6.5<u>, except that the bracing amount increase for *braced wall line* spacing greater than 25 feet in accordance with Table R602.10.1.3 shall be required.</u> In no case shall the minimum total length of bracing in a *braced wall line*, after all adjustments have been taken, be less than 48 inches (1219 mm) total.

Reason: The purpose is this code change is to clarify the required maximum spacing of braced wall lines supporting brick veneer in Seismic Design Categories D_0, D_1, and D_2, and when the spacing is permitted to be increased, and that the bracing amounts are to be increased when the braced wall spacing is increased above the typical maximum of 25 feet. The current section is basically silent on what the braced wall line spacing should be. Further, it states that the typical seismic increases in Table R602.10.3.4 are not to be used. This could lead the user to believe that all braced wall lines must be spaced a maximum of 25 feet apart. By specifying that the braced wall line spacing is to be in accordance with Table R602.10.1.3, this clarifies that the spacing is permitted to be increased to 35 feet in certain cases.
But when braced wall line spacing is increased, the shear load on the braced wall lines is increased, so more bracing is required. This change will allow for flexibility in residences that are covered by this section by clarifying that the braced wall lines are permitted to be spaced up to 35 feet apart, as long as the amount of bracing is appropriately increased.

Cost Impact: Depending on how this section is currently being interpreted, this could lower costs by allowing braced wall lines to be spaced farther apart, or it could increase costs if braced wall lines are currently being permitted to be spaced further apart than allowed by Table R602.10.1.3.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB315-13	**AS**

Code Change No: RB319-13

Original Proposal

Section(s): R602.10.8.2

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R602.10.8.2 Connections to roof framing. Top plates of exterior braced wall panels shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of braced wall panels and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the braced wall panels shall be permitted to replace the blocking required by this section. Blocking shall not be required over openings in continuously-sheathed braced wall lines. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with Section R806.1.

1. For Seismic Design Categories A, B and C ~~and wind speeds less than 100 mph (45 m/s)~~ where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is 9 1/4 inches (235 mm) or less, blocking between rafters or roof trusses shall not be required. Where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is between 9 1/4 inches (235 mm) and 15 1/4 inches (387 mm), blocking between rafters or roof trusses shall be provided above the braced wall panel in accordance with Figure R602.10.8.2(1).

   <u>**Exception:** Where the outside edge of truss vertical web members aligns with the outside face of the wall studs below, the wall sheathing extending above the top plate as shown in Figure R602.10.8/2(3) shall be permitted to be fastened to each truss webs with 3-8d nails (2.5” x 0.131”) and blocking between the trusses shall not be required.</u>

2. For Seismic Design Categories D0, D1 and D2 ~~or wind speeds of 100 mph (45 m/s) or greater~~, where the distance from the top of the braced wall panel to the top of the rafters or roof trusses is 15 1/4 inches (387 mm) or less, blocking between rafters or roof trusses shall be provided above the braced wall panel in accordance with Figure R602.10.8.2(1).

3. Where the distance from the top of the braced wall panel to the top of rafters or roof trusses exceeds 15 1/4 inches (387 mm), the top plates of the braced wall panel shall be connected to perpendicular rafters or roof trusses above in accordance with one or more of the following methods:

   3.1. Soffit blocking panels constructed in accordance with Figure R602.10.8.2(2);

   3.2. Vertical blocking panels constructed in accordance with Figure R602.10.8.2(3);

   3.3. <u>Blocking panels provided by the roof truss manufacturer and designed in accordance with Section R802.10</u>~~Full-height engineered blocking panels designed in accordance with the AF&PA WFCM~~; or

3.4. Blocking, blocking panels, or other methods of lateral load transfer designed in accordance with <u>the AWC WFCM or </u>accepted engineering practice.

Reason: In 2010, the NAHB Research Center with the support of NAHB and the Forest Products Laboratory conducted testing of roof assemblies with 10” and 16” deep truss heels. The research indicates that the IRC blocking provisions are overly conservative for truss heels up to 16” in areas within the wind design limits of the IRC. The results can be summarized and compared with required lateral capacities per Table 3.4 of the 2012 *Wood Frame Construction Manual*:

700-year Basic Wind Speed (mph)	Wind Exposure	Heel Height (inches)	Required Lateral Capacity (lbs)	Peak Lateral Capacity (lbs)	Factor of Safety	Deflection (inches)
140mph	B	10	134	514	3.84	0.40
140mph	B	10	134	332	2.62	0.60
140mph	C	16	186	514	2.76	0.55
140mph	C	16	186	332	1.89	0.80

The NAHBRC also tested several 16” heel configurations with a strip of OSB face-nailed to the ends of the trusses instead of blocking between the trusses. The peak capacities exceeded those for the unblocked 16” heel and were slightly lower than those for the 10” heel. The stiffnesses are greater than those for both the unblocked 10” and the 16’” heel, thus the deflections at the required lateral capacity will be less.

Two additional changes are proposed. The current options 3.3 and 3.4 for designing a blocking panel using the WFCM or designing blocking, blocking panels or other methods of lateral load transfer are effectively one and the same. The WFCM provides an engineered design, whether the Chapter 2 engineering tables or Chapter 3 prescriptive tables are used. It is therefore proposed to combine the option to use the WFCM into the general design option. A pointer to the wood truss section is added for when the truss manufacturer designs and supplies truss blocking panels as part of the truss package. By adding this pointer, the truss manufacturer is still required to design the truss block in accordance with accepted engineering practice, but the design need not be signed and sealed by a registered design professional unless the jurisdiction where the project is located requires the entire truss design package be signed and sealed.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R602.10.8.2 Connections to roof framing. Top plates of exterior braced wall panels shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of braced wall panels and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the braced wall panels shall be permitted to replace the blocking required by this section. Blocking shall not be required over openings in continuously-sheathed braced wall lines. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with Section R806.1.

1. For Seismic Design Categories A, B and C where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is 9 1/4 inches (235 mm) or less, blocking between rafters or roof trusses shall not be required. Where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is between 9 1/4 inches (235 mm) and 15 1/4 inches (387 mm), blocking between rafters or roof trusses shall be provided above the braced wall panel in accordance with Figure R602.10.8.2(1).

   Exception: Where the outside edge of truss vertical web members aligns with the outside face of the wall studs below, ~~the wall~~ <u>wood structural panel </u>sheathing extending above the top plate as shown in Figure R602.10.8<u>.</u>~~/~~2(3) shall be permitted to be fastened to each truss webs with 3-8d nails (2.5” x 0.131”) and blocking between the trusses shall not be required.

(Portions of code change not shown remain unchanged)

Committee Reason: Approval was based upon the proponent’s published reason. The modification corrects the exception to apply to WSP sheathing to be consistent with the testing.

Assembly Action: **None**

Final Hearing Results

RB319-13 **AM**

Code Change No: RB320-13

Original Proposal

Section(s): R602.10.8.2(3)

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

Add detail as shown below to Figure R602.10.8.2(3): (Remainder unchanged)

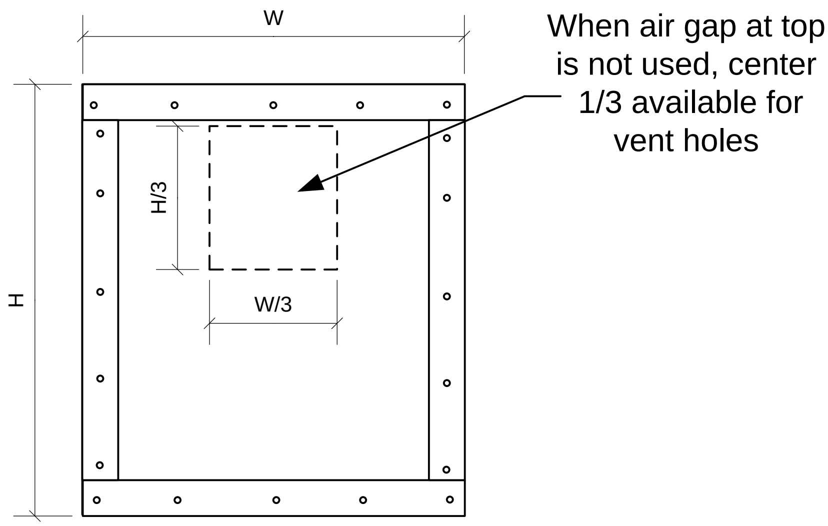


FIGURE R602.10.8.2(3)
BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

Reason: When the air gap is not desired, as in the case of an engineered roof system, the ventilation requirements can be met by placing an opening in the fabricated blocking panels. An opening sized as shown above will not compromise the ability of the fabricated blocking panel to resist overturning or transfer shear from the roof diaphragm to the wall below.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. Also, provides missing information on how to deal with ventilation.

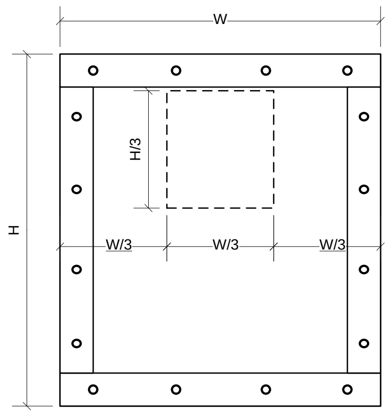
Assembly Action: **None**

Public Comments

Public Comment:

Edward L. Keith, representing APA – The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:



~~When~~ Where air gap at top is not used, center ~~1/3~~ W/3 available for vent holes

FIGURE R602.10.8.2(3)
BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

Commenter's Reason: While the original proposal was recommended for approval as submitted, a number of minor editorial improvements were recommended be attendees at the mid-year meeting. The minor changes are:

- The addition of "W/3" to either side of the opening.
- Changing "When" to "Where" in the annotation.
- Changing "1/3" to "W/3" in the annotation.

This public comment makes these editorial improvements, making the code easier to understand, administer and use.

Final Hearing Results

RB320-13	**AMPC**

Code Change No: RB321-13

Original Proposal

Section(s): R602.10.11

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R602.10.11 Cripple wall bracing. Cripple walls shall be constructed in accordance with Section R602.9 and braced in accordance with this section. Cripple walls shall be braced with the length and method of bracing used for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3), and the applicable adjustment factors in Tables R602.10.3(2) and R602.10.3(4), respectively, except the length of the cripple wall bracing shall be multiplied by a factor of 1.15. The maximum distance between adjacent edges of braced wall panels shall be reduced from 20 feet (6069 mm) to 14 feet (4267 mm). When gypsum wall board is not used on the inside of the cripple wall bracing, the length adjustments for the elimination of the gypsum wallboard, or equivalent, shall be applied as directed in Tables R602.10.3(2) and R602.10.3(4) to the length of cripple wall bracing required. This adjustment shall be taken in addition to the 1.15 increase described above.

Reason: The original provision requires the cripple wall length of bracing to be based on the length of bracing used in the wall above the cripple wall, increased by a factor of 1.15. Note however, the walls above are normally habitable spaces and as such the lengths of bracing used in these spaces are usually based on using gypsum board on the inside of the walls. Cripple walls however are not normally fabricated with a gypsum wall board finish on the inside. As such, just to make the resistance to wind or seismic forces equal between the walls above and the cripple walls below, the required bracing lengths in the cripple walls below would have to be increased by the adjustment factors (1.4 for wind and 1.5 for seismic) applicable when gypsum board is not present on the inside. See Tables R602.10.3(2) and (4). Of course, the alternative would be to sheath the inside of the cripple wall framing with gypsum wall board or an equivalent finish. On top of this increase in bracing of the cripple walls by either applying the adjustment factors or through the application of gypsum wallboard to the inside of the cripple wall framing, the 1.15 is still applicable.

Note that the 1.15 increase for cripple walls was a part of the code before the wall bracing lengths were based on gypsum board, or an equivalent, being required on the inside of the braced wall panels. As such it is clearly the intent of the code that the cripple walls have 15 percent more resistance to wind and seismic forces (a greater length of bracing) than the walls it supports. To accomplish this, cripple wall bracing length must be increased if gypsum wall board is not installed on the inside in addition to the 1.15 factor.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides for the proper adjustment when cripple walls do not have gypsum board on the interior side.

Assembly Action: **None**

Final Hearing Results

RB321-13	**AS**

Code Change No: RB322-13

Original Proposal

Section(s): R602.10.11

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R602.10.11 Cripple wall bracing. Cripple walls shall be constructed in accordance with Section R602.9 and braced in accordance with this section. Cripple walls shall be braced with the length and method of bracing used for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3), and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4), respectively, except that the length of cripple wall bracing shall be multiplied by a factor of 1.15. ~~The distance between adjacent edges of *braced wall panels* shall be reduced from 20 feet (6096 mm) to 14 feet (4267 mm).~~

Reason: The purpose of this code change proposal is to correct an error made in correlating the 2012 braced wall provisions. The reduction in spacing between braced wall panels in a cripple wall originated from cripple wall failures observed in seismic events such as the 1994 Northridge Earthquake. Working through the ICC Ad-Hoc Committee on Wall Bracing, NAHB developed a proposal for the 2009/2010 Code Development Cycle that reorganized the cripple wall bracing provisions and removed the spacing reduction for low-seismic areas. The proposal was approved at the Public Hearings and ratified by the consent agenda vote at the Final Action Hearings. A separate effort by the Ad-Hoc Committee to correlate their comprehensive reorganization of the wall bracing section with a modification made by the IRC-Building/Energy Committee inadvertently resulted in the spacing reduction being reinstated for low-seismic areas. This amendment corrects that oversight and restores the original intent of the Ad-Hoc Wall Bracing Committee's cripple wall proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change corrects the braced wall spacing for cripple wall bracing in low seismic areas.

Assembly Action: **None**

Final Hearing Results

RB322-13	**AS**

Code Change No: RB324-13

Original Proposal

Section(s): R602.12, Table R602.12.4

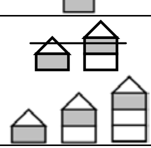
Proponent: Brian Foley, P.E., Fairfax County, VA, representing Virginia Building and Code Officials Association (brian.foley@fairfaxcounty.gov)

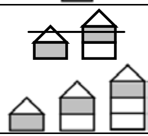
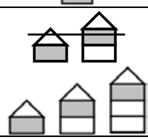
Revise as follows:

R602.12 Simplified wall bracing. Buildings meeting all of the conditions listed below shall be permitted to be braced in accordance with this section as an alternate to the requirements of Section R602.10. The entire building shall be braced in accordance with this section; the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.

1. There shall be no more than ~~two~~ three stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.
2. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.
3. Wall height shall not be greater than 10 feet (2743 mm).
4. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.
5. All exterior walls shall have gypsum board with a minimum thickness of $^1/_2$ inches (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.
6. The structure shall be located where the basic wind speed is less than or equal to ~~90~~ 100 mph (~~40~~ 44 m/s), and the Exposure Category is A or B.
7. The structure shall be located in Seismic Design Category of A, B or C for detached one- and two-family dwellings or Seismic Design Category A or B for townhouses.
8. Cripple walls shall not be permitted in ~~two~~three-story buildings.

TABLE R602.12.4
MINIMUM NUMBER OF BRACING UNITS ON EACH SIDE OF THE CIRCUMSCRIBED RECTANGLE

WIND SPEED	STORY LEVEL	EAVE-TO RIDGE HEIGHT (FEET)	MINIMUM NUMBER OF BRACING UNITS ON EACH LONG SIDE [a,b]						MINIMUM NUMBER OF BRACING UNITS ON EACH SHORT SIDE [a,b]					
			Length of short side (ft) [c]						Length of long side (ft) [c]					
			10	20	30	40	50	60	10	20	30	40	50	60
90		10	1	2	2	2	3	3	1	2	2	2	3	3
			2	3	3	4	5	6	2	3	3	4	5	6
			2	3	4	6	7	8	2	3	4	6	7	8
		15	1	2	3	3	4	4	1	2	3	3	4	4
			2	3	4	5	6	7	2	3	4	5	6	7

WIND SPEED	STORY LEVEL	EAVE-TO RIDGE HEIGHT (FEET)	MINIMUM NUMBER OF BRACING UNITS ON EACH LONG SIDE [a,b]						MINIMUM NUMBER OF BRACING UNITS ON EACH SHORT SIDE [a,b]					
			Length of short side (ft) [c]						Length of long side (ft) [c]					
			10	20	30	40	50	60	10	20	30	40	50	60
			2	4	5	6	7	9	2	4	5	6	7	9
100		10	1	2	2	3	3	4	1	2	2	3	3	4
			2	3	4	5	6	7	2	3	4	5	6	7
			2	4	5	7	8	10	2	4	5	7	8	10
		15	2	3	3	4	4	6	2	3	3	4	4	6
			3	4	6	7	8	10	3	4	6	7	8	10
			3	6	7	10	11	13	3	6	7	10	11	13

For SI: 1 ft = 304.8 mm
a. Interpolation shall not be permitted.
b. Cripple walls or wood-framed basement walls in a walk-out condition of a one-story structure shall be designed as the first floor of a two-story house.
c. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.

Reason: Using the wall bracing values for wind speed of 100 mph and three stories from Section R602.10, the use of Simplified Wall Bracing can be expanded to a wide range of areas and building types without impacting safety. Since the 90 mph values in Table R602.12.4 were calculated from R602.10, then the 100 mph will create an accurate bracing amounts as it would if calculated from the wind tables of R602.10.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

TABLE R602.12.4
MINIMUM NUMBER OF BRACING UNITS ON EACH SIDE OF THE CIRCUMSCRIBED RECTANGLE

For SI: 1 ft = 304.8 mm
a. Interpolation shall not be permitted.
b. Cripple walls or wood-framed basement walls in a walk-out condition ~~of a one-story structure~~ shall be ~~designed~~ designated as the first ~~floor~~ story ~~of a two-story house~~ and the stories above shall be redesignated as the second and third stories, respectively, and shall be prohibited in a three-story structure..
c. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.

Committee Reason: Approval was based upon the proponent's published reason. The modification clarifies where a cripple wall or wood-framed basement wall is considered a story.

Assembly Action: None

Public Comments

Public Comment:

Brian Foley, P.E. Fairfax County, VA, representing Virginia Building and Code Officials Association and Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB), request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R602.12 Simplified wall bracing. Buildings meeting all of the conditions listed in items 1-8 shall be permitted to be braced in accordance with this section as an alternative to the requirements of Section R602.10. The entire building shall be braced in accordance with this section; the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.

1. There shall be no more than three stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.
2. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.
3. Wall height shall not be greater than 10 feet (2743 mm).
4. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.
5. All exterior walls shall have gypsum board with a minimum thickness of ½ inch (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.
6. The structure shall be located where the ~~basic~~ ultimate design wind speed is less than or equal to 130 ~~100~~ mph (58 m/s) ~~(44 m/s)~~, and the Exposure Category is ~~A,~~ B or C.
7. The structure shall be located in Seismic Design Category A, B or C for detached one- and two-family dwellings or Seismic Design Category A or B for townhouses.
8. Cripple walls shall not be permitted in three-story buildings.

(Portions of code change proposal not show remain unchanged)

Commenter's Reason: The purpose of this public comment is to correlate RB324 with the comprehensive update of the IRC wind provisions to the ultimate design wind speed basis of ASCE 7-10 and the 2012 IBC. RB324 increased the scope of the simplified wall bracing method from 90mph to 100mph, but those wind speeds reflect the old ASCE 7-05 basis (now the "nominal design wind speed" or V_{ASD}). This code change converts the limit from 100mph V_{ASD} to the equivalent 130mph V_{ULT}.

Final Hearing Results

RB324-13	AMPC

Code Change No: RB325-13

Original Proposal

Section(s): R602.12, Table R602.12.4

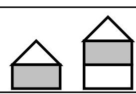
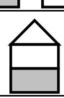
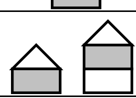
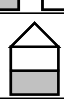
Proponent: Brian Foley, P.E., Fairfax County, VA, representing Virginia Building and Code Officials Association (brian.foley@fairfaxcounty.gov)

Revise as follows:

R602.12 Simplified wall bracing. Buildings meeting all of the conditions listed below shall be permitted to be braced in accordance with this section as an alternate to the requirements of Section R602.10. The entire building shall be braced in accordance with this section; the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.

1. There shall be no more than two stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.
2. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.
3. Wall height shall not be greater than 10 feet (2743 mm).
4. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.
5. All exterior walls shall have gypsum board with a minimum thickness of $^{1}/_{2}$ inches (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.
6. The structure shall be located where the basic wind speed is less than or equal to 90 mph (40 m/s), and the Exposure Category is A, ~~or~~ B or C.
7. The structure shall be located in Seismic Design Category of A, B or C for detached one- and two-family dwellings or Seismic Design Category A or B for townhouses.
8. Cripple walls shall not be permitted in two-story buildings.

TABLE R602.12.4
MINIMUM NUMBER OF BRACING UNITS ON EACH SIDE OF THE CIRCUMSCRIBED RECTANGLE

STORY LEVEL	EAVE-TO RIDGE HEIGHT (FEET)	MINIMUM NUMBER OF BRACING UNITS ON EACH LONG SIDE [a,b,d]						MINIMUM NUMBER OF BRACING UNITS ON EACH SHORT SIDE [a,b,d]					
		Length of short side (ft) [c]						Length of long side (ft) [c]					
		10	20	30	40	50	60	10	20	30	40	50	60
	10	1	2	2	2	3	3	1	2	2	2	3	3
		2	3	3	4	5	6	2	3	3	4	5	6
	15	1	2	3	3	4	4	1	2	3	3	4	4
		2	3	4	5	6	7	2	3	4	5	6	7

For SI: 1 ft = 304.8 mm
a. Interpolation shall not be permitted.
b. Cripple walls or wood-framed basement walls in a walk-out condition of a one-story structure shall be designed as the first floor of a two-story house.

c. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.
d. For exposure category C, multiply bracing units by a factor of 1.20 for a one-story building and 1.30 for a two-story building.

Reason: Using the existing adjustments for exposure category C from Section R602.10, the use of Simplified Wall Bracing can be expanded to a wide range of areas of the country without impacting safety. Since the values in Table R602.12.4 were calculated from R602.10, then the adjustment factors will create an accurate bracing amount for exposure category C just as it would if calculated from the wind tables of R602.10.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change will allow the simplified method to be used where the exposure category is C.

Assembly Action: **None**

Final Hearing Results

RB325-13 **AS**

Code Change No: **RB327-13**

Original Proposal

Section(s): R602.12.6.2

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R602.12.6.2 Method CS-PF *Braced wall panels* constructed as Method CS-PF in accordance with Section R602.10.6.4 shall be permitted when all framed portions of all exterior walls are sheathed with wood structural panels. Each CS-PF panel shall equal ~~0.5~~ 0.75 bracing units. A maximum of four CS-PF panels shall be permitted on all segments of walls parallel to each side of the circumscribed rectangle. Segments of walls which include a Method CS-PF panel shall meet the requirements of Section R602.10.4.2.

Reason: Currently each Method PFG (Portal Frame at Garage) is permitted in the 2012 IRC Section R602.12.6.3 to contributing 0.75 bracing units to the required amount of bracing. The contribution amount is based on the 1.5 multiplier to the length of the vertical leg of the portal frame permitted in Table R602.10.5. This multiplier was added in the "legacy" IRC provisions because Method PFG was restricted for use in areas of low seismicity (SDCs A, B and C).

Cyclic testing conducted at APA in 2006 of the CS-PF (Continuous Sheathed – Portal Frame) showed that the CS-PF has a design strength at least as high as the PFG tested in a similar manner. Based on the results of this testing it is reasonable to permit the same contributing amount of bracing units for the Method CS-PF when similarly restricted to areas of low seismicity as is the Simplified Method.

Please note that the CS-PF portal frame can have a leg length as small at 16 inches, where the PFG has a minimum leg length of 24 inches. What makes the CS-PF perform as well or better than the PFG, even with a shorter leg length, is the fact that the CS-PF has nearly twice as many fasteners as the PFG. It is the fastener interaction between the framing and sheathing that determine the ultimate capacity of this wood-structural-panel/framing bracing system.

Note that the IRC bracing provisions are difficult to meet in many cases as a result of narrow lot widths and the aesthetic requirements of modern homes. Areas around garages and picture windows are especially difficult to accommodate and still meet the minimum bracing requirements of the code. Permitting the equal-to-stronger minimum 16-inch CS-PF the to have the same adjustment factor as the 24-inch PFG is both rational and extremely helpful in broadening the scope of the 2012 IRC Simplified Bracing provisions.

We ask the committee to permit the 16-inch CS-PF the same 0.75 bracing unit contribution as is applied to the 24-inch PFG when used in the Simplified Bracing Method. This is based on full-scale cyclic load tests described in APA Test Report T2006-29 and NAHB-Research Center Test Report EG5522_08216.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Based upon the committee's previous action on RB310-13 and the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB327-13 **AS**

Code Change No: RB328-13

Original Proposal

Section(s): R602.12.6.3

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R602.12.6.3 Methods ABW, PFH and PFG. *Braced wall panels* constructed as Methods ABW, PFH and PFG shall be permitted when bracing units are constructed using wood structural panels applied either continuously or intermittently. Each ABW and PFH panel shall equal one bracing unit, and each PFG panel shall be equal to 0.75 bracing units.

Reason: This proposal adds the traditional bracing method with hold downs (Method ABW) to the list of permitted bracing methods that may be used with the Simplified Bracing Provisions. Method ABW provides a narrow wall bracing option to the Simplified Method that may assist designers and builders in meeting the hard-to-meet bracing requirements of the first story of a two story structure on a narrow width lot. This method would provide one unit of bracing (36 inches to 48 inches for continuous and intermittent, respectively) for a bracing element as narrow as 28 inches.

With the increases in bracing requirements of the 2009 IRC it is important that designers and builders have the requisite tools to meet these more challenging requirements. Site-built shear walls (ABW), portal frames (PFH and PFG) are essential tools equally beneficial for both intermittent and continuously sheathed walls alike.

Cost Impact: The code change proposal will not increase the cost of construction

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change adds an additional option for narrow wall bracing to the simplified method.

Assembly Action: **None**

Final Hearing Results

RB328-13	**AS**

Code Change No: RB330-13

Original Proposal

Section(s): R603, M1308.1, M2101.6, P2603.2

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R602.12.6.3 Methods ABW, PFH and PFG. *Braced wall panels* constructed as Methods ABW, PFH and PFG shall be permitted when bracing units are constructed using wood structural panels applied either continuously or intermittently. Each ABW and PFH panel shall equal one bracing unit, and each PFG panel shall be equal to 0.75 bracing units.

Reason: This proposal adds the traditional bracing method with hold downs (Method ABW) to the list of permitted bracing methods that may be used with the Simplified Bracing Provisions. Method ABW provides a narrow wall bracing option to the Simplified Method that may assist designers and builders in meeting the hard-to-meet bracing requirements of the first story of a two story structure on a narrow width lot. This method would provide one unit of bracing (36 inches to 48 inches for continuous and intermittent, respectively) for a bracing element as narrow as 28 inches.

With the increases in bracing requirements of the 2009 IRC it is important that designers and builders have the requisite tools to meet these more challenging requirements. Site-built shear walls (ABW), portal frames (PFH and PFG) are essential tools equally beneficial for both intermittent and continuously sheathed walls alike.

Cost Impact: The code change proposal will not increase the cost of construction

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change will update and streamline the cold-formed steel wall framing requirements. This aligns the cold-form steel provisions with the latest standards. Also, consistent with the committee's action on RB258-13.

Assembly Action: **None**

Final Hearing Results

RB330-13	**AS**

Code Change No: RB331-13

Original Proposal

Section(s): R604.3

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R604.3 Installation. Wood structural panel wall sheathing shall be attached to framing in accordance with Table R602.3(1) or R602.3(3). ~~Wood structural panels marked as Exposure I or Exterior are considered water-repellent sheathing under the code.~~

Reason: Water-repellent sheathing is a term no longer recognized in the IRC. The term now used is weather-resistive barrier. The current provisions of Section R703.2 require a weather-resistive barrier under all products including wood structural panels. Wood structural panels are not recognized as a weather-resistive barrier as the term is currently used in Chapter 7. We ask the committee to approve our proposal to remove the last reference to water-repellent sheathing from the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB331-13	**AS**

Code Change No: RB332-13

Original Proposal

Section(s): R606.2 , R606.2.1, R606.2.2, R606.2.3, R606.2.4, R606.2.5 (NEW), R606.2.6 (NEW), R606.2.7 (NEW), R606.2.8 (NEW), R606.2.9 (NEW), R606.2.10 (NEW), R606.2.12 (NEW), R606.3, R606.3.4 (NEW), R606.3.4.1 (NEW), R606.3.4.2 (NEW), R606.3.4.3 (NEW), R606.8, R606.11, R606.12, R606.12.3, R606.13, R606.14 (NEW), R606.14.1 (NEW), R606.14.2 (NEW), R606.15, R606.15.1, Table R606.15.1, R607.1.1, R607, R607.1.2, R607.1.3, R607.2.1, R607.2.1.1, R607.2.2, R607.2.2.1, R607.2.2.2, R607.3, R608, R608.1, R608.1.1, R608.1.1.1, R608.1.1.2, R608.1.2, R608.1.2.1, R608.1.2.2, R608.1.2.3, R608.1.3, R608.1.3.1, R608.1.3.2, R608.2, R608.2.1, R608.2.2, R609, R609.1, R609.1.1, Table R609.1.1, R609.1.2, Table R609.1.2, R609.1.3, R609.1.4, R609.1.4.1, R609.1.5, R609.1.5.1, R609.1.5.2, R609.2, R609.2.1, R609.2.2, R609.2.3, R609.3, R609.3.1, R609.4, R609.4.1, Chapter 44

Proponent: Jason Thompson, National Concrete Masonry Association representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

Revise as follows:

R606.2 Masonry construction materials.

R606.2.1 Concrete masonry units. Concrete masonry units shall conform to the following standards: ASTM C55 for concrete brick; ASTM C73 for calcium silicate face brick; ASTM C90 for load-bearing concrete masonry units; ASTM C744 for prefaced concrete and calcium silicate masonry units or ASTM C1634 for concrete facing brick.

R606.2.2 Clay or shale masonry units. Clay or shale masonry units shall conform to the following standards: ASTM C34 for structural clay *load-bearing wall* tile; ASTM C56 for structural clay nonload-bearing wall tile; ASTM C62 for building brick (solid masonry units made from clay or shale); ASTM C1088 for solid units of thin veneer brick; ASTM C126 for ceramic-glazed structural clay facing tile, facing brick and solid masonry units; ASTM C212 for structural clay facing tile; ASTM C216 for facing brick (solid masonry units made from clay or shale); ASTM C652 for hollow brick (hollow masonry units made from clay or shale) or ASTM C1405 for glazed brick (single-fired solid brick units).

> **Exception:** Structural clay tile for nonstructural use in fireproofing of structural members and in wall furring shall not be required to meet the compressive strength specifications. The fire-resistance rating shall be determined in accordance with ASTM E119 or UL 263 and shall comply with the requirements of Section R302.

R606.2.3 AAC masonry. AAC masonry units shall conform to ASTM C1386 for the strength class specified.

R606.2.4 Stone masonry units. Stone masonry units shall conform to the following standards: ASTM C503 for marble building stone (exterior); ASTM C568 for limestone building stone; ASTM C615 for granite building stone; ASTM C616 for sandstone building stone; or ASTM C629 for slate building stone.

R606.2.5 Architectural cast stone. Architectural cast stone shall conform to ASTM C1364.

R606.2.6 Second-hand units. Second-hand masonry units shall not be reused unless they conform to the requirements of new units. The units shall be of whole, sound materials and free from cracks and other defects that will interfere with proper laying or use. Old mortar shall be cleaned from the unit before reuse.

R606.2.7 Mortar. Except for mortars listed in Sections R606.2.8, R606.2.9, and R606.2.10, mortar for use in masonry construction shall meet the proportion specifications of Table R606.2.7 or the property specifications of ASTM C270. The type of mortar shall be in accordance with Sections R606.2.7.1, R606.2.7.2, and R606.2.7.3.

~~R607.1.1~~ R606.2.7.1 Foundation walls. ~~Masonry~~ Mortar for masonry foundation walls constructed as set forth in Tables R404.1.1(1) through R404.1.1(4) ~~and mortar~~ shall be Type M or S mortar.

~~R607.1.2~~ R606.2.7.2 Masonry in Seismic Design Categories A, B and C. Mortar for masonry serving as the lateral-force-resisting system in Seismic Design Categories A, B and C shall be Type M, S or N mortar.

~~R607.1.3~~ R606.2.7.3 Masonry in Seismic Design Categories D_0, D_1 and D_2. Mortar for masonry serving as the lateral-force-resisting system in Seismic Design Categories D_0, D_1 and D_2 shall be Type M or S Portland cement-lime or mortar cement mortar.

TABLE ~~R607.~~1 R606.2.7
MORTAR PROPORTIONS[a, b]

		PROPORTIONS BY VOLUME (cementitious materials)								
MORTAR	TYPE	Portland cement or blended cement	Mortar cement			Masonry cement			Hydrated lime[c] or lime putty	Aggregate ratio (measured in damp, loose conditions)
			M	S	N	M	S	N		
Cement-lime	M	1	—	—	—	—	—	—	1/4	Not less than 2 1/4 and not more than 3 times the sum of separate volumes of lime, if used, and cement
	S	1	—	—	—	—	—	—	over 1/4 to 1/2	
	N	1	—	—	—	—	—	—	over 1/2 to 1 1/4	
	O	1	—	—	—	—	—	—	over 1 1/4 to 2 1/2	
Mortar cement	M	1	—	—	1	—	—	—	—	
	M	—	1	—	—	—	—	—		
	S	1/2	—	—	1	—	—	—		
	S	—	—	1	—	—	—	—		
	N	—	—	—	1	—	—	—		
	O	—	—	—	1	—	—	—		
Masonry cement	M	1				—	—	1	—	
	M	—				1	—	—		
	S	1/2				—	—	1		
	S	—				—	1	—		
	N	—				—	—	1		
	O	—				—	—	1		

For SI: 1 cubic foot = 0.0283 m^3, 1 pound = 0.454 kg.

a. For the purpose of these specifications, the weight of 1 cubic foot of the respective materials shall be considered to be as follows:

Portland Cement	94 pounds	Masonry Cement	Weight printed on bag
Mortar Cement	Weight printed on bag	Hydrated Lime	40 pounds
Lime Putty (Quicklime)	80 pounds	Sand, damp and loose	80 pounds of dry sand

b. Two air-entraining materials shall not be combined in mortar.

c. Hydrated lime conforming to the requirements of ASTM C 207.

R606.2.8 Surface-bonding mortar. Surface-bonding mortar shall comply with ASTM C887. Surface bonding of concrete masonry units shall comply with ASTM C946.

R606.2.9 Mortar for AAC masonry. Thin-bed mortar for AAC masonry shall comply with Article 2.1 C.1 of TMS 602/ACI 530.1/ASCE 6. Mortar used for the leveling courses of AAC masonry shall comply with Article 2.1 C.2 of TMS 602/ACI 530.1/ASCE 6.

R606.2.10 Mortar for adhered masonry veneer. Mortar for use with adhered masonry veneer shall conform to ASTM C270 Type S or Type N or shall comply with ANSI A118.4 for latex-modified portland cement mortar.

~~**R609.1.1**~~ **R606.2.11 Grout.** Grout shall consist of cementitious material and aggregate in accordance with ASTM C476 or ~~and~~ the proportion specifications of Table ~~R609.1.~~1 R606.2.11. Type M or Type S mortar to which sufficient water has been added to produce pouring consistency ~~can~~ shall be permitted to be used as grout.

TABLE ~~R609.1.~~1 R606.2.11
GROUT PROPORTIONS BY VOLUME FOR MASONRY CONSTRUCTION

TYPE	PORTLAND CEMENT OR BLENDED CEMENT SLAG CEMENT	HYDRATED LIME OR LIME PUTTY	AGGREGATE MEASURED IN A DAMP, LOOSE CONDITION	
			Fine	Coarse
Fine	1	0 to 1/10	$2^1/_4$ to 3 times the sum of the volume of the cementitious materials	—
Coarse	1	0 to 1/10	$2^1/_4$ to 3 times the sum of the volume of the cementitious materials	1 to 2 times the sum of the volumes of the cementitious materials

R606.2.12 Metal reinforcement and accessories. Metal reinforcement and accessories shall conform to Article 2.4 of TMS 602/ACI 530.1/ASCE 6.

R606.3 Construction requirements.

~~**R607.2.1**~~ **R606.3.1 Bed and head joints.** Unless otherwise required or indicated on the project drawings, head and bed joints shall be 3/8 inch (10 mm) thick, except that the thickness of the bed joint of the starting course placed over foundations shall not be less than 1/4 inch (7 mm) and not more than 3/4 inch (19 mm).

~~**R607.2.1.1 Mortar joint thickness tolerance.**~~ Mortar joint thickness for load-bearing masonry shall be within the following tolerances from the specified dimensions:

1. Bed joint: + 1/8 inch (3 mm).
2. Head joint: - 1/4 inch (7 mm), + 3/8 inch (10 mm).
3. Collar joints: - 1/4 inch (7 mm), + 3/8 inch (10 mm).

~~**R607.2.2**~~ **R606.3.2 Masonry unit placement.** The mortar shall be sufficiently plastic and units shall be placed with sufficient pressure to extrude mortar from the joint and produce a tight joint. Deep furrowing of bed joints that produces voids shall not be permitted. Any units disturbed to the extent that initial bond is broken after initial placement shall be removed and relaid in fresh mortar. Surfaces to be in contact with mortar shall be clean and free of deleterious materials.

~~**R607.2.2.1**~~ **R606.3.2.1 Solid masonry.** *Solid masonry* units shall be laid with full head and bed joints and all interior vertical joints that are designed to receive mortar shall be filled.

~~**R607.2.2.2**~~ **R606.3.2.2 Hollow masonry.** For hollow masonry units, head and bed joints shall be filled solidly with mortar for a distance in from the face of the unit not less than the thickness of the face shell.
~~**R607.3**~~ **R606.3.3 Installation of wall ties.** The installation of wall ties shall be as follows:

1. The ends of wall ties shall be embedded in mortar joints. Wall ties shall have a minimum of 5/8-inch (15.9 mm) mortar coverage from the exposed face.
2. Wall ties shall not be bent after being embedded in grout or mortar.

3. For solid masonry units, solid grouted hollow units, or hollow units in anchored masonry veneer, wall ties shall be embedded in mortar bed at least 11/2 inches (38 mm).
4. For hollow masonry units in other than anchored masonry veneer, wall ties shall engage outer face shells by at least 1/2 inch (13 mm).

~~R606.13~~ R606.3.4 Protection for reinforcement. Bars shall be completely embedded in mortar or grout. Joint reinforcement embedded in horizontal mortar joints shall not have less than 5/8-inch (15.9 mm) mortar coverage from the exposed face. All other reinforcement shall have a minimum coverage of one bar diameter over all bars, but not less than 3/4 inch (19 mm), except where exposed to weather or soil, in which case the minimum coverage shall be 2 inches (51 mm).

~~R606.15.1~~ R606.3.4.1 Corrosion protection. Minimum corrosion protection of joint reinforcement, anchor ties and wire fabric for use in masonry wall construction shall conform to Table ~~R606.15.1~~ R606.3.4.1.

TABLE ~~R606.15.1~~ R606.3.4.1
MINIMUM CORROSION PROTECTION

MASONRY METAL ACCESSORY	STANDARD
Joint reinforcement, interior walls	ASTM A 641, Class 1
Wire ties or anchors in exterior walls completely embedded in mortar or grout	ASTM A 641, Class 3
Wire ties or anchors in exterior walls not completely embedded in mortar or grout	ASTM A 153, Class B-2
Joint reinforcement in exterior walls or interior walls exposed to moist environment	ASTM A 153, Class B-2
Sheet metal ties or anchors exposed to weather	ASTM A 153, Class B-2
Sheet metal ties or anchors completely embedded in mortar or grout	ASTM A 653, Coating Designation G60
Stainless steel hardware for any exposure	ASTM A 167, Type 304

R606.3.4 Grouting requirements.

R606.3.4.1 Grout placement. Grout shall be a plastic mix suitable for pumping without segregation of the constituents and shall be mixed thoroughly. Grout shall be placed by pumping or by an *approved* alternate method and shall be placed before any initial set occurs and in no case more than 1 1/2 hours after water has been added. Grout shall be consolidated by puddling or mechanical vibrating during placing and reconsolidated after excess moisture has been absorbed but before plasticity is lost. Grout shall not be pumped through aluminum pipes.

Maximum pour heights and the minimum dimensions of spaces provided for grout placement shall conform to Table R606.3.4.1. Grout shall be poured in lifts of 8-foot (2438 mm) maximum height. When a total grout pour exceeds 8 feet (2438 mm) in height, the grout shall be placed in lifts not exceeding 64 inches (1626 mm) and special inspection during grouting shall be required. If the work is stopped for one hour or longer, the horizontal construction joints shall be formed by stopping all tiers at the same elevation and with the grout 1 inch (25 mm) below the top.

TABLE ~~R609.1.2~~ R606.3.4.1
GROUT SPACE DIMENSIONS AND POUR HEIGHTS

GROUT TYPE	GROUT POUR MAXIMUM HEIGHT (feet)	MINIMUM WIDTH OF GROUT SPACES[a, b] (inches)	MINIMUM GROUT[b, c] SPACE DIMENSIONS FOR GROUTING CELLS OF HOLLOW UNITS (inches × inches)
Fine	1	0.75	1.5 × 2
	5	2	2 × 3
	12	2.5	2.5 × 3
	24	3	3 × 3
Coarse	1	1.5	1.5 × 3
	5	2	2.5 × 3
	12	2.5	3 × 3
	24	3	3 × 4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. For grouting between masonry wythes.
b. Grout space dimension is the clear dimension between any masonry protrusion and shall be increased by the horizontal projection of the diameters of the horizontal bars within the cross section of the grout space.
c. Area of vertical reinforcement shall not exceed 6 percent of the area of the grout space.

R606.3.4.2 Cleanouts. Provision shall be made for cleaning the space to be grouted. Mortar that projects more than 1/2 inch (13 mm) into the grout space and any other foreign matter shall be removed from the grout space prior to inspection and grouting. Where required by the *building official*, cleanouts shall be provided in the bottom course of masonry for each grout pour when the grout pour height exceeds 64 inches (1626 mm). In solid grouted masonry, cleanouts shall be spaced horizontally a maximum of 32 in. (813 mm) on center. The cleanouts shall be sealed before grouting and after inspection.

R606.3.4.3 Construction. Requirements for grouted masonry construction shall be as follows:

1. Masonry shall be built to preserve the unobstructed vertical continuity of the cells or spaces to be filled. In partially grouted construction, cross webs forming cells to be filled shall be full-bedded in mortar to prevent leakage of grout. Head and end joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells.
2. Vertical reinforcement shall be held in position at top and bottom and at intervals not exceeding 200 diameters of the reinforcement.
3. Cells containing reinforcement shall be filled solidly with grout.
4. The thickness of grout or mortar between masonry units and reinforcement shall not be less than 1/4 inch (7 mm), except that 1/4-inch (7 mm) bars may be laid in horizontal mortar joints at least 1/2 inch (13 mm) thick, and steel wire reinforcement may be laid in horizontal mortar joints at least twice the thickness of the wire diameter.

~~R609.2~~ R606.3.5 Grouted multiple-wythe masonry. Grouted multiple-wythe masonry shall conform to all the requirements specified in Section ~~R609.1~~ R606.3.4 and the requirements of this section.

~~R609.2.1~~ R606.3.5.1 Bonding of backup wythe. Where all interior vertical spaces are filled with grout in multiple-wythe construction, masonry headers shall not be permitted. Metal wall ties shall be used in accordance with Section ~~R608.1.2~~ R606.13.2 to prevent spreading of the wythes and to maintain the vertical alignment of the wall. Wall ties shall be installed in accordance with Section ~~R608.1.2~~ R606.13.2 when the backup wythe in multiple-wythe construction is fully grouted.

~~R609.2.3~~ R606.3.5.2 Grout barriers. Vertical grout barriers or dams shall be built of *solid masonry* across the grout space the entire height of the wall to control the flow of the grout horizontally. Grout barriers shall not be more than 25 feet (7620 mm) apart. The grouting of any section of a wall between control barriers shall be completed in one day with no interruptions greater than one hour.

~~R608.2~~ R606.3.6 Masonry bonding pattern. Masonry laid in running and stack bond shall conform to Sections ~~R608.2.1 and R608.2.2~~ R606.3.6.1 and R606.3.6.2.

~~R608.2.1~~ R606.3.6.1 Masonry laid in running bond. In each wythe of masonry laid in running bond, head joints in successive courses shall be offset by not less than one-fourth the unit length, or the masonry walls shall be reinforced longitudinally as required in Section ~~R608.2.2~~ R606.3.6.2.

~~R608.2.2~~ R606.3.6.2 Masonry laid in stack bond. Where unit masonry is laid with less head joint offset than in Section ~~R608.2.1~~ R606.3.6.1, the minimum area of horizontal reinforcement placed in mortar bed joints or in bond beams spaced not more than 48 inches (1219 mm) apart, shall be 0.0007 times the vertical cross-sectional area of the wall.

~~R606.2~~ R606.4 Thickness of masonry. The nominal thickness of masonry walls shall conform to the requirements of Sections ~~R606.2.1~~ R606.4.1 through ~~R606.2.4~~ R606.4.4.

~~R606.2.1~~ R606.4.1 Minimum thickness. The minimum thickness of masonry bearing walls more than one *story* high shall be 8 inches (203 mm). *Solid masonry* walls of one-story *dwellings* and garages shall not be less than 6 inches (152 mm) in thickness when not greater than 9 feet (2743 mm) in height, provided that when gable construction is used, an additional 6 feet (1829 mm) is permitted to the peak of the gable. Masonry walls shall be laterally supported in either the horizontal or vertical direction at intervals as required by Section ~~R606.9~~ R606.6.4.

~~R606.2.2~~ R606.4.2 Rubble stone masonry wall. The minimum thickness of rough, random or coursed rubble stone masonry walls shall be 16 inches (406 mm).

~~R606.2.3~~ R606.4.3 Change in thickness. Where walls of masonry of hollow units or masonry-bonded hollow walls are decreased in thickness, a course of *solid masonry* or masonry units filled with mortar or grout shall be constructed between the wall below and the thinner wall above, or special units or construction shall be used to transmit the loads from face shells or wythes above to those below.

~~R606.2.4~~ R606.4.4 Parapet walls. Unreinforced *solid masonry* parapet walls shall not be less than 8 inches (203 mm) thick and their height shall not exceed four times their thickness. Unreinforced hollow unit masonry parapet walls shall be not less than 8 inches (203 mm) thick, and their height shall not exceed three times their thickness. Masonry parapet walls in areas subject to wind loads of 30 pounds per square foot (1.44 kPa) located in Seismic Design Category D_0, D_1 or D_2, or on townhouses in Seismic Design Category C shall be reinforced in accordance with Section R606.12.

~~R606.3~~ R606.5 Corbeled masonry. Corbeled masonry shall be in accordance with Sections ~~R606.3.1~~ R606.5.1 through ~~R606.3.3~~ R606.5.3.

~~R606.3.1~~ R606.5.1 Units. *Solid masonry* units or masonry units filled with mortar or grout shall be used for corbeling.

~~R606.3.2~~ R606.5.2 Corbel projection. The maximum projection of one unit shall not exceed one-half the height of the unit or one-third the thickness at right angles to the wall. The maximum corbeled projection beyond the face of the wall shall not exceed:

1. One-half of the wall thickness for multi-wythe walls bonded by mortar or grout and wall ties or masonry headers, or
2. One-half the wythe thickness for single wythe walls, masonry-bonded hollow walls, multiwythe walls with open collar joints and veneer walls.

~~R606.3.3~~ R606.5.3 Corbeled masonry supporting floor or roof-framing members. When corbeled masonry is used to support floor or roof-framing members, the top course of the corbel shall be a header course or the top course bed joint shall have ties to the vertical wall.

~~R606.4~~ R606.6 Support conditions. Bearing and support conditions shall be in accordance with Sections ~~R606.4.1 and R606.4.2~~ R606.6.1 through R606.6.4.

~~R606.4.1~~ R606.6.1 Bearing on support. Each masonry wythe shall be supported by at least two-thirds of the wythe thickness.

~~R606.4.2~~ R606.6.2 Support at foundation. Cavity wall or masonry veneer construction ~~may~~ shall be permitted to be supported on an 8-inch (203 mm) foundation wall, provided the 8-inch (203 mm) wall is corbeled to the width of the wall system above with masonry constructed of *solid masonry* units or masonry units filled with mortar or grout. The total horizontal projection of the corbel shall not exceed 2 inches (51 mm) with individual corbels projecting not more than one-third the thickness of the unit or one-half the height of the unit. The hollow space behind the corbeled masonry shall be filled with mortar or grout.

~~R606.14~~ R606.6.3 Beam supports. Beams, girders or other concentrated loads supported by a wall or column shall have a bearing of at least 3 inches (76 mm) in length measured parallel to the beam upon *solid masonry* not less than 4 inches (102 mm) in thickness, or upon a metal bearing plate of adequate design and dimensions to distribute the load safely, or upon a continuous reinforced masonry member projecting not less than 4 inches (102 mm) from the face of the wall.

~~R606.14.1~~ R606.6.3.1 Joist bearing. Joists shall have a bearing of not less than 11/2 inches (38 mm), except as provided in Section ~~R606.14~~ R606.6.3, and shall be supported in accordance with Figure R606.11(1).

~~R606.9~~ R606.6.4 Lateral support. Masonry walls shall be laterally supported in either the horizontal or the vertical direction. The maximum spacing between lateral supports shall not exceed the distances in Table ~~R606.9~~ R606.6.4. Lateral support shall be provided by cross walls, pilasters, buttresses or structural frame members when the limiting distance is taken horizontally, or by floors or roofs when the limiting distance is taken vertically.

TABLE ~~R606.9~~ R606.6.4
SPACING OF LATERAL SUPPORT FOR MASONRY WALLS

(Portions of Table not shown remain unchanged)

a. Except for cavity walls and cantilevered walls, the thickness of a wall shall be its nominal thickness measured perpendicular to the face of the wall. For cavity walls, the thickness shall be determined as the sum of the nominal thicknesses of the individual wythes. For cantilever walls, except for parapets, the ratio of height to nominal thickness shall not exceed 6 for solid masonry, or 4 for hollow masonry. For parapets, see Section ~~R606.2.4~~ R606.4.4.

~~R606.9.1~~ R606.6.4.1 Horizontal lateral support. Lateral support in the horizontal direction provided by intersecting masonry walls shall be provided by one of the methods in Section ~~R606.9.1.1~~ R606.6.4.1.1 or Section ~~R606.9.1.2~~ R606.6.4.1.2.

~~R606.9.1.1~~ R606.6.4.1.1 Bonding pattern. Fifty percent of the units at the intersection shall be laid in an overlapping masonry bonding pattern, with alternate units having a bearing of not less than 3 inches (76 mm) on the unit below.

~~R606.9.1.2~~ R606.6.4.1.2 Metal reinforcement. Interior nonloadbearing walls shall be anchored at their intersections, at vertical intervals of not more than 16 inches (406 mm) with joint reinforcement of at least 9 gage [0.148 inch (4mm)], or 1/4-inch (6 mm) galvanized mesh hardware cloth. Intersecting masonry walls, other than interior nonloadbearing walls, shall be anchored at vertical intervals of not more than 8 inches (203 mm) with joint reinforcement of at least 9 gage and shall extend at least 30 inches (762 mm) in each direction at the intersection. Other metal ties, joint reinforcement or anchors, if used, shall be spaced to provide equivalent area of anchorage to that required by this section.

~~R606.9.2~~ R606.6.4.2 Vertical lateral support. Vertical lateral support of masonry walls in Seismic Design Category A, B or C shall be provided in accordance with one of the methods in Section ~~R606.9.2.1~~ R606.6.4.2.1 or Section ~~R606.9.2.2~~ R606.6.4.2.2.

~~R606.9.2.1~~ R606.6.4.2.1 Roof structures. Masonry walls shall be anchored to roof structures with metal strap anchors spaced in accordance with the manufacturer's instructions, 1/2-inch (13 mm) bolts spaced not more than 6 feet (1829 mm) on center, or other *approved* anchors. Anchors shall be embedded at least 16 inches (406 mm) into the masonry, or be hooked or welded to bond beam reinforcement placed not less than 6 inches (152 mm) from the top of the wall.

R606.6.4.2.2 ~~R606.9.2.2~~ Floor diaphragms. Masonry walls shall be anchored to floor *diaphragm* framing by metal strap anchors spaced in accordance with the manufacturer's instructions, 1/2-inch-diameter (13 mm) bolts spaced at intervals not to exceed 6 feet (1829 mm) and installed as shown in Figure R606.11(1), or by other *approved* methods.

R606.7 ~~R606.6~~ Piers. The unsupported height of masonry piers shall not exceed ten times their least dimension. When structural clay tile or hollow concrete masonry units are used for isolated piers to support beams and girders, the cellular spaces shall be filled solidly with ~~concrete~~ grout or Type M or S mortar, except that unfilled hollow piers may be used if their unsupported height is not more than four times their least dimension. Where hollow masonry units are solidly filled with ~~concrete~~ grout or Type M, S or N mortar, the allowable compressive stress shall be permitted to be increased as provided in Table ~~R606.5~~ R606.9.

~~R606.6.1~~ R606.7.1 Pier cap. Hollow piers shall be capped with 4 inches (102 mm) of *solid masonry* or concrete, a masonry cap block, or shall have cavities of the top course filled with concrete or grout.

~~R606.7~~ R606.8 Chases. Chases and recesses in masonry walls shall not be deeper than one-third the wall thickness, and the maximum length of a horizontal chase or horizontal projection shall not exceed 4 feet (1219 mm), and shall have at least 8 inches (203 mm) of masonry in back of the chases and recesses and between adjacent chases or recesses and the jambs of openings. Chases and recesses in masonry walls shall be designed and constructed so as not to reduce the required strength or required fire resistance of the wall and in no case shall a chase or recess be permitted within the required area of a pier. Masonry directly above chases or recesses wider than 12 inches (305 mm) shall be supported on noncombustible lintels.

~~R606.5~~ R606.9 Allowable stresses. Allowable compressive stresses in masonry shall not exceed the values prescribed in Table ~~R606.5~~ R606.9. In determining the stresses in masonry, the effects of all loads and conditions of loading and the influence of all forces affecting the design and strength of the several parts shall be taken into account.

~~R606.5.1~~ R606.9.1 Combined units. In walls or other structural members composed of different kinds or grades of units, materials or mortars, the maximum stress shall not exceed the allowable stress for the weakest of the combination of units, materials and mortars of which the member is composed. The net thickness of any facing unit that is used to resist stress shall not be less than 1.5 inches (38 mm).

TABLE ~~R606.5~~ R606.9
ALLOWABLE COMPRESSIVE STRESSES FOR EMPIRICAL DESIGN OF MASONRY

CONSTRUCTION; COMPRESSIVE STRENGTH OF UNIT, GROSS AREA	ALLOWABLE COMPRESSIVE STRESSES[a] GROSS CROSS-SECTIONAL AREA[b]	
	Type M or S mortar	Type N mortar
Solid masonry of brick and other solid units of clay or shale; sand-lime or concrete brick:		
8,000 + psi	350	300
4,500 psi	225	200
2,500 psi	160	140
1,500 psi	115	100
Grouted[c] masonry, of clay or shale; sand-lime or concrete:		
4,500 + psi	225	200
2,500 psi	160	140
1,500 psi	115	100
Solid masonry of solid concrete masonry units:		
3,000 + psi	225	200
2,000 psi	160	140
1,200 psi	115	100
Masonry of hollow load-bearing units:		
2,000 + psi	140	120
1,500 psi	115	100
1,000 psi	75	70
700 psi	60	55
Hollow walls (cavity or masonry bonded[d]) solid units:		
2,500 + psi	160	140
1,500 psi	115	100
Hollow units	75	70
Stone ashlar masonry:		
Granite	720	640
Limestone or marble	450	400
Sandstone or cast stone	360	320
Rubble stone masonry:		
Coarse, rough or random	120	100

For SI: 1 pound per square inch = 6.895 kPa.

a. Linear interpolation shall be used for determining allowable stresses for masonry units having compressive strengths that are intermediate between those given in the table.

b. Gross cross-sectional area shall be calculated on the actual rather than nominal dimensions.

c. See Section ~~R608~~ R606.13.

d. Where floor and roof loads are carried upon one wythe, the gross cross-sectional area is that of the wythe under load; if both wythes are loaded, the gross cross-sectional area is that of the wall minus the area of the cavity between the wythes. Walls bonded with metal ties shall be considered as cavity walls unless the collar joints are filled with mortar or grout.

R606.11 Anchorage. Masonry walls shall be anchored to floor and roof systems in accordance with the details shown in Figure R606.11(1), R606.11(2) or R606.11(3). Footings ~~may~~ shall be permitted to be considered as points of lateral support.

R606.12 Seismic requirements. The seismic requirements of this section shall apply to the design of masonry and the construction of masonry building elements located in Seismic Design Category D0, D1 or D2. Townhouses in Seismic Design Category C shall comply with the requirements of Section R606.12.2. These requirements shall not apply to glass unit masonry conforming to Section R610 ~~or~~ anchored masonry veneer conforming to Section R703.7, or adhered masonry veneer conforming to Section R703.12..

R606.12.3 Seismic Design Category D_0 or D_1. Structures in Seismic Design Category D_0 or D_1 shall comply with the requirements of Seismic Design Category C and the additional requirements of this section. AAC masonry shall not be used for the design of masonry elements that are part of the lateral force-resisting system.

~~SECTION R608~~
~~MULTIPLE-WYTHE MASONRY~~

~~**R608.1 General.**~~ **R606.13 Multiple-Wythe Masonry.** The facing and backing of multiple-wythe masonry walls shall be bonded in accordance with Section ~~R608.1.1, R608.1.2 or R608.1.3~~ R606.13.1, R606.13.2 or R606.13.3. In cavity walls, neither the facing nor the backing shall be less than 3 inches (76 mm) nominal in thickness and the cavity shall not be more than 4 inches (102 mm) nominal in width. The backing shall be at least as thick as the facing.

> **Exception:** Cavities shall be permitted to exceed the 4-inch (102 mm) nominal dimension provided tie size and tie spacing have been established by calculation.

~~**R608.1.1**~~ **R606.13.1 Bonding with masonry headers.** Bonding with solid or hollow masonry headers shall comply with Sections ~~R608.1.1.1 and R608.1.1.2~~ R606.13.1.1 and R606.13.1.2.

~~**R608.1.1.1**~~ **R606.13.1.1 Solid units.** Where the facing and backing (adjacent wythes) of *solid masonry* construction are bonded by means of masonry headers, no less than 4 percent of the wall surface of each face shall be composed of headers extending not less than 3 inches (76 mm) into the backing. The distance between adjacent full-length headers shall not exceed 24 inches (610 mm) either vertically or horizontally. In walls in which a single header does not extend through the wall, headers from the opposite sides shall overlap at least 3 inches (76 mm), or headers from opposite sides shall be covered with another header course overlapping the header below at least 3 inches (76 mm).

~~**R608.1.1.2**~~ **R606.13.1.2 Hollow units.** Where two or more hollow units are used to make up the thickness of a wall, the stretcher courses shall be bonded at vertical intervals not exceeding 34 inches (864 mm) by lapping at least 3 inches (76 mm) over the unit below, or by lapping at vertical intervals not exceeding 17 inches (432 mm) with units that are at least 50 percent thicker than the units below.

~~**R608.1.2**~~ **R606.13.2 Bonding with wall ties or joint reinforcement.** Bonding with wall ties or joint reinforcement shall comply with Sections R606.13.2.1 ~~R608.1.2.1~~ through ~~R608.1.2.3~~ R606.13.2.3.

~~**R608.1.2.1**~~ **R606.13.2.1 Bonding with wall ties.** Bonding with wall ties, except as required by Section R610, where the facing and backing (adjacent wythes) of masonry walls are bonded with 3/16-inch-diameter (5 mm) wall ties embedded in the horizontal mortar joints, there shall be at least one metal tie for each 4.5 square feet (0.418 m2) of wall area. Ties in alternate courses shall be staggered. The maximum vertical distance between ties shall not exceed 24 inches (610 mm), and the maximum horizontal distance shall not exceed 36 inches (914 mm). Rods or ties bent to rectangular shape shall be used with hollow masonry units laid with the cells vertical. In other walls, the ends of ties shall be bent to 90- degree (0.79 rad) angles to provide hooks no less than 2 inches (51 mm) long. Additional bonding ties shall be provided at all openings, spaced not more than 3 feet (914 mm) apart around the perimeter and within 12 inches (305 mm) of the opening.

~~R608.1.2.2~~ R606.13.2.2 Bonding with adjustable wall ties. Where the facing and backing (adjacent wythes) of masonry are bonded with adjustable wall ties, there shall be at least one tie for each 2.67 square feet (0.248 m2) of wall area. Neither the vertical nor the horizontal spacing of the adjustable wall ties shall exceed 24 inches (610 mm). The maximum vertical offset of bed joints from one wythe to the other shall be 1.25 inches (32 mm). The maximum clearance between connecting parts of the ties shall be 1/16 inch (2 mm). When pintle legs are used, ties shall have at least two 3/16-inch-diameter (5 mm) legs.

~~R608.1.2.3~~ R606.13.2.3 Bonding with prefabricated joint reinforcement. Where the facing and backing (adjacent wythes) of masonry are bonded with prefabricated joint reinforcement, there shall be at least one cross wire serving as a tie for each 2.67 square feet (0.248 m2) of wall area. The vertical spacing of the joint reinforcement shall not exceed 16 inches (406 mm). Cross wires on prefabricated joint reinforcement shall not be smaller than No. 9 gage. The longitudinal wires shall be embedded in the mortar.

~~R608.1.3~~ R606.13.3 Bonding with natural or cast stone. Bonding with natural and cast stone shall conform to Sections ~~R608.1.3.1 and R608.1.3.2~~ R606.13.3.1 and R606.13.3.2.

~~R608.1.3.1~~ R606.13.3.1 Ashlar masonry. In ashlar masonry, bonder units, uniformly distributed, shall be provided to the extent of not less than 10 percent of the wall area. Such bonder units shall extend not less than 4 inches (102 mm) into the backing wall.

~~R608.1.3.2~~ R606.13.3.2 Rubble stone masonry. Rubble stone masonry 24 inches (610 mm) or less in thickness shall have bonder units with a maximum spacing of 3 feet (914 mm) vertically and 3 feet (914 mm) horizontally, and if the masonry is of greater thickness than 24 inches (610 mm), shall have one bonder unit for each 6 square feet (0.557 m2) of wall surface on both sides.

R606.14 Anchored and adhered masonry veneer.

R606.14.1 Anchored veneer. Anchored masonry veneer installed over a backing of wood or cold-formed steel shall meet the requirements of Section R703.7.

R606.14.2 Adhered veneer. Adhered masonry veneer shall be installed in accordance with the requirements of Section R703.12.

~~**R606.8 Stack bond.** In unreinforced masonry where masonry units are laid in stack bond, longitudinal reinforcement consisting of not less than two continuous wires each with a minimum aggregate cross-sectional area of 0.017 square inch (11 mm2) shall be provided in horizontal bed joints spaced not more than 16 inches (406 mm) on center vertically.~~

~~**R606.15 Metal accessories.** Joint reinforcement, anchors, ties and wire fabric shall conform to the following: ASTM A 82 for wire anchors and ties; ASTM A 36 for plate, headed and bent-bar anchors; ASTM A 510 for corrugated sheet metal anchors and ties; ASTM A 951 for joint reinforcement; ASTM B 227 for copper-clad steel wire ties; or ASTM A 167 for stainless steel hardware.~~

~~SECTION R607~~
~~UNIT MASONRY~~

~~**R607.1 Mortar.** Mortar for use in masonry construction shall comply with ASTM C 270. The type of mortar shall be in accordance with Sections R607.1.1, R607.1.2 and R607.1.3 and shall meet the proportion specifications of Table R607.1 or the property specifications of ASTM C 270.~~

~~**R607.2 Placing mortar and masonry units.**~~

~~SECTION R609~~
~~GROUTED MASONRY~~

~~**R609.1 General.** Grouted multiple-wythe masonry is a form of construction in which the space between the wythes is solidly filled with grout. It is not necessary for the cores of masonry units to be filled with grout. Grouted hollow unit masonry is a form of construction in which certain cells of hollow units are continuously filled with grout.~~

~~**R609.1.2 Grouting requirements.** Maximum pour heights and the minimum dimensions of spaces provided for grout placement shall conform to Table R609.1.2. If the work is stopped for one hour or longer, the horizontal construction joints shall be formed by stopping all tiers at the same elevation and with the grout 1 inch (25 mm) below the top.~~

~~**R609.1.3 Grout space (cleaning).** Provision shall be made for cleaning grout space. Mortar projections that project more than 1/2 inch (13 mm) into grout space and any other foreign matter shall be removed from grout space prior to inspection and grouting.~~

~~**R609.1.4 Grout placement.** Grout shall be a plastic mix suitable for pumping without segregation of the constituents and shall be mixed thoroughly. Grout shall be placed by pumping or by an *approved* alternate method and shall be placed before any initial set occurs and in no case more than 11/2 hours after water has been added. Grouting shall be done in a continuous pour, in lifts not exceeding 5 feet (1524 mm). It shall be consolidated by puddling or mechanical vibrating during placing and reconsolidated after excess moisture has been absorbed but before plasticity is lost.~~

~~**R609.1.4.1 Grout pumped through aluminum pipes.** Grout shall not be pumped through aluminum pipes.~~

~~**R609.1.5 Cleanouts.** Where required by the *building official*, cleanouts shall be provided as specified in this section. The cleanouts shall be sealed before grouting and after inspection.~~

~~**R609.1.5.1 Grouted multiple-wythe masonry.** Cleanouts shall be provided at the bottom course of the exterior wythe at each pour of grout where such pour exceeds 5 feet (1524 mm) in height.~~

~~**R609.1.5.2 Grouted hollow unit masonry.** Cleanouts shall be provided at the bottom course of each cell to be grouted at each pour of grout, where such pour exceeds 4 feet (1219 mm) in height.~~

~~**R609.2.2 Grout spaces.** Fine grout shall be used when interior vertical space to receive grout does not exceed 2 inches (51 mm) in thickness. Interior vertical spaces exceeding 2 inches (51 mm) in thickness shall use coarse or fine grout.~~

~~**R609.3 Reinforced grouted multiple-wythe masonry.** Reinforced grouted multiple-wythe masonry shall conform to all the requirements specified in Sections R609.1 and R609.2 and the requirements of this section.~~

~~**R609.3.1 Construction.** The thickness of grout or mortar between masonry units and reinforcement shall not be less than 1/4 inch (7 mm), except that 1/4-inch (7 mm) bars may be laid in horizontal mortar joints at least 1/2 inch (13 mm) thick, and steel wire reinforcement may be laid in horizontal mortar joints at least twice the thickness of the wire diameter.~~

~~**R609.4 Reinforced hollow unit masonry.** Reinforced hollow unit masonry shall conform to all the requirements of Section R609.1 and the requirements of this section.~~

~~**R609.4.1 Construction.** Requirements for construction shall be as follows:~~

1. ~~Reinforced hollow-unit masonry shall be built to preserve the unobstructed vertical continuity of the cells to be filled. Walls and cross webs forming cells to be filled shall be full-bedded in mortar to prevent leakage of grout. Head and end joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells. Bond shall be provided by lapping units in successive vertical courses.~~
2. ~~Cells to be filled shall have vertical alignment sufficient to maintain a clear, unobstructed continuous vertical cell of dimensions prescribed in Table R609.1.2.~~
3. ~~Vertical reinforcement shall be held in position at top and bottom and at intervals not exceeding 200 diameters of the reinforcement.~~
4. ~~Cells containing reinforcement shall be filled solidly with grout. Grout shall be poured in lifts of 8-foot (2438 mm) maximum height. When a total grout pour exceeds 8 feet (2438 mm) in height, the grout shall be placed in lifts not exceeding 5 feet (1524 mm) and special inspection during grouting shall be required.~~
5. ~~Horizontal steel shall be fully embedded by grout in an uninterrupted pour.~~

Add new standards to Chapter 44 as follows:

ASTM

C56 Standard Specification for Structural Clay Nonloadbearing Tile
C126 Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units
C212 Standard Specification for Structural Clay Facing Tile
C503 Standard Specification for Marble Dimension Stone
C568 Standard Specification for Limestone Dimension Stone
C615 Standard Specification for Granite Dimension Stone
C629 Standard Specification for Slate Dimension Stone
C744 Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units
C946 Standard Practice for Construction of Dry-Stacked, Surface-Bonded Walls
C1088 Standard Specification for Thin Veneer Brick Units Made From Clay or Shale
C1364 Standard Specification for Architectural Cast Stone
C1386 Standard Specification for Precast Autoclaved Aerated Concrete (AAC) Wall Construction Units
C1405 Standard Specification for Glazed Brick (Single Fired, Brick Units)
C1634 Standard Specification for Concrete Facing Brick

ANSI

A118.4 American National Standard Specifications for Latex-Portland Cement Mortar

Reason: This change proposal is largely a clean-up and consolidation of the masonry design and construction requirements currently scattered throughout Sections R606, R607, R608, and R609. The provisions of these four sections have evolved over time somewhat autonomously resulting in conflicts and disconnects. For example, mortar requirements for masonry construction are covered in Section R607; however these requirements are not cited by Sections R606, R608, or R609.

Given the substantial reorganization, there are some technical differences proposed here compared to the existing requirements of Sections R606, R607, R608, and R609:

- A new Section R602.2 has been added to define the minimum requirements for masonry materials. While the IRC covers material requirements for mortar and grout, masonry unit requirements are not explicitly defined and as such are proposed to be added. Where the IRC does not define masonry material requirements, the provisions of the IBC are proposed.
- There are several conflicts in the existing grouting requirements. Grout pour height triggering cleanouts vary depending upon whether the masonry construction is multi-wythe, single wythe, or reinforced. Here, the grout lift requirements triggering cleanouts is changed to 64 inches for all masonry construction to be consistent with current IBC requirements. Similarly, grout lift requirements triggering special inspection are increased from 60 to 64 inches for consistency.
- Some non-mandatory language is revised.
- Section R606.12.3 introduces a limit on the use of AAC masonry in shear walls assigned to SDC D consistent with existing IBC limits.
- Redundant provisions are removed. For example, Section R606.8, which addresses minimum horizontal reinforcement requirements for masonry laid in stack bond, is already covered by Section R606.3.6.2. Likewise, grout space requirements per Section R609.2.2 are covered by the grout space requirements of Table R606.3.4.1.

- A new Section R606.14 is added that provides a pointer to the anchored and adhered veneer provisions of Chapter 7.

Cost Impact: This code change will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, ASTM C 56, ASTM C 126, ASTM C212, ASTM C 503, ASTM C 568, ASTM C 615, ASTM C 616, ASTM C 629, ASTM C 744, ASTM C 946, ASTM C 1088, ASTM C1364, ASTM C1386, ASTM C 1405, ASTM C 1634 and ANSI A 118.4 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ASTM C56, C126, C212, C503, C568, C615, C629, C744, C946, C1088, C1364, C1386, C1405, and C1634 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This change consolidates and organizes the masonry design and construction into one section. Also, this adds needed reference standards.

Assembly Action: **None**

Final Hearing Results

RB332-13 **AS**

Code Change No: RB334-13

Original Proposal

Section(s): R611.2, R611.6.2, Table R611.6(1), Table R611.6(2), Table R611.6(3), Table R611.6(4), R611.7.1.1, Table R611.7(1A), Table R611.7(1B), Table R611.7(1C), Figure R611.9(1), Table R611.9(1), Figure R611.9(2), Table R611.9(2), Figure R611.9(3), Table R611.9(3), Figure R611.9(4), Table R611.9(4), Figure R611.9(5), Table R611.9(5), Figure R611.9(6), Table R611.9(6), Figure R611.9(7), Table R611.9(7), Figure R611.9(8), Table R611.9(8), Figure R611.9(9), Table R611.9(9), Figure R611.9(10), Table R611.9(10), Figure R611.9(11), Table R611.9(11), Figure R611.9(12), Table R611.9(12), R611.9.2, R611.9.3, R611.10

Proponent: Stephen S. Szoke, P.E., Portland Cement Association

Revise as follows:

R611.2 Applicability limits. The provisions of this section shall apply to the construction of exterior concrete walls for buildings not greater than 60 feet (18 288 mm) in plan dimensions, floors with clear spans not greater than 32 feet (9754 mm) and roofs with clear spans not greater than 40 feet (12 192 mm). Buildings shall not exceed 35 feet (10 668 mm) in mean roof height or two stories in height above-grade. Floor/ceiling dead loads shall not exceed 10 pounds per square foot (479 Pa), roof/ceiling dead loads shall not exceed 15 pounds per square foot (718 Pa) and *attic* live loads shall not exceed 20 pounds per square foot (958 Pa). Roof overhangs shall not exceed 2 feet (610 mm) of horizontal projection beyond the exterior wall and the dead load of the overhangs shall not exceed 8 pounds per square foot (383 Pa).

Walls constructed in accordance with the provisions of this section shall be limited to buildings subjected to a maximum design wind speed of ~~130 miles per hour (58 m/s)~~160 miles per hour (72 m/s) Exposure B, ~~110 miles per hour (49 m/s)~~136 miles per hour (61 m/s) Exposure C and ~~100 miles per hour (45 m/s)~~125 miles per hour (56 m/s) Exposure D. Walls constructed in accordance with the provisions of this section shall be limited to detached one- and two-family *dwellings* and townhouses assigned to Seismic Design Category A or B, and detached one- and two-family *dwellings* assigned to Seismic Design Category C.

Buildings that are not within the scope of this section shall be designed in accordance with PCA 100 or ACI 318.

R611.6.2 Wall reinforcement for wind. Vertical wall reinforcement for resistance to out-of-plane wind forces shall be determined from Table R611.6(1), R611.6(2), R611.6(3) or R611.6(4). For the design of non-loadbearing walls, in Tables R611.6(1), R611.6(2) and R611.6(3) use the appropriate column labeled "top." Also, see Sections R611.7.2.2.2 and R611.7.2.2.3. There shall be a vertical bar at all corners of exterior walls. Unless more horizontal reinforcement is required by Section R611.7.2.2.1, the minimum horizontal reinforcement shall be four No. 4 bars [Grade 40 (280 MPa)] placed as follows: top bar within 12 inches (305 mm) of the top of the wall, bottom bar within 12 inches (305 mm) of the finish floor, and one bar each at approximately one-third and two-thirds of the wall height.

~~TABLE R611.6(1)~~
~~MINIMUM VERTICAL REINFORCEMENT FOR FLAT ABOVE-GRADE WALLS~~~~[a, b, c, d, e]~~

~~MAXIMUM WIND SPEED (mph)~~	~~MAXIMUM UNSUPPORTED WALL HEIGHT PER~~	~~MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)~~~~[f, g]~~
		~~Nominal~~~~[h]~~ ~~wall thickness (inches)~~

~~Exposure Category~~			~~STORY (feet)~~	~~4~~		~~6~~		~~8~~		~~10~~	
~~B~~	~~C~~	~~D~~		~~Top[i]~~	~~Side[i]~~	~~Top[i]~~	~~Side[i]~~	~~Top[i]~~	~~Side[i]~~	~~Top[i]~~	~~Side[i]~~
~~85~~	—	—	~~8~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~9~~	~~4@48~~	~~4@43~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~10~~	~~4@47~~	~~4@36~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
~~90~~	—	—	~~8~~	~~4@48~~	~~4@47~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~9~~	~~4@48~~	~~4@39~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~10~~	~~4@42~~	~~4@34~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
~~100~~	~~85~~	—	~~8~~	~~4@48~~	~~4@40~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~9~~	~~4@42~~	~~4@34~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~10~~	~~4@34~~	~~4@34~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
~~110~~	~~90~~	~~85~~	~~8~~	~~4@44~~	~~4@34~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~9~~	~~4@34~~	~~4@34~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~10~~	~~4@34~~	~~4@31~~	~~4@48~~	~~4@37~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
~~120~~	~~100~~	~~90~~	~~8~~	~~4@36~~	~~4@34~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~9~~	~~4@34~~	~~4@32~~	~~4@48~~	~~4@38~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~10~~	~~4@30~~	~~4@27~~	~~4@48~~	~~5@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
~~130~~	~~110~~	~~100~~	~~8~~	~~4@34~~	~~4@34~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~9~~	~~4@32~~	~~4@28~~	~~4@48~~	~~4@33~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~
			~~10~~	~~4@26~~	~~4@23~~	~~4@48~~	~~5@43~~	~~4@48~~	~~4@48~~	~~4@48~~	~~4@48~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square inch = 1.895 kPa, 1 square foot = 0.0929 m²~~.

a. ~~Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet, and topographic factor, K_{zt}, and importance factor, *I*, equal to 1.0.~~

b. ~~Table is based on concrete with a minimum specified compressive strength of 2,500 psi.~~

c. ~~See Section R611.6.5 for location of reinforcement in wall.~~

d. ~~Deflection criterion is *L*/240, where *L* is the unsupported height of the wall in inches.~~

e. ~~Interpolation is not permitted.~~

f. ~~Where No. 4 reinforcing bars at a spacing of 48 inches are specified in the table, use of bars with a minimum yield strength of 40,000 psi or 60,000 psi is permitted.~~

g. ~~Other than for No. 4 bars spaced at 48 inches on center, table values are based on reinforcing bars with a minimum yield strength of 60,000 psi. Vertical reinforcement with a yield strength of less than 60,000 psi and/or bars of a different size than specified in the table are permitted in accordance with Section R611.5.4.7 and Table R611.5.4(2).~~

h. ~~See Table R611.3 for tolerances on nominal thicknesses.~~

i. ~~Top means gravity load from roof and/or floor construction bears on top of wall. Side means gravity load from floor construction is transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. Where floor framing members span parallel to the wall, use of the top bearing condition is permitted.~~

TABLE R611.6(1)
MINIMUM VERTICAL REINFORCEMENT FOR FLAT ABOVE-GRADE WALLS[a, b, c, d, e]

MAXIMUM WIND SPEED (mph)	MAXIMUM UNSUPPORTED WALL HEIGHT PER STORY	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)[f, g]			
		Nominal[h] wall thickness (inches)			
Exposure		4	6	8	10

Category			(feet)								
B	C	D		Top[i]	Side[i]	Top[i]	Side[i]	Top[i]	Side[i]	Top[i]	Side[i]
115			8	4@48	4@48	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@48	4@39	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@41	4@34	4@48	4@48	4@48	4@48	4@48	4@48
120			8	4@48	4@43	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@48	4@36	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@37	4@34	4@48	4@48	4@48	4@48	4@48	4@48
130	110		8	4@48	4@38	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@39	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@34	4@34	4@48	4@48	4@48	4@48	4@48	4@48
140	119	110	8	4@43	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@34	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@34	4@31	4@48	4@48	4@48	4@48	4@48	4@48
150	127	117	8	4@37	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@34	4@33	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@31	4@27	4@48	4@48	4@48	4@48	4@48	4@48
160	136	125	8	4@34	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@34	4@29	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@27	4@24	4@48	4@48	4@48	4@48	4@48	4@48

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square inch = 1.895 kPa, 1 square foot = 0.0929 m^2.

a. Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet, topographic factor, K_{zt}, equal to 1.0, and Risk Category II.

b. Table is based on concrete with a minimum specified compressive strength of 2,500 psi.

c. See Section R611.6.5 for location of reinforcement in wall.

d. Deflection criterion is L/240, where L is the unsupported height of the wall in inches.

e. Interpolation is not permitted.

f. Where No. 4 reinforcing bars at a spacing of 48 inches are specified in the table as indicated by shaded cells, use of bars with a minimum yield strength of 40,000 psi or 60,000 psi is permitted.

g. Other than for No. 4 bars spaced at 48 inches on center, table values are based on reinforcing bars with a minimum yield strength of 60,000 psi. Vertical reinforcement with a yield strength of less than 60,000 psi and/or bars of a different size than specified in the table are permitted in accordance with Section R611.5.4.7 and Table R611.5.4(2).

h. See Table R611.3 for tolerances on nominal thicknesses.

i. "Top" means gravity load from roof and/or floor construction bears on top of wall. "Side" means gravity load from floor construction is transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. For nonloadbearing walls and where floor framing members span parallel to the wall, use of the "top" bearing condition is permitted.

~~TABLE R611.6(2)~~
~~MINIMUM VERTICAL REINFORCEMENT FOR WAFFLE-GRID ABOVE-GRADE WALLS~~[a, b, c, d, e]

~~MAXIMUM WIND SPEED (mph)~~			~~MAXIMUM UNSUPPORTED WALL HEIGHT PER STORY (feet)~~	~~MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)~~[f, g]			
~~Exposure Category~~				~~Nominal[h] wall thickness (inches)~~			
				~~6~~		~~8~~	
~~B~~	~~C~~	~~D~~		~~Top~~[i]	~~Side~~[i]	~~Top~~[i]	~~Side~~[i]
~~85~~	—	—	~~8~~	~~4@48~~	~~4@36, 5@48~~	~~4@48~~	~~4@48~~
			~~9~~	~~4@48~~	~~4@30, 5@47~~	~~4@48~~	~~4@45~~

			~~10~~	~~4@48~~	~~4@26, 5@40~~	~~4@48~~	~~4@39~~
~~90~~	~~—~~	~~—~~	~~8~~	~~4@48~~	~~4@33, 5@48~~	~~4@48~~	~~4@48~~
			~~9~~	~~4@48~~	~~4@28, 5@43~~	~~4@48~~	~~4@42~~
			~~10~~	~~4@31, 5@48~~	~~4@24, 5@37~~	~~4@48~~	~~4@36~~
~~100~~	~~85~~	~~—~~	~~8~~	~~4@48~~	~~4@28, 5@44~~	~~4@48~~	~~4@43~~
			~~9~~	~~4@31, 5@48~~	~~4@24, 5@37~~	~~4@48~~	~~4@36~~
			~~10~~	~~4@25, 5@39~~	~~4@24, 5@37~~	~~4@48~~	~~4@31, 5@48~~
~~110~~	~~90~~	~~85~~	~~8~~	~~4@33, 5@48~~	~~4@25, 5@38~~	~~4@48~~	~~4@38~~
			~~9~~	~~4@26, 5@40~~	~~4@24, 5@37~~	~~4@48~~	~~4@31, 5@48~~
			~~10~~	~~4@24, 5@37~~	~~4@23, 5@35~~	~~4@48~~	~~4@27, 5@41~~
~~120~~	~~100~~	~~90~~	~~8~~	~~4@27, 5@42~~	~~4@24, 5@37~~	~~4@48~~	~~4@33, 5@48~~
			~~9~~	~~4@24, 5@37~~	~~4@23, 5@36~~	~~4@48~~	~~4@27, 5@43~~
			~~10~~	~~4@23, 5@35~~	~~4@19, 5@30~~	~~4@48~~	~~4@23, 5@36~~
~~130~~	~~110~~	~~100~~	~~8~~	~~4@24, 5@37~~	~~4@24, 5@37~~	~~4@48~~	~~4@29, 5@45~~
			~~9~~	~~4@24, 5@37~~	~~4@20, 5@32~~	~~4@48~~	~~4@24, 5@37~~
			~~10~~	~~4@19, 5@30~~	~~4@17, 5@26~~	~~4@23, 5@36~~	~~4@20, 5@31~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square inch = 6.895 kPa, 1 square foot = 0.0929 m²~~.

~~a. Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet, and topographic factor, K_{zt}, and importance factor, I, equal to 1.0.~~

~~b. Table is based on concrete with a minimum specified compressive strength of 2,500 psi.~~

~~c. See Section R611.6.5 for location of reinforcement in wall.~~

~~d. Deflection criterion is L/240, where L is the unsupported height of the wall in inches.~~

~~e. Interpolation is not permitted.~~

~~f. Where No. 4 reinforcing bars at a spacing of 48 inches are specified in the table, use of bars with a minimum yield strength of 40,000 psi or 60,000 psi is permitted.~~

~~g. Other than for No. 4 bars spaced at 48 inches on center, table values are based on reinforcing bars with a minimum yield strength of 60,000 psi. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (i.e., 12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and/or bars of a different size than specified in the table are permitted in accordance with Section R611.5.4.7 and Table R611.5.4(2).~~

~~h. See Table R611.3 for minimum core dimensions and maximum spacing of horizontal and vertical cores.~~

~~i. Top means gravity load from roof and/or floor construction bears on top of wall. Side means gravity load from floor construction is transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. Where floor framing members span parallel to the wall, the top bearing condition is permitted to be used.~~

TABLE R611.6(2)
MINIMUM VERTICAL REINFORCEMENT FOR WAFFLE-GRID ABOVE-GRADE WALLS[a, b, c, d, e]

MAXIMUM WIND SPEED (mph)			MAXIMUM UNSUPPORTED WALL HEIGHT PER STORY (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)[f, g]			
Exposure Category				Nominal[h] wall thickness (inches)			
				6		8	
B	C	D		Top[i]	Side[i]	Top[i]	Side[i]
115			8	4@48	4@48	4@48	4@48
			9	4@48	5@43	4@48	4@48

			10	5@47	5@37	4@48	4@48
120			8	4@48	5@48	4@48	4@48
			9	4@48	5@40	4@48	4@48
			10	5@43	5@37	4@48	4@48
130	110		8	4@48	5@42	4@48	4@48
			9	5@45	5@37	4@48	4@48
			10	5@37	5@37	4@48	4@48
140	119	110	8	4@48	5@38	4@48	4@48
			9	5@39	5@37	4@48	4@48
			10	5@37	5@35	4@48	4@48
150	127	117	8	5@43	5@37	4@48	4@48
			9	5@37	5@37	4@48	4@48
			10	5@36	6@44	4@48	4@48
160	136	125	8	5@38	5@37	4@48	4@48
			9	5@37	6@47	4@48	4@48
			10	6@45	6@39	4@48	6@46

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square inch = 6.895 kPa, 1 square foot = 0.0929 m^2.

a. Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet, topographic factor, K_{zt} equal to 1.0, and Risk Category II.

b. Table is based on concrete with a minimum specified compressive strength of 2,500 psi.

c. See Section R611.6.5 for location of reinforcement in wall.

d. Deflection criterion is *L* /240, where *L* is the unsupported height of the wall in inches.

e. Interpolation is not permitted.

f. Where No. 4 reinforcing bars at a spacing of 48 inches are specified in the table as indicated by shaded cells, use of bars with a minimum yield strength of 40,000 psi or 60,000 psi is permitted.

g. Other than for No. 4 bars spaced at 48 inches on center, table values are based on reinforcing bars with a minimum yield strength of 60,000 psi. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (i.e., 12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and/or bars of a different size than specified in the table are permitted in accordance with Section R611.5.4.7 and Table R611.5.4(2).

h. See Table R611.3 for minimum core dimensions and maximum spacing of horizontal and vertical cores.

i. “Top” means gravity load from roof and/or floor construction bears on top of wall. “Side” means gravity load from floor construction is transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. For non-loadbearing walls and where floor framing members span parallel to the wall, the “top” bearing condition is permitted to be used.

~~TABLE R611.6(3)~~
~~MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH SCREEN-GRID ABOVE-GRADE WALLS~~[a, b, c, d, e]

~~MAXIMUM WIND SPEED (mph)~~			~~MAXIMUM UNSUPPORTED WALL HEIGHT PER STORY (feet)~~	~~MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)~~[f, g]	
				~~Nominal[h] wall thickness (inches)~~	
~~Exposure Category~~				~~6~~	
~~B~~	~~C~~	~~D~~		~~Top~~[i]	~~Side~~[i]
~~85~~	~~—~~	~~—~~	~~8~~	~~4@48~~	~~4@34, 5@48~~
			~~9~~	~~4@48~~	~~4@29, 5@45~~
			~~10~~	~~4@48~~	~~4@25, 5@39~~

~~90~~	~~—~~	~~—~~	~~8~~	~~4@48~~	~~4@31, 5@48~~
			~~9~~	~~4@48~~	~~4@27, 5@41~~
			~~10~~	~~4@30, 5@47~~	~~4@23, 5@35~~
~~100~~	~~85~~	~~—~~	~~8~~	~~4@48~~	~~4@27, 5@42~~
			~~9~~	~~4@30, 5@47~~	~~4@23, 5@35~~
			~~10~~	~~4@24, 5@38~~	~~4@22, 5@34~~
~~110~~	~~90~~	~~85~~	~~8~~	~~4@48~~	~~4@24, 5@37~~
			~~9~~	~~4@25, 5@38~~	~~4@22, 5@34~~
			~~10~~	~~4@22, 5@34~~	~~4@22, 5@34~~
~~120~~	~~100~~	~~90~~	~~8~~	~~4@26, 5@41~~	~~4@22, 5@34~~
			~~9~~	~~4@22, 5@34~~	~~4@22, 5@34~~
			~~10~~	~~4@22, 6@34~~	~~4@19, 5@26~~
~~130~~	~~110~~	~~100~~	~~8~~	~~4@22, 5@35~~	~~4@22, 5@34~~
			~~9~~	~~4@22, 5@34~~	~~4@20, 5@30~~
			~~10~~	~~4@19, 5@29~~	~~4@16, 5@25~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square inch = 6.895 kPa, 1 square foot = 0.0929 m^2.~~

~~a. Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet, and topographic factor, K_{zt}, and importance factor, *I*, equal to 1.0.~~

~~b. Table is based on concrete with a minimum specified compressive strength of 2,500 psi.~~

~~c. See Section R611.6.5 for location of reinforcement in wall.~~

~~d. Deflection criterion is *L*/240, where *L* is the unsupported height of the wall in inches.~~

~~e. Interpolation is not permitted.~~

~~f. Where No. 4 reinforcing bars at a spacing of 48 inches are specified in the table, use of bars with a minimum yield strength of 40,000 psi or 60,000 psi is permitted.~~

~~g. Other than for No. 4 bars spaced at 48 inches on center, table values are based on reinforcing bars with a minimum yield strength of 60,000 psi. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (i.e., 12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and/or bars of a different size than specified in the table are permitted in accordance with Section R611.5.4.7 and Table R611.5.4(2).~~

~~h. See Table R611.3 for minimum core dimensions and maximum spacing of horizontal and vertical cores.~~

~~i. Top means gravity load from roof and/or floor construction bears on top of wall. Side means gravity load from floor construction is transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. Where floor framing members span parallel to the wall, use of the top bearing condition is permitted.~~

TABLE R611.6(3) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH SCREEN-GRID ABOVE-GRADE WALLS[a, b, c, d, e]

MAXIMUM WIND SPEED (mph)			MAXIMUM UNSUPPORTED WALL HEIGHT PER STORY (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)[f, g]	
				Nominal[h] wall thickness (inches)	
Exposure Category				6	
B	C	D		Top[i]	Side[i]
115			8	4@48	4@48
			9	4@48	5@41

			10	4@48	6@48
120			8	4@48	4@48
			9	4@48	5@38
			10	5@42	6@48
130	110		8	4@48	5@41
			9	5@44	6@48
			10	5@35	6@48
140	119	110	8	4@48	5@36
			9	5@38	6@48
			10	6@48	6@48
150	127	117	8	5@42	6@48
			9	6@48	6@48
			10	6@48	6@42
160	136	125	8	5@37	6@48
			9	6@48	6@45
			10	6@44	6@38

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square inch = 6.895 kPa, 1 square foot = 0.0929 m^2.

a. Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet, topographic factor, K_{zt}, equal to 1.0, and Risk Category II.

b. Table is based on concrete with a minimum specified compressive strength of 2,500 psi.

c. See Section R611.6.5 for location of reinforcement in wall.

d. Deflection criterion is *L*/240, where *L* is the unsupported height of the wall in inches.

e. Interpolation is not permitted.

f. Where No. 4 reinforcing bars at a spacing of 48 inches are specified in the table as indicated by shaded cells, use of bars with a minimum yield strength of 40,000 psi or 60,000 psi is permitted.

g. Other than for No. 4 bars spaced at 48 inches on center, table values are based on reinforcing bars with a minimum yield strength of 60,000 psi. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (i.e., 12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and/or bars of a different size than specified in the table are permitted in accordance with Section R611.5.4.7 and Table R611.5.4(2).

h. See Table R611.3 for minimum core dimensions and maximum spacing of horizontal and vertical cores.

i. "Top" means gravity load from roof and/or floor construction bears on top of wall. "Side" means gravity load from floor construction is transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. For non-loadbearing wall and where floor framing members span parallel to the wall, use of the "top" bearing condition is permitted.

~~TABLE R611.6(4)~~
~~MINIMUM VERTICAL REINFORCEMENT FOR FLAT, WAFFLE- AND SCREEN-GRID ABOVE-GRADE WALLS DESIGNED CONTINUOUS WITH FOUNDATION STEM WALLS~~[a, b, c, d, e, k, l]

~~MAXIMUM WIND SPEED (mph)~~			~~HEIGHT OF STEM WALL~~[h, i] ~~(feet)~~	~~MAXIMUM DESIGN LATERAL SOIL LOAD (psf/ft)~~	~~MAXIMUM UNSUPPORTED HEIGHT OF ABOVE-GRADE WALL (feet)~~	~~MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)~~[f, g]						
						~~Wall type and nominal thickness~~[j] ~~(inches)~~						
~~Exposure Category~~						~~Flat~~				~~Waffle~~		~~Screen~~
~~B~~	~~C~~	~~D~~				~~4~~	~~6~~	~~8~~	~~10~~	~~6~~	~~8~~	~~6~~
~~85~~	~~—~~	~~—~~	~~3~~	~~30~~	~~8~~	~~4@33~~	~~4@39~~	~~4@48~~	~~4@48~~	~~4@24~~	~~4@28~~	~~4@22~~
					~~10~~	~~4@26~~	~~5@48~~	~~4@41~~	~~4@48~~	~~4@19~~	~~4@22~~	~~4@18~~
				~~60~~	~~10~~	~~4@21~~	~~5@40~~	~~5@48~~	~~4@44~~	~~4@16~~	~~4@19~~	~~4@15~~

			~~6~~	~~30~~	~~10~~	~~DR~~	~~5@22~~	~~6@35~~	~~6@43~~	~~DR~~	~~4@11~~	~~DR~~
				~~60~~	~~10~~	~~DR~~	~~DR~~	~~6@26~~	~~6@28~~	~~DR~~	~~DR~~	~~DR~~
~~90~~	~~—~~	~~—~~	~~3~~	~~30~~	~~8~~	~~4@30~~	~~4@36~~	~~4@48~~	~~4@48~~	~~4@22~~	~~4@26~~	~~4@21~~
					~~10~~	~~4@24~~	~~5@44~~	~~4@38~~	~~4@48~~	~~4@17~~	~~4@21~~	~~4@17~~
				~~60~~	~~10~~	~~4@20~~	~~5@37~~	~~4@48~~	~~4@41~~	~~4@15~~	~~4@18~~	~~4@14~~
			~~6~~	~~30~~	~~10~~	~~DR~~	~~5@21~~	~~6@35~~	~~6@41~~	~~DR~~	~~4@10~~	~~DR~~
				~~60~~	~~10~~	~~DR~~	~~DR~~	~~6@26~~	~~6@28~~	~~DR~~	~~DR~~	~~DR~~
~~100~~	~~85~~	~~—~~	~~3~~	~~30~~	~~8~~	~~4@26~~	~~5@48~~	~~4@42~~	~~4@48~~	~~4@19~~	~~4@23~~	~~4@18~~
					~~10~~	~~4@20~~	~~5@37~~	~~4@33~~	~~4@41~~	~~4@15~~	~~4@18~~	~~4@14~~
			~~6~~	~~60~~	~~10~~	~~4@17~~	~~5@34~~	~~5@44~~	~~4@36~~	~~4@13~~	~~4@17~~	~~4@12~~
				~~30~~	~~10~~	~~DR~~	~~5@20~~	~~6@35~~	~~6@38~~	~~DR~~	~~4@9~~	~~DR~~
				~~60~~	~~10~~	~~DR~~	~~DR~~	~~6@24~~	~~6@28~~	~~DR~~	~~DR~~	~~DR~~
~~110~~	~~90~~	~~85~~	~~3~~	~~30~~	~~8~~	~~4@22~~	~~5@42~~	~~4@37~~	~~4@46~~	~~4@16~~	~~4@20~~	~~4@16~~
					~~10~~	~~4@17~~	~~5@34~~	~~5@44~~	~~4@35~~	~~4@12~~	~~4@17~~	~~4@12~~
				~~60~~	~~10~~	~~4@15~~	~~5@34~~	~~5@39~~	~~5@48~~	~~4@11~~	~~4@17~~	~~4@11~~
			~~6~~	~~30~~	~~10~~	~~DR~~	~~5@18~~	~~6@35~~	~~6@35~~	~~DR~~	~~4@9~~	~~DR~~
				~~60~~	~~10~~	~~DR~~	~~DR~~	~~6@23~~	~~6@28~~	~~DR~~	~~DR~~	~~DR~~
~~120~~	~~100~~	~~90~~	~~3~~	~~30~~	~~8~~	~~4@19~~	~~5@37~~	~~5@48~~	~~4@40~~	~~4@14~~	~~4@17~~	~~4@14~~
					~~10~~	~~4@14~~	~~5@34~~	~~5@38~~	~~5@48~~	~~4@11~~	~~4@17~~	~~4@10~~
				~~60~~	~~10~~	~~4@13~~	~~5@33~~	~~6@48~~	~~5@43~~	~~4@10~~	~~4@16~~	~~4@9~~
			~~6~~	~~30~~	~~10~~	~~DR~~	~~5@16~~	~~6@33~~	~~6@32~~	~~DR~~	~~4@8~~	~~DR~~
				~~60~~	~~10~~	~~DR~~	~~DR~~	~~6@22~~	~~6@28~~	~~DR~~	~~DR~~	~~DR~~
~~130~~	~~110~~	~~100~~	~~3~~	~~30~~	~~8~~	~~4@17~~	~~5@34~~	~~5@44~~	~~4@36~~	~~4@12~~	~~4@17~~	~~4@10~~
					~~10~~	~~DR~~	~~5@32~~	~~6@47~~	~~5@42~~	~~4@9~~	~~4@15~~	~~DR~~
				~~60~~	~~10~~	~~DR~~	~~5@29~~	~~6@43~~	~~5@39~~	~~DR~~	~~4@14~~	~~DR~~
			~~6~~	~~30~~	~~10~~	~~DR~~	~~5@15~~	~~6@30~~	~~6@29~~	~~DR~~	~~4@7~~	~~DR~~
				~~60~~	~~10~~	~~DR~~	~~DR~~	~~6@21~~	~~6@27~~	~~DR~~	~~DR~~	~~DR~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square inch = 6.895 kPa, 1 square foot = 0.0929 m²~~.

~~a. Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet, and topographic factor, K_{zt}, and importance factor, *I*, equal to 1.0.~~

~~b. Table is based on concrete with a minimum specified compressive strength of 2,500 psi.~~

~~c. See Section R611.6.5 for location of reinforcement in wall.~~

~~d. Deflection criterion is *L*/240, where *L* is the height of the wall in inches from the exterior finish ground level to the top of the above-grade wall.~~

~~e. Interpolation is not permitted. For intermediate values of basic wind speed, heights of stem wall and above-grade wall, and design lateral soil load, use next higher value.~~

~~f. Where No. 4 reinforcing bars at a spacing of 48 inches are specified in the table, use of bars with a minimum yield strength of 40,000 psi or 60,000 psi is permitted.~~

~~g. Other than for No. 4 bars spaced at 48 inches on center, table values are based on reinforcing bars with a minimum yield strength of 60,000 psi. Maximum spacings shown are the values calculated for the specified bar size. In waffle and screen-grid walls where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (i.e., 12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and/or bars of a different size than specified in the table are permitted in accordance with Section R611.5.4.7 and Table R611.5.4(2).~~

~~h. Height of stem wall is the distance from the exterior finish ground level to the top of the slab-on-ground.~~

~~i. Where the distance from the exterior finish ground level to the top of the slab-on-ground is equal to or greater than 4 feet, the stem wall shall be laterally supported at the top and bottom before backfilling. Where the wall is designed and constructed to be continuous with the above-grade wall, temporary supports bracing the top of the stem wall shall remain in place until the above-grade wall is laterally supported at the top by floor or roof construction.~~

~~j. See Table R611.3 for tolerances on nominal thicknesses, and minimum core dimensions and maximum spacing of horizontal and vertical cores for waffle- and screen-grid walls.~~

~~k. Tabulated values are applicable to construction where gravity loads bear on top of wall, and conditions where gravity loads from floor construction are transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. See Tables R611.6(1), R611.6(2) and R611.6(3).~~

~~l. DR indicates design required.~~

TABLE R611.6(4) MINIMUM VERTICAL REINFORCEMENT FOR FLAT, WAFFLE- AND SCREEN-GRID ABOVE-GRADE WALLS DESIGNED CONTINUOUS WITH FOUNDATION STEM WALLS[a, b, c, d, e, k, l]

MAXIMUM WIND SPEED (mph)			HEIGHT OF STEM WALL[h, i] (feet)	MAXIMUM DESIGN LATERAL SOIL LOAD (psf/ft)	MAXIMUM UNSUPPORTED HEIGHT OF ABOVE-GRADE WALL (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)[f, g]						
Exposure Category						Wall type and nominal thickness[L] (inches)						
						Flat				Waffle		Screen
B	C	D				4	6	8	10	6	8	6
115			3	30	8	4@30	4@48	4@48	4@48	4@22	4@26	4@21
					10	4@23	5@43	4@48	4@48	4@17	4@20	4@16
				60	10	4@19	5@37	4@48	4@48	4@14	4@17	4@14
			6	30	10	DR	5@21	6@35	4@48	DR	4@10	DR
				60	10	DR	5@12	6@25	6@28	DR	DR	DR
120			3	30	8	4@28	4@48	4@48	4@48	4@21	4@48	4@20
					10	4@22	5@41	4@48	4@48	4@16	4@19	4@15
				60	10	4@18	5@35	4@48	4@48	4@14	4@17	4@13
			6	30	10	DR	5@21	6@35	4@48	DR	4@10	DR
				60	10	DR	5@12	6@25	6@28	DR	DR	DR
130	110		3	30	8	4@25	4@48	4@48	4@48	4@18	4@22	4@18
					10	4@19	5@36	4@48	4@48	4@14	4@17	4@13
			6	60	10	4@16	5@34	4@48	4@48	4@12	4@17	4@12
				30	10	DR	5@19	6@35	4@48	DR	4@9	DR
				60	10	DR	5@12	6@24	6@28	DR	DR	DR
140	119	110	3	30	8	4@22	5@42	4@48	4@48	4@16	4@20	4@16
					10	4@17	5@34	4@48	4@48	4@21	4@17	4@12
				60	10	4@15	5@34	4@48	4@48	4@11	4@17	4@10
			6	30	10	DR	5@18	6@35	6@35	DR	4@48	DR
				60	10	DR	5@11	6@23	6@28	DR	DR	DR
150	127	117	3	30	8	4@20	5@37	4@48	4@48	4@15	4@18	4@14
					10	4@15	5@34	4@48	4@48	4@11	4@17	4@11

				60	10	4@13	5@34	4@48	4@48	4@10	4@16	4@9
			6	30	10	DR	5@17	6@33	6@32	DR	4@8	DR
				60	10	DR	DR	6@22	6@28	DR	DR	DR
160	136	125	3	30	8	4@18	5@34	4@48	4@48	4@13	4@17	4@13
					10	4@13	5@34	4@48	4@48	4@10	4@16	4@9
				60	10	4@11	5@31	6@45	4@48	4@9	4@14	4@8
			6	30	10	DR	5@15	6@31	6@30	DR	4@7	DR
				60	10	DR	DR	6@21	6@27	DR	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square inch = 6.895 kPa, 1 square foot = 0.0929 m^2.

a. Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet topographic factor, K_{zt}, equal to 1.0, and Risk Category II.

b. Table is based on concrete with a minimum specified compressive strength of 2,500 psi.

c. See Section R611.6.5 for location of reinforcement in wall.

d. Deflection criterion is L/240, where L is the height of the wall in inches from the exterior finish ground level to the top of the above-grade wall.

e. Interpolation is not permitted. For intermediate values of basic wind speed, heights of stem wall and above-grade wall, and design lateral soil load, use next higher value.

f. Where No. 4 reinforcing bars at a spacing of 48 inches are specified in the table as indicated by shaded cells, use of bars with a minimum yield strength of 40,000 psi or 60,000 psi is permitted.

g. Other than for No. 4 bars spaced at 48 inches on center, table values are based on reinforcing bars with a minimum yield strength of 60,000 psi. Maximum spacings shown are the values calculated for the specified bar size. In waffle and screen-grid walls where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (i.e., 12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and/or bars of a different size than specified in the table are permitted in accordance with Section R611.5.4.7 and Table R611.5.4(2).

h. Height of stem wall is the distance from the exterior finish ground level to the top of the slab-on-ground.

i. Where the distance from the exterior finish ground level to the top of the slab-on-ground is equal to or greater than 4 feet, the stem wall shall be laterally supported at the top and bottom before backfilling. Where the wall is designed and constructed to be continuous with the above-grade wall, temporary supports bracing the top of the stem wall shall remain in place until the above-grade wall is laterally supported at the top by floor or roof construction.

j. See Table R611.3 for tolerances on nominal thicknesses, and minimum core dimensions and maximum spacing of horizontal and vertical cores for waffle- and screen-grid walls.

k. Tabulated values are applicable to construction where gravity loads bear on top of wall, and conditions where gravity loads from floor construction are transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. See Tables R611.6(1), R611.6(2) and R611.6(3).

l. DR indicates design required.

R611.7.1.1 Length of solid wall for wind. All buildings shall have solid walls in each exterior endwall line (the side of a building that is parallel to the span of the roof or floor framing) and sidewall line (the side of a building that is perpendicular to the span of the roof or floor framing) to resist lateral in-plane wind forces. The site-appropriate basic wind speed and exposure category shall be used in Tables R611.7(1A) through (1C) to determine the unreduced total length, *UR,* of solid wall required in each exterior endwall line and sidewall line. For buildings with a mean roof height of less than 35 feet (10,668 mm), the unreduced values determined from Tables R611.7(1A) though (1C) ~~is~~ are permitted to be reduced by multiplying by the applicable factor, R_1, from Table R611.7(2); however, reduced values shall not be less than the minimum values in Tables R611.7(1A) through (1C). Where the floor-to-ceiling height of a *story* is less than 10 feet (3048 mm), the unreduced values determined from Tables R611.7(1A) through (C), including minimum values, is are permitted to be reduced by multiplying by the applicable factor, R_2, from Table R611.7(3). To account for different design strengths than assumed in determining the values in Tables R611.7(1A) through (1C), the unreduced lengths determined from Tables R611.7(1A) through (1C), including minimum values, are permitted to be reduced by multiplying by the applicable factor, R_3, from Table R611.7(4). The reductions permitted by Tables R611.7(2), R611.7(3) and R611.7(4) are cumulative.

The total length of solid wall segments, *TL,* in a wall line that comply with the minimum length requirements of Section R611.7.2.1 [see Figure R611.7(1)] shall be equal to or greater than the product of the unreduced length of solid wall from Tables R611.7(1A) through (1C), *UR* and the applicable reduction factors, if any, from Tables R611.7(2), R611.7(3) and R611.7(4) as indicated by Equation R6-1.

$$TL \geq R_1 \bullet R_2 \bullet R_3 \bullet UR \qquad \textbf{(Equation R6-1)}$$

where:

TL = Total length of solid wall segments in a wall line that comply with Section R611.7.2.1 [see Figure R611.7(1)];

R_1 = 1.0 or reduction factor for mean roof height from Table R611.7(2);

R_2 = 1.0 or reduction factor for floor-to-ceiling wall height from Table R611.7(3);

R_3 = 1.0 or reduction factor for design strength from Table R611.7(4), and

UR = Unreduced length of solid wall from Tables R611.7(1A) through (1C).

The total length of solid wall in a wall line, *TL,* shall not be less than that provided by two solid wall segments complying with the minimum length requirements of Section R611.7.2.1.

To facilitate determining the required wall thickness, wall type, number and *grade* of vertical bars at the each end of each solid wall segment, and whether shear reinforcement is required, use of Equation R6-2 is permitted.

$$R_{\underline{3}} \underline{\leq} \frac{TL}{R_1 \,.\, R_2 \,.\, UR} \qquad \textbf{(Equation R6-2)}$$

After determining the maximum permitted value of the reduction factor for design strength, R_3, in accordance with Equation R6-2, select a wall type from Table R611.7(4) with R_3 less than or equal to the value calculated.

~~TABLE R611.7(1A)~~
~~UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN EACH EXTERIOR ENDWALL FOR WIND PERPENDICULAR TO RIDGE ONE STORY OR TOP STORY OF TWO STORY~~[a, c, d, e, f, g]

~~SIDEWALL LENGTH (feet)~~	~~ENDWALL LENGTH (feet)~~	~~ROOF SLOPE~~	~~UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN ENDWALLS FOR WIND PERPENDICULAR TO RIDGE (feet)~~						
			~~Basic Wind Speed (mph) Exposure~~						
			~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~	~~Minimum~~[b]
			-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~	
			-	-	-	~~85D~~	~~90D~~	~~100D~~	
~~15~~	~~15~~	~~< 1:12~~	~~0.90~~	~~1.01~~	~~1.25~~	~~1.51~~	~~1.80~~	~~2.11~~	~~0.98~~
		~~5:12~~	~~1.25~~	~~1.40~~	~~1.73~~	~~2.09~~	~~2.49~~	~~2.92~~	~~1.43~~
		~~7:12~~	~~1.75~~	~~1.96~~	~~2.43~~	~~2.93~~	~~3.49~~	~~4.10~~	~~1.64~~
		~~12:12~~	~~2.80~~	~~3.13~~	~~3.87~~	~~4.68~~	~~5.57~~	~~6.54~~	~~2.21~~
	~~30~~	~~< 1:12~~	~~0.90~~	~~1.01~~	~~1.25~~	~~1.51~~	~~1.80~~	~~2.11~~	~~1.09~~
		~~5:12~~	~~1.25~~	~~1.40~~	~~1.73~~	~~2.09~~	~~2.49~~	~~2.92~~	~~2.01~~
		~~7:12~~	~~2.43~~	~~2.73~~	~~3.37~~	~~4.08~~	~~4.85~~	~~5.69~~	~~2.42~~

		~~12:12~~	~~4.52~~	~~5.07~~	~~6.27~~	~~7.57~~	~~9.01~~	~~10.58~~	~~3.57~~
	~~45~~	~~< 1:12~~	~~0.90~~	~~1.01~~	~~1.25~~	~~1.51~~	~~1.80~~	~~2.11~~	~~1.21~~
		~~5:12~~	~~1.25~~	~~1.40~~	~~1.73~~	~~2.09~~	~~2.49~~	~~2.92~~	~~2.59~~
		~~7:12~~	~~3.12~~	~~3.49~~	~~4.32~~	~~5.22~~	~~6.21~~	~~7.29~~	~~3.21~~
		~~12:12~~	~~6.25~~	~~7.00~~	~~8.66~~	~~10.47~~	~~12.45~~	~~14.61~~	~~4.93~~
	~~60~~	~~< 1:12~~	~~0.90~~	~~1.01~~	~~1.25~~	~~1.51~~	~~1.80~~	~~2.11~~	~~1.33~~
		~~5:12~~	~~1.25~~	~~1.40~~	~~1.73~~	~~2.09~~	~~2.49~~	~~2.92~~	~~3.16~~
		~~7:12~~	~~3.80~~	~~4.26~~	~~5.26~~	~~6.36~~	~~7.57~~	~~8.89~~	~~3.99~~
		~~12:12~~	~~7.97~~	~~8.94~~	~~11.05~~	~~13.36~~	~~15.89~~	~~18.65~~	~~6.29~~
~~30~~	~~15~~	~~< 1:12~~	~~1.61~~	~~1.80~~	~~2.23~~	~~2.70~~	~~3.21~~	~~3.77~~	~~1.93~~
		~~5:12~~	~~2.24~~	~~2.51~~	~~3.10~~	~~3.74~~	~~4.45~~	~~5.23~~	~~2.75~~
		~~7:12~~	~~3.15~~	~~3.53~~	~~4.37~~	~~5.28~~	~~6.28~~	~~7.37~~	~~3.12~~
		~~12:12~~	~~4.90~~	~~5.49~~	~~6.79~~	~~8.21~~	~~9.77~~	~~11.46~~	~~4.14~~
	~~30~~	~~< 1:12~~	~~1.61~~	~~1.80~~	~~2.23~~	~~2.70~~	~~3.21~~	~~3.77~~	~~2.14~~
		~~5:12~~	~~2.24~~	~~2.51~~	~~3.10~~	~~3.74~~	~~4.45~~	~~5.23~~	~~3.78~~
		~~7:12~~	~~4.30~~	~~4.82~~	~~5.96~~	~~7.20~~	~~8.57~~	~~10.05~~	~~4.52~~
		~~12:12~~	~~7.79~~	~~8.74~~	~~10.80~~	~~13.06~~	~~15.53~~	~~18.23~~	~~6.57~~
	~~45~~	~~< 1:12~~	~~1.61~~	~~1.80~~	~~2.23~~	~~2.70~~	~~3.21~~	~~3.77~~	~~2.35~~
		~~5:12~~	~~2.24~~	~~2.51~~	~~3.10~~	~~3.74~~	~~4.45~~	~~5.23~~	~~4.81~~
		~~7:12~~	~~5.44~~	~~6.10~~	~~7.54~~	~~9.12~~	~~10.85~~	~~12.73~~	~~5.92~~
		~~12:12~~	~~10.69~~	~~11.98~~	~~14.81~~	~~17.90~~	~~21.30~~	~~25.00~~	~~9.00~~
	~~60~~	~~< 1:12~~	~~1.61~~	~~1.80~~	~~2.23~~	~~2.70~~	~~3.21~~	~~3.77~~	~~2.56~~
		~~5:12~~	~~2.24~~	~~2.51~~	~~3.10~~	~~3.74~~	~~4.45~~	~~5.23~~	~~5.84~~
		~~7:12~~	~~6.59~~	~~7.39~~	~~9.13~~	~~11.04~~	~~13.14~~	~~15.41~~	~~7.32~~
		~~12:12~~	~~13.58~~	~~15.22~~	~~18.82~~	~~22.75~~	~~27.07~~	~~31.77~~	~~11.43~~
~~60~~	~~15~~	~~< 1:12~~	~~2.99~~	~~3.35~~	~~4.14~~	~~5.00~~	~~5.95~~	~~6.98~~	~~3.83~~
		~~5:12~~	~~4.15~~	~~4.65~~	~~5.75~~	~~6.95~~	~~8.27~~	~~9.70~~	~~5.37~~
		~~7:12~~	~~5.91~~	~~6.63~~	~~8.19~~	~~9.90~~	~~11.78~~	~~13.83~~	~~6.07~~
		~~12:12~~	~~9.05~~	~~10.14~~	~~12.54~~	~~15.16~~	~~18.03~~	~~21.16~~	~~8.00~~
	~~30~~	~~< 1:12~~	~~2.99~~	~~3.35~~	~~4.14~~	~~5.00~~	~~5.95~~	~~6.98~~	~~4.23~~
		~~5:12~~	~~4.15~~	~~4.65~~	~~5.75~~	~~6.95~~	~~8.27~~	~~9.70~~	~~7.31~~
		~~7:12~~	~~7.97~~	~~8.94~~	~~11.05~~	~~13.36~~	~~15.89~~	~~18.65~~	~~8.71~~
		~~12:12~~	~~14.25~~	~~15.97~~	~~19.74~~	~~23.86~~	~~28.40~~	~~33.32~~	~~12.57~~

	~~45~~	~~< 1:12~~	~~3.11~~	~~3.48~~	~~4.30~~	~~5.20~~	~~6.19~~	~~7.26~~	~~4.63~~
		~~5:12~~	~~4.31~~	~~4.84~~	~~5.98~~	~~7.23~~	~~8.60~~	~~10.09~~	~~9.25~~
		~~7:12~~	~~10.24~~	~~11.47~~	~~14.19~~	~~17.15~~	~~20.40~~	~~23.84~~	~~11.35~~
		~~12:12~~	~~19.84~~	~~22.24~~	~~27.49~~	~~33.23~~	~~39.54~~	~~46.40~~	~~17.14~~
	~~60~~	~~< 1:12~~	~~3.22~~	~~3.61~~	~~4.46~~	~~5.39~~	~~6.42~~	~~7.53~~	~~5.03~~
		~~5:12~~	~~4.47~~	~~5.01~~	~~6.19~~	~~7.49~~	~~8.91~~	~~10.46~~	~~11.19~~
		~~7:12~~	~~12.57~~	~~14.09~~	~~17.42~~	~~21.05~~	~~25.05~~	~~29.39~~	~~13.99~~
		~~12:12~~	~~25.61~~	~~28.70~~	~~35.49~~	~~42.90~~	~~51.04~~	~~59.90~~	~~21.71~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound-force per linear foot = 0.146 kN/m, 1 pound per square foot = 47.88 Pa.~~

~~a. Tabulated lengths were derived by calculating design wind pressures in accordance with Figure 6-10 of ASCE 7 for a building with a mean roof height of 35 feet. For wind perpendicular to the ridge, the effects of a 2-foot overhang on each endwall are included. The design pressures were used to calculate forces to be resisted by solid wall segments in each endwall [Table R611.7(1A) or R611.7(1B) or sidewall (Table R611.7(1C)], as appropriate. The forces to be resisted by each wall line were then divided by the default design strength of 840 pounds per linear foot of length to determine the required solid wall length. The actual mean roof height of the building shall not exceed the least horizontal dimension of the building.~~

~~b. Tabulated lengths in the "minimum" column are based on the requirement of Section 6.1.4.1 of ASCE 7 that the main windforce-resisting system be designed for a minimum service level force of 10 psf multiplied by the area of the building projected onto a vertical plane normal to the assumed wind direction. Tabulated lengths in shaded cells are less than the "minimum" value. Where the minimum controls, it is permitted to be reduced in accordance with Notes c, d and e. See Section R611.7.1.1.~~

~~c. For buildings with a mean roof height of less than 35 feet, tabulated lengths are permitted to be reduced by multiplying by the appropriate factor, R_1, from Table R611.7(2). The reduced length shall not be less than the "minimum" value shown in the table.~~

~~d. Tabulated lengths for "one story or top story of two story" are based on a floor-to-ceiling height of 10 feet. Tabulated lengths for "first story of two story" are based on floor-to-ceiling heights of 10 feet each for the first and second story. For floor-to-ceiling heights less than assumed, use the lengths in Table R611.7(1A), (1B) or (1C), or multiply the value in the table by the reduction factor, R_2, from Table R611.7(3).~~

~~e. Tabulated lengths are based on the default design shear strength of 840 pounds per linear foot of solid wall segment. The tabulated lengths are permitted to be reduced by multiplying by the applicable reduction factor for design strength, R_3, from Table R611.7(4).~~

~~f. The reduction factors, R_1, R_2 and R_3, in Tables R611.7(2), R611.7(3), and R611.7(4), respectively, are permitted to be compounded, subject to the limitations of Note b. However, the minimum number and minimum length of solid walls segments in each wall line shall comply with Sections R611.7.1 and R611.7.2.1, respectively.~~

~~g. For intermediate values of sidewall length, endwall length, roof slope and basic wind speed, use the next higher value, or determine by interpolation.~~

TABLE R611.7(1A)
UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN EACH EXTERIOR ENDWALL FOR WIND PERPENDICULAR TO RIDGE ONE STORY OR TOP STORY OF TWO STORY[a, c, d, e, f, g]

SIDEWALL LENGTH (feet)	ENDWALL LENGTH (feet)	ROOF SLOPE	UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN ENDWALLS FOR WIND PERPENDICULAR TO RIDGE (feet)						
			Basic Wind Speed (mph) Exposure						
			115B	120B	130B	140B	150B	160B	Minimum[b]
					110C	119C	127C	136C	
						110D	117D	125D	
15	15	< 1:12	1.03	1.12	1.32	1.53	1.76	2.00	0.92
		5:12	1.43	1.56	1.83	2.12	2.43	2.77	1.15
		7:12	2.00	2.18	2.56	2.97	3.41	3.88	1.25
		12:12	3.20	3.48	4.09	4.74	5.44	6.19	1.54
	30	< 1:12	1.03	1.12	1.32	1.53	1.76	2.00	0.98
		5:12	1.43	1.56	1.83	2.12	2.43	2.77	1.43

		7:12	2.78	3.03	3.56	4.13	4.74	5.39	1.64
		12:12	5.17	5.63	6.61	7.67	8.80	10.01	2.21
	45	< 1:12	1.03	1.12	1.32	1.53	1.76	2.00	1.04
		5:12	1.43	1.56	1.83	2.12	2.43	2.77	1.72
		7:12	3.57	3.88	4.56	5.28	6.07	6.90	2.03
		12:12	7.15	7.78	9.13	10.59	12.16	13.84	2.89
	60	< 1:12	1.03	1.12	1.32	1.53	1.76	2.00	1.09
		5:12	1.43	1.56	1.83	2.12	2.43	2.77	2.01
		7:12	4.35	4.73	5.55	6.44	7.39	8.41	2.42
		12:12	9.12	9.93	11.66	13.52	15.52	17.66	3.57
30	15	< 1:12	1.84	2.01	2.35	2.73	3.13	3.57	1.82
		5:12	2.56	2.78	3.27	3.79	4.35	4.95	2.23
		7:12	3.61	3.93	4.61	5.34	6.13	6.98	2.42
		12:12	5.61	6.10	7.16	8.31	9.54	10.85	2.93
	30	< 1:12	1.84	2.01	2.35	2.73	3.13	3.57	1.93
		5:12	2.56	2.78	3.27	3.79	4.35	4.95	2.75
		7:12	4.92	5.35	6.28	7.29	8.37	9.52	3.12
		12:12	8.92	9.71	11.39	13.22	15.17	17.26	4.14
	45	< 1:12	1.84	2.01	2.35	2.73	3.13	3.57	2.03
		5:12	2.56	2.78	3.27	3.79	4.35	4.95	3.26
		7:12	6.23	6.78	7.96	9.23	10.60	12.06	3.82
		12:12	12.23	13.31	15.63	18.12	20.80	23.67	5.36
	60	< 1:12	1.84	2.01	2.35	2.73	3.13	3.57	2.14
		5:12	2.56	2.78	3.27	3.79	4.35	4.95	3.78
		7:12	7.54	8.21	9.64	11.17	12.83	14.60	4.52
		12:12	15.54	16.92	19.86	23.03	26.44	30.08	6.57
60	15	< 1:12	3.42	3.72	4.36	5.06	5.81	6.61	3.63
		5:12	4.75	5.17	6.06	7.03	8.07	9.19	4.40
		7:12	6.76	7.36	8.64	10.02	11.51	13.09	4.75
		12:12	10.35	11.27	13.23	15.34	17.61	20.04	5.71
	30	< 1:12	3.42	3.72	4.36	5.06	5.81	6.61	3.83
		5:12	4.75	5.17	6.06	7.03	8.07	9.19	5.37
		7:12	9.12	9.93	11.66	13.52	15.52	17.66	6.07
		12:12	16.30	17.75	20.83	24.16	27.73	31.55	8.00
	45	< 1:12	3.55	3.87	4.54	5.27	6.05	6.88	4.03
		5:12	4.94	5.37	6.31	7.31	8.40	9.55	6.34
		7:12	11.71	12.75	14.97	17.36	19.93	22.67	7.39
		12:12	22.70	24.71	29.00	33.64	38.62	43.94	10.29
	60	< 1:12	3.68	4.01	4.71	5.46	6.27	7.13	4.23
		5:12	5.11	5.57	6.54	7.58	8.70	9.90	7.31
		7:12	14.38	15.66	18.37	21.31	24.46	27.83	8.71
		12:12	29.30	31.90	37.44	43.42	49.85	56.72	12.57

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound-force per linear foot = 0.146 kN/m, 1 pound per square foot = 47.88 Pa.

a. Tabulated lengths were derived by calculating design wind pressures in accordance with Figure 28.4-1 of ASCE 7 for a building with a mean roof height of 35 feet, topographic factor, K_{zt}, equal to 1.0, and Risk Category II. For wind perpendicular to the ridge, the effects of a 2-foot overhang on each endwall are included. The design pressures were used to calculate forces to be resisted by solid wall segments in each. The forces to be resisted by each wall line were then divided by the default design strength of 840 pounds per linear foot of length to determine the unreduced length, **UR,** of solid wall length required in each endwall. The actual mean roof height of the building shall not exceed the least horizontal dimension of the building.

b. Tabulated lengths in the "minimum" column are based on the requirement of Section 28.4.4 of ASCE 7 that the main windforce-resisting system be designed for a minimum pressure of 16 psf multiplied by the wall area of the building and 8 psf multiplied by the roof area of the building projected onto a vertical plane normal to the assumed wind direction. Tabulated lengths in shaded cells are less than the "minimum" value. Where the minimum controls, it is permitted to be reduced in accordance with Notes c, d and e. See Section R611.7.1.1.

c. For buildings with a mean roof height of less than 35 feet, tabulated lengths are permitted to be reduced by multiplying by the appropriate factor, R_1, from Table R611.7(2). The reduced length shall not be less than the "minimum" value shown in the table.

d. Tabulated lengths for "one story or top story of two story" are based on a floor-to-ceiling height of 10 feet. Tabulated lengths for "first story of two story" are based on floor-to-ceiling heights of 10 feet each for the first and second story. For floor-to-ceiling heights less than assumed, use the lengths in Table R611.7(1A), (1B) or (1C), or multiply the value in the table by the reduction factor, R_2, from Table R611.7(3).

e. Tabulated lengths are based on the default design shear strength of 840 pounds per linear foot of solid wall segment. The tabulated lengths are permitted to be reduced by multiplying by the applicable reduction factor for design strength, R_3, from Table R611.7(4).

f. The reduction factors, R_1, R_2 and R_3, in Tables R611.7(2), R611.7(3), and R611.7(4), respectively, are permitted to be compounded, subject to the limitations of Note b. However, the minimum number and minimum length of solid walls segments in each wall line shall comply with Sections R611.7.1 and R611.7.2.1, respectively.

g. For intermediate values of sidewall length, endwall length, roof slope and basic wind speed, use the next higher value, or determine by interpolation.

~~TABLE R611.7(1B)~~
~~UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN EACH EXTERIOR ENDWALL~~
~~FOR WIND PERPENDICULAR TO RIDGE FIRST STORY OF TWO STORY~~[a, c, d, e, f, g]

~~SIDEWALL LENGTH (feet)~~	~~ENDWALL LENGTH (feet)~~	~~ROOF SLOPE~~	~~UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN ENDWALLS FOR WIND PERPENDICULAR TO RIDGE (feet)~~						
			~~Basic Wind Speed (mph) Exposure~~						
			~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~	~~Minimum~~[b]
			-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~	
			-	-	-	~~85D~~	~~90D~~	~~100D~~	
			~~Velocity pressure (psf)~~						
			~~11.51~~	~~12.90~~	~~15.95~~	~~19.28~~	~~22.94~~	~~26.92~~	-
~~15~~	~~15~~	~~< 1:12~~	~~2.60~~	~~2.92~~	~~3.61~~	~~4.36~~	~~5.19~~	~~6.09~~	~~2.59~~
		~~5:12~~	~~3.61~~	~~4.05~~	~~5.00~~	~~6.05~~	~~7.20~~	~~8.45~~	~~3.05~~
		~~7:12~~	~~3.77~~	~~4.23~~	~~5.23~~	~~6.32~~	~~7.52~~	~~8.82~~	~~3.26~~
		~~12:12~~	~~4.81~~	~~5.40~~	~~6.67~~	~~8.06~~	~~9.60~~	~~11.26~~	~~3.83~~
	~~30~~	~~< 1:12~~	~~2.60~~	~~2.92~~	~~3.61~~	~~4.36~~	~~5.19~~	~~6.09~~	~~2.71~~
		~~5:12~~	~~3.61~~	~~4.05~~	~~5.00~~	~~6.05~~	~~7.20~~	~~8.45~~	~~3.63~~
		~~7:12~~	~~4.45~~	~~4.99~~	~~6.17~~	~~7.46~~	~~8.88~~	~~10.42~~	~~4.04~~
		~~12:12~~	~~6.54~~	~~7.33~~	~~9.06~~	~~10.96~~	~~13.04~~	~~15.30~~	~~5.19~~
	~~45~~	~~< 1:12~~	~~2.60~~	~~2.92~~	~~3.61~~	~~4.36~~	~~5.19~~	~~6.09~~	~~2.83~~
		~~5:12~~	~~3.61~~	~~4.05~~	~~5.00~~	~~6.05~~	~~7.20~~	~~8.45~~	~~4.20~~

		~~7:12~~	~~5.14~~	~~5.76~~	~~7.12~~	~~8.60~~	~~10.24~~	~~12.01~~	~~4.83~~
		~~12:12~~	~~8.27~~	~~9.27~~	~~11.46~~	~~13.85~~	~~16.48~~	~~19.34~~	~~6.55~~
	~~60~~	~~< 1:12~~	~~2.60~~	~~2.92~~	~~3.61~~	~~4.36~~	~~5.19~~	~~6.09~~	~~2.95~~
		~~5:12~~	~~3.61~~	~~4.05~~	~~5.00~~	~~6.05~~	~~7.20~~	~~8.45~~	~~4.78~~
		~~7:12~~	~~5.82~~	~~6.52~~	~~8.06~~	~~9.75~~	~~11.60~~	~~13.61~~	~~5.61~~
		~~12:12~~	~~9.99~~	~~11.20~~	~~13.85~~	~~16.74~~	~~19.92~~	~~23.37~~	~~7.90~~
~~30~~	~~15~~	~~< 1:12~~	~~4.65~~	~~5.21~~	~~6.45~~	~~7.79~~	~~9.27~~	~~10.88~~	~~5.16~~
		~~5:12~~	~~6.46~~	~~7.24~~	~~8.95~~	~~10.82~~	~~12.87~~	~~15.10~~	~~5.98~~
		~~7:12~~	~~6.94~~	~~7.78~~	~~9.62~~	~~11.62~~	~~13.83~~	~~16.23~~	~~6.35~~
		~~12:12~~	~~8.69~~	~~9.74~~	~~12.04~~	~~14.55~~	~~17.32~~	~~20.32~~	~~7.38~~
	~~30~~	~~< 1:12~~	~~4.65~~	~~5.21~~	~~6.45~~	~~7.79~~	~~9.27~~	~~10.88~~	~~5.38~~
		~~5:12~~	~~6.46~~	~~7.24~~	~~8.95~~	~~10.82~~	~~12.87~~	~~15.10~~	~~7.01~~
		~~7:12~~	~~8.09~~	~~9.06~~	~~11.21~~	~~13.54~~	~~16.12~~	~~18.91~~	~~7.76~~
		~~12:12~~	~~11.58~~	~~12.98~~	~~16.05~~	~~19.40~~	~~23.08~~	~~27.09~~	~~9.81~~
	~~45~~	~~< 1:12~~	~~4.65~~	~~5.21~~	~~6.45~~	~~7.79~~	~~9.27~~	~~10.88~~	~~5.59~~
		~~5:12~~	~~6.46~~	~~7.24~~	~~8.95~~	~~10.82~~	~~12.87~~	~~15.10~~	~~8.04~~
		~~7:12~~	~~9.23~~	~~10.35~~	~~12.79~~	~~15.46~~	~~18.40~~	~~21.59~~	~~9.16~~
		~~12:12~~	~~14.48~~	~~16.22~~	~~20.06~~	~~24.25~~	~~28.85~~	~~33.86~~	~~12.24~~
	~~60~~	~~< 1:12~~	~~4.65~~	~~5.21~~	~~6.45~~	~~7.79~~	~~9.27~~	~~10.88~~	~~5.80~~
		~~5:12~~	~~6.46~~	~~7.24~~	~~8.95~~	~~10.82~~	~~12.87~~	~~15.10~~	~~9.08~~
		~~7:12~~	~~10.38~~	~~11.63~~	~~14.38~~	~~17.38~~	~~20.69~~	~~24.27~~	~~10.56~~
		~~12:12~~	~~17.37~~	~~19.47~~	~~24.07~~	~~29.10~~	~~34.62~~	~~40.63~~	~~14.67~~
~~60~~	~~15~~	~~< 1:12~~	~~8.62~~	~~9.67~~	~~11.95~~	~~14.45~~	~~17.19~~	~~20.17~~	~~10.30~~
		~~5:12~~	~~11.98~~	~~13.43~~	~~16.61~~	~~20.07~~	~~23.88~~	~~28.03~~	~~11.85~~
		~~7:12~~	~~13.18~~	~~14.78~~	~~18.27~~	~~22.08~~	~~26.28~~	~~30.83~~	~~12.54~~
		~~12:12~~	~~16.32~~	~~18.29~~	~~22.62~~	~~27.34~~	~~32.53~~	~~38.17~~	~~14.48~~
	~~30~~	~~< 1:12~~	~~8.62~~	~~9.67~~	~~11.95~~	~~14.45~~	~~17.19~~	~~20.17~~	~~10.70~~
		~~5:12~~	~~11.98~~	~~13.43~~	~~16.61~~	~~20.07~~	~~23.88~~	~~28.03~~	~~13.79~~
		~~7:12~~	~~15.25~~	~~17.09~~	~~21.13~~	~~25.54~~	~~30.38~~	~~35.66~~	~~15.18~~
		~~12:12~~	~~21.52~~	~~24.12~~	~~29.82~~	~~36.05~~	~~42.89~~	~~50.33~~	~~19.05~~
	~~45~~	~~< 1:12~~	~~8.97~~	~~10.06~~	~~12.43~~	~~15.03~~	~~17.88~~	~~20.99~~	~~11.10~~
		~~5:12~~	~~12.46~~	~~13.97~~	~~17.27~~	~~20.88~~	~~24.84~~	~~29.15~~	~~15.73~~
		~~7:12~~	~~17.67~~	~~19.80~~	~~24.48~~	~~29.59~~	~~35.21~~	~~41.32~~	~~17.82~~

		~~12:12~~	~~27.27~~	~~30.56~~	~~37.79~~	~~45.68~~	~~54.35~~	~~63.78~~	~~23.62~~
	~~60~~	~~< 1:12~~	~~9.30~~	~~10.43~~	~~12.89~~	~~15.58~~	~~18.54~~	~~21.76~~	~~11.50~~
		~~5:12~~	~~12.91~~	~~14.47~~	~~17.90~~	~~21.63~~	~~25.74~~	~~30.20~~	~~17.67~~
		~~7:12~~	~~20.14~~	~~22.58~~	~~27.91~~	~~33.74~~	~~40.15~~	~~47.11~~	~~20.46~~
		~~12:12~~	~~33.19~~	~~37.19~~	~~45.99~~	~~55.59~~	~~66.14~~	~~77.62~~	~~28.19~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound force per linear foot = 0.146 kN/m, 1 pound per square foot = 47.88 Pa.~~

~~a. Tabulated lengths were derived by calculating design wind pressures in accordance with Figure 6-10 of ASCE 7 for a building with a mean roof height of 35 feet. For wind perpendicular to the ridge, the effects of a 2-foot overhang on each endwall are included. The design pressures were used to calculate forces to be resisted by solid wall segments in each endwall [Table R611.7(1A) or R611.7(1B)] or sidewall [Table R611.7(1C)], as appropriate. The forces to be resisted by each wall line were then divided by the default design strength of 840 pounds per linear foot of length to determine the required solid wall length. The actual mean roof height of the building shall not exceed the least horizontal dimension of the building.~~

~~b. Tabulated lengths in the "minimum" column are based on the requirement of Section 6.1.4.1 of ASCE 7 that the main windforce-resisting system be designed for a minimum service level force of 10 psf multiplied by the area of the building projected onto a vertical plane normal to the assumed wind direction. Tabulated lengths in shaded cells are less than the "minimum" value. Where the minimum controls, it is permitted to be reduced in accordance with Notes c, d and e. See Section R611.7.1.1.~~

~~c. For buildings with a mean roof height of less than 35 feet, tabulated lengths are permitted to be reduced by multiplying by the appropriate factor, R_1, from Table R611.7(2). The reduced length shall not be less than the "minimum" value shown in the table.~~

~~d. Tabulated lengths for "one story or top story of two story" are based on a floor-to-ceiling height of 10 feet. Tabulated lengths for "first story of two story" are based on floor-to-ceiling heights of 10 feet each for the first and second story. For floor-to-ceiling heights less than assumed, use the lengths in Table R611.7(1A), (1B) or (1C), or multiply the value in the table by the reduction factor, R_2, from Table R611.7(3).~~

~~e. Tabulated lengths are based on the default design shear strength of 840 pounds per linear foot of solid wall segment. The tabulated lengths are permitted to be reduced by multiplying by the applicable reduction factor for design strength, R_3, from Table R611.7(4).~~

~~f. The reduction factors, R_1, R_2 and R_3, in Tables R611.7(2), R611.7(3), and R611.7(4), respectively, are permitted to be compounded, subject to the limitations of Note b. However, the minimum number and minimum length of solid walls segments in each wall line shall comply with Sections R611.7.1 and R611.7.2.1, respectively.~~

~~g. For intermediate values of sidewall length, endwall length, roof slope and basic wind speed, use the next higher value, or determine by interpolation.~~

TABLE R611.7(1B)
UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN EACH EXTERIOR ENDWALL FOR WIND PERPENDICULAR TO RIDGE FIRST STORY OF TWO STORY[a, c, d, e, f, g]

SIDEWALL LENGTH (feet)	ENDWALL LENGTH (feet)	ROOF SLOPE	UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN ENDWALLS FOR WIND PERPENDICULAR TO RIDGE (feet)						
			Basic Wind Speed (mph) Exposure						
			115B	120B	130B	140B	150B	160B	Minimum[b]
					110C	119C	127C	136C	
						110D	117D	125D	
15	15	< 1:12	2.98	3.25	3.81	4.42	5.07	5.77	2.54
		5:12	4.13	4.50	5.28	6.12	7.03	8.00	2.76
		7:12	4.31	4.70	5.51	6.39	7.34	8.35	2.87
		12:12	5.51	6.00	7.04	8.16	9.37	10.66	3.15
	30	< 1:12	2.98	3.25	3.81	4.42	5.07	5.77	2.59
		5:12	4.13	4.50	5.28	6.12	7.03	8.00	3.05
		7:12	5.09	5.55	6.51	7.55	8.67	9.86	3.26
		12:12	7.48	8.15	9.56	11.09	12.73	14.49	3.83
	45	< 1:12	2.98	3.25	3.81	4.42	5.07	5.77	2.65
		5:12	4.13	4.50	5.28	6.12	7.03	8.00	3.34

		7:12	5.88	6.40	7.51	8.71	10.00	11.37	3.65
		12:12	9.46	10.30	12.09	14.02	16.09	18.31	4.51
	60	< 1:12	2.98	3.25	3.81	4.42	5.07	5.77	2.71
		5:12	4.13	4.50	5.28	6.12	7.03	8.00	3.63
		7:12	6.66	7.25	8.51	9.87	11.32	12.89	4.04
		12:12	11.43	12.45	14.61	16.94	19.45	22.13	5.19
30	15	< 1:12	5.32	5.79	6.80	7.89	9.05	10.30	5.06
		5:12	7.39	8.04	9.44	10.95	12.57	14.30	5.47
		7:12	7.94	8.65	10.15	11.77	13.51	15.37	5.65
		12:12	9.94	10.82	12.70	14.73	16.91	19.24	6.17
	30	< 1:12	5.32	5.79	6.80	7.89	9.05	10.30	5.16
		5:12	7.39	8.04	9.44	10.95	12.57	14.30	5.98
		7:12	9.25	10.07	11.82	13.71	15.74	17.91	6.35
		12:12	13.25	14.43	16.93	19.64	22.54	25.65	7.38
	45	< 1:12	5.32	5.79	6.80	7.89	9.05	10.30	5.27
		5:12	7.39	8.04	9.44	10.95	12.57	14.30	6.50
		7:12	10.56	11.50	13.50	15.65	17.97	20.45	7.06
		12:12	16.56	18.03	21.16	24.55	28.18	32.06	8.60
	60	< 1:12	5.32	5.79	6.80	7.89	9.05	10.30	5.38
		5:12	7.39	8.04	9.44	10.95	12.57	14.30	7.01
		7:12	11.87	12.93	15.17	17.60	20.20	22.98	7.76
		12:12	19.87	21.64	25.40	29.45	33.81	38.47	9.81
60	15	< 1:12	9.87	10.74	12.61	14.62	16.79	19.10	10.10
		5:12	13.71	14.93	17.52	20.32	23.33	26.54	10.87
		7:12	15.08	16.42	19.27	22.35	25.66	29.20	11.22
		12:12	18.67	20.33	23.86	27.67	31.77	36.14	12.19
	30	< 1:12	9.87	10.74	12.61	14.62	16.79	19.10	10.30
		5:12	13.71	14.93	17.52	20.32	23.33	26.54	11.85
		7:12	17.44	18.99	22.29	25.85	29.67	33.76	12.54
		12:12	24.62	26.81	31.46	36.49	41.89	47.66	14.48
	45	< 1:12	10.27	11.18	13.12	15.21	17.47	19.87	10.50
		5:12	14.26	15.52	18.22	21.13	24.26	27.60	12.82
		7:12	20.21	22.01	25.83	29.95	34.39	39.12	13.86
		12:12	31.20	33.97	39.87	46.23	53.07	60.39	16.76
	60	< 1:12	10.64	11.59	13.60	15.77	18.11	20.60	10.70
		5:12	14.77	16.09	18.88	21.90	25.14	28.60	13.79
		7:12	23.05	25.09	29.45	34.15	39.21	44.61	15.18
		12:12	37.97	41.34	48.52	56.27	64.60	73.49	19.05

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound force per linear foot = 0.146 kN/m, 1 pound per square foot = 47.88 Pa.

a. Tabulated lengths were derived by calculating design wind pressures in accordance with Figure28.4-1 of ASCE 7 for a building with a mean roof height of 35 feet, topographic factor, K_{zt}, equal to 1.0, and Risk Category II. For wind perpendicular to the ridge, the effects of a 2-foot overhang on each endwall are included. The design pressures were used to calculate forces to be resisted by solid wall segments in each endwall. The forces to be resisted by each wall line were then divided by the default design strength of

840 pounds per linear foot of length to determine the unreduced length, **UR,** of solid wall length required in each endwall. The actual mean roof height of the building shall not exceed the least horizontal dimension of the building.

b. Tabulated lengths in the "minimum" column are based on the requirement of Section 28.4.4 of ASCE 7 that the main windforce-resisting system be designed for a minimum pressure of ~~10~~16 psf multiplied by the wall area of the building and 8 psf multiplied by the roof area of the building projected onto a vertical plane normal to the assumed wind direction. Tabulated lengths in shaded cells are less than the "minimum" value. Where the minimum controls, it is permitted to be reduced in accordance with Notes c, d and e. See Section R611.7.1.1.

c. For buildings with a mean roof height of less than 35 feet, tabulated lengths are permitted to be reduced by multiplying by the appropriate factor, R_1, from Table R611.7(2). The reduced length shall not be less than the "minimum" value shown in the table.

d. Tabulated lengths for "one story or top story of two story" are based on a floor-to-ceiling height of 10 feet. Tabulated lengths for "first story of two story" are based on floor-to-ceiling heights of 10 feet each for the first and second story. For floor-to-ceiling heights less than assumed, use the lengths in Table R611.7(1A), (1B) or (1C), or multiply the value in the table by the reduction factor, R_2, from Table R611.7(3).

e. Tabulated lengths are based on the default design shear strength of 840 pounds per linear foot of solid wall segment. The tabulated lengths are permitted to be reduced by multiplying by the applicable reduction factor for design strength, R_3, from Table R611.7(4).

f. The reduction factors, R_1, R_2 and R_3, in Tables R611.7(2), R611.7(3), and R611.7(4), respectively, are permitted to be compounded, subject to the limitations of Note b. However, the minimum number and minimum length of solid walls segments in each wall line shall comply with Sections R611.7.1 and R611.7.2.1, respectively.

g. For intermediate values of sidewall length, endwall length, roof slope and basic wind speed, use the next higher value, or determine by interpolation.

~~TABLE R611.7(1C)~~
~~UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN EACH EXTERIOR SIDEWALL FOR WIND PARALLEL TO RIDGE~~[~~a, c, d, e, f, g~~]

~~SIDEWALL LENGTH (feet)~~	~~ENDWALL LENGTH (feet)~~	~~ROOF SLOPE~~	~~UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN ENDWALLS FOR WIND PERPENDICULAR TO RIDGE (feet)~~						
			~~Basic Wind Speed (mph) Exposure~~						
			~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~	~~Minimum~~[~~b~~]
			-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~	
			-	-	-	~~85D~~	~~90D~~	~~100D~~	
			~~One story or top story of two story~~						
~~≤ 30~~	~~15~~	~~≤ 1:12~~	~~0.95~~	~~1.06~~	~~1.31~~	~~1.59~~	~~1.89~~	~~2.22~~	~~0.90~~
		~~5:12~~	~~1.13~~	~~1.26~~	~~1.56~~	~~1.88~~	~~2.24~~	~~2.63~~	~~1.08~~
		~~7:12~~	~~1.21~~	~~1.35~~	~~1.67~~	~~2.02~~	~~2.40~~	~~2.82~~	~~1.17~~
		~~12:12~~	~~1.43~~	~~1.60~~	~~1.98~~	~~2.39~~	~~2.85~~	~~3.34~~	~~1.39~~
	~~30~~	~~≤ 1:12~~	~~1.77~~	~~1.98~~	~~2.45~~	~~2.96~~	~~3.53~~	~~4.14~~	~~1.90~~
		~~5:12~~	~~2.38~~	~~2.67~~	~~3.30~~	~~3.99~~	~~4.75~~	~~5.57~~	~~2.62~~
		~~7:12~~	~~2.66~~	~~2.98~~	~~3.69~~	~~4.46~~	~~5.31~~	~~6.23~~	~~2.95~~
		~~12:12~~	~~3.43~~	~~3.85~~	~~4.76~~	~~5.75~~	~~6.84~~	~~8.03~~	~~3.86~~
	~~45~~	~~≤ 1:12~~	~~2.65~~	~~2.97~~	~~3.67~~	~~4.43~~	~~5.27~~	~~6.19~~	~~2.99~~
		~~5:12~~	~~3.98~~	~~4.46~~	~~5.51~~	~~6.66~~	~~7.93~~	~~9.31~~	~~4.62~~
		~~7:12~~	~~4.58~~	~~5.14~~	~~6.35~~	~~7.68~~	~~9.14~~	~~10.72~~	~~5.36~~
		~~12:12~~	~~6.25~~	~~7.01~~	~~8.67~~	~~10.48~~	~~12.47~~	~~14.63~~	~~7.39~~
	~~60~~	~~≤ 1:12~~	~~3.59~~	~~4.03~~	~~4.98~~	~~6.02~~	~~7.16~~	~~8.40~~	~~4.18~~
		~~5:12~~	~~5.93~~	~~6.65~~	~~8.22~~	~~9.93~~	~~11.82~~	~~13.87~~	~~7.07~~

		~~7:12~~	~~6.99~~	~~7.83~~	~~9.69~~	~~11.71~~	~~13.93~~	~~16.35~~	~~8.38~~
		~~12:12~~	~~9.92~~	~~11.12~~	~~13.75~~	~~16.62~~	~~19.77~~	~~23.21~~	~~12.00~~
~~60~~	~~45~~	~~< 1:12~~	~~2.77~~	~~3.11~~	~~3.84~~	~~4.65~~	~~5.53~~	~~6.49~~	~~2.99~~
		~~5:12~~	~~4.15~~	~~4.66~~	~~5.76~~	~~6.96~~	~~8.28~~	~~9.72~~	~~4.62~~
		~~7:12~~	~~4.78~~	~~5.36~~	~~6.63~~	~~8.01~~	~~9.53~~	~~11.18~~	~~5.36~~
		~~12:12~~	~~6.51~~	~~7.30~~	~~9.03~~	~~10.91~~	~~12.98~~	~~15.23~~	~~7.39~~
	~~60~~	~~< 1:12~~	~~3.86~~	~~4.32~~	~~5.35~~	~~6.46~~	~~7.69~~	~~9.02~~	~~4.18~~
		~~5:12~~	~~6.31~~	~~7.08~~	~~8.75~~	~~10.57~~	~~12.58~~	~~14.76~~	~~7.07~~
		~~7:12~~	~~7.43~~	~~8.32~~	~~10.29~~	~~12.44~~	~~14.80~~	~~17.37~~	~~8.38~~
		~~12:12~~	~~10.51~~	~~11.78~~	~~14.56~~	~~17.60~~	~~20.94~~	~~24.57~~	~~12.00~~
~~First story of two story~~									
~~< 30~~	~~15~~	~~< 1:12~~	~~2.65~~	~~2.97~~	~~3.67~~	~~4.44~~	~~5.28~~	~~6.20~~	~~2.52~~
		~~5:12~~	~~2.83~~	~~3.17~~	~~3.92~~	~~4.74~~	~~5.64~~	~~6.62~~	~~2.70~~
		~~7:12~~	~~2.91~~	~~3.26~~	~~4.03~~	~~4.87~~	~~5.80~~	~~6.80~~	~~2.79~~
		~~12:12~~	~~3.13~~	~~3.51~~	~~4.34~~	~~5.25~~	~~6.24~~	~~7.32~~	~~3.01~~
	~~30~~	~~< 1:12~~	~~4.81~~	~~5.39~~	~~6.67~~	~~8.06~~	~~9.59~~	~~11.25~~	~~5.14~~
		~~5:12~~	~~5.42~~	~~6.08~~	~~7.52~~	~~9.09~~	~~10.81~~	~~12.69~~	~~5.86~~
		~~7:12~~	~~5.70~~	~~6.39~~	~~7.90~~	~~9.55~~	~~11.37~~	~~13.34~~	~~6.19~~
		~~12:12~~	~~6.47~~	~~7.25~~	~~8.97~~	~~10.84~~	~~12.90~~	~~15.14~~	~~7.10~~
	~~45~~	~~< 1:12~~	~~6.99~~	~~7.83~~	~~9.69~~	~~11.71~~	~~13.93~~	~~16.35~~	~~7.85~~
		~~5:12~~	~~8.32~~	~~9.33~~	~~11.53~~	~~13.94~~	~~16.59~~	~~19.47~~	~~9.48~~
		~~7:12~~	~~8.93~~	~~10.01~~	~~12.37~~	~~14.95~~	~~17.79~~	~~20.88~~	~~10.21~~
		~~12:12~~	~~10.60~~	~~11.88~~	~~14.69~~	~~17.75~~	~~21.13~~	~~24.79~~	~~12.25~~
	~~60~~	~~< 1:12~~	~~9.23~~	~~10.35~~	~~12.79~~	~~15.46~~	~~18.40~~	~~21.59~~	~~10.65~~
		~~5:12~~	~~11.57~~	~~12.97~~	~~16.03~~	~~19.38~~	~~23.06~~	~~27.06~~	~~13.54~~
		~~7:12~~	~~12.63~~	~~14.15~~	~~17.50~~	~~21.15~~	~~25.17~~	~~29.54~~	~~14.85~~
		~~12:12~~	~~15.56~~	~~17.44~~	~~21.56~~	~~26.06~~	~~31.01~~	~~36.39~~	~~18.48~~
~~60~~	~~45~~	~~< 1:12~~	~~7.34~~	~~8.22~~	~~10.17~~	~~12.29~~	~~14.62~~	~~17.16~~	~~7.85~~
		~~5:12~~	~~8.72~~	~~9.77~~	~~12.08~~	~~14.60~~	~~17.37~~	~~20.39~~	~~9.48~~
		~~7:12~~	~~9.34~~	~~10.47~~	~~12.95~~	~~15.65~~	~~18.62~~	~~21.85~~	~~10.21~~
		~~12:12~~	~~11.08~~	~~12.41~~	~~15.35~~	~~18.55~~	~~22.07~~	~~25.90~~	~~12.25~~
	~~60~~	~~< 1:12~~	~~9.94~~	~~11.14~~	~~13.77~~	~~16.65~~	~~19.81~~	~~23.25~~	~~10.65~~
		~~5:12~~	~~12.40~~	~~13.89~~	~~17.18~~	~~20.76~~	~~24.70~~	~~28.99~~	~~13.54~~

		~~7:12~~	~~13.51~~	~~15.14~~	~~18.72~~	~~22.63~~	~~26.92~~	~~31.60~~	~~14.85~~
		~~12:12~~	~~16.59~~	~~18.59~~	~~22.99~~	~~27.79~~	~~33.06~~	~~38.80~~	~~18.48~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound force per linear foot = 0.146 kN/m, 1 pound per square foot = 47.88 Pa.~~

~~a. Tabulated lengths were derived by calculating design wind pressures in accordance with Figure 6-10 of ASCE 7 for a building with a mean roof height of 35 feet. For wind perpendicular to the ridge, the effects of a 2-foot overhang on each endwall are included. The design pressures were used to calculate forces to be resisted by solid wall segments in each endwall [Table R611.7(1A) or R611.7(1B)] or sidewall [(Table R611.7(1C)], as appropriate. The forces to be resisted by each wall line were then divided by the default design strength of 840 pounds per linear foot of length to determine the required solid wall length. The actual mean roof height of the building shall not exceed the least horizontal dimension of the building.~~

~~b. Tabulated lengths in the "minimum" column are based on the requirement of Section 6.1.4.1 of ASCE 7 that the main windforce-resisting system be designed for a minimum service level force of 10 psf multiplied by the area of the building projected onto a vertical plane normal to the assumed wind direction. Tabulated lengths in shaded cells are less than the "minimum" value. Where the minimum controls, it is permitted to be reduced in accordance with Notes c, d and e. See Section R611.7.1.1.~~

~~c. For buildings with a mean roof height of less than 35 feet, tabulated lengths are permitted to be reduced by multiplying by the appropriate factor,~~ R_1~~, from Table R611.7(2). The reduced length shall not be less than the "minimum" value shown in the table.~~

~~d. Tabulated lengths for "one story or top story of two story" are based on a floor-to-ceiling height of 10 feet. Tabulated lengths for "first story of two story" are based on floor-to-ceiling heights of 10 feet each for the first and second story. For floor-to-ceiling heights less than assumed, use the lengths in Table R611.7(1A), (1B) or (1C), or multiply the value in the table by the reduction factor,~~ R_2~~, from Table R611.7(3).~~

~~e. Tabulated lengths are based on the default design shear strength of 840 pounds per linear foot of solid wall segment. The tabulated lengths are permitted to be reduced by multiplying by the applicable reduction factor for design strength,~~ R_3~~, from Table R611.7(4).~~

~~f. The reduction factors,~~ R_1~~,~~ R_2 ~~and~~ R_3~~, in Tables R611.7(2), R611.7(3), and R611.7(4), respectively, are permitted to be compounded, subject to the limitations of Note b. However, the minimum number and minimum length of solid walls segments in each wall line shall comply with Sections R611.7.1 and R611.7.2.1, respectively.~~

~~g. For intermediate values of sidewall length, endwall length, roof slope and basic wind speed, use the next higher value, or determine by interpolation.~~

TABLE R611.7(1C)
UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN EACH EXTERIOR SIDEWALL FOR WIND PARALLEL TO RIDGE[a, c, d, e, f, g]

SIDEWALL LENGTH (feet)	ENDWALL LENGTH (feet)	ROOF SLOPE	UNREDUCED LENGTH, *UR*, OF SOLID WALL REQUIRED IN SIDEWALLS FOR WIND PARALLEL TO RIDGE (feet)						
			Basic Wind Speed (mph) Exposure						
			115B	120B	130B	140B	150B	160B	Minimum[b]
					110C	119C	127C	136C	
						110D	117D	125D	
			One story or top story of two story						
< 30	15	< 1:12	1.08	1.18	1.39	1.61	1.84	2.10	0.90
		5:12	1.29	1.40	1.65	1.91	2.19	2.49	1.08
		7:12	1.38	1.50	1.76	2.04	2.35	2.67	1.17
		12:12	1.63	1.78	2.09	2.42	2.78	3.16	1.39
	30	< 1:12	2.02	2.20	2.59	3.00	3.44	3.92	1.90
		5:12	2.73	2.97	3.48	4.04	4.64	5.28	2.62
		7:12	3.05	3.32	3.89	4.51	5.18	5.89	2.95
		12:12	3.93	4.27	5.02	5.82	6.68	7.60	3.86
	45	< 1:12	3.03	3.30	3.87	4.49	5.15	5.86	2.99
		5:12	4.55	4.96	5.82	6.75	7.74	8.81	4.62
		7:12	5.24	5.71	6.70	7.77	8.92	10.15	5.36
		12:12	7.16	7.79	9.14	10.61	12.17	13.85	7.39
	60	< 1:12	4.11	4.47	5.25	6.09	6.99	7.96	4.18

		5:12	6.78	7.39	8.67	10.05	11.54	13.13	7.07
		7:12	8.00	8.71	10.22	11.85	13.61	15.48	8.38
		12:12	11.35	12.36	14.51	16.82	19.31	21.97	12.00
60	45	< 1:12	3.17	3.46	4.06	4.70	5.40	6.14	2.99
		5:12	4.75	5.18	6.07	7.04	8.09	9.20	4.62
		7:12	5.47	5.96	6.99	8.11	9.31	10.59	5.36
		12:12	7.45	8.11	9.52	11.04	12.68	14.43	7.39
	60	< 1:12	4.41	4.81	5.64	6.54	7.51	8.54	4.18
		5:12	7.22	7.86	9.23	10.70	12.29	13.98	7.07
		7:12	8.50	9.25	10.86	12.59	14.46	16.45	8.38
		12:12	12.02	13.09	15.36	17.81	20.45	23.27	12.00
First story of two story									
< 30	15	< 1:12	3.03	3.30	3.88	4.49	5.16	5.87	2.52
		5:12	3.24	3.52	4.14	4.80	5.51	6.26	2.70
		7:12	3.33	3.62	4.25	4.93	5.66	6.44	2.79
		12:12	3.58	3.90	4.58	5.31	6.10	6.94	3.01
	30	< 1:12	5.50	5.99	7.03	8.16	9.36	10.65	5.14
		5:12	6.21	6.76	7.93	9.20	10.56	12.01	5.86
		7:12	6.52	7.10	8.34	9.67	11.10	12.63	6.19
		12:12	7.41	8.06	9.46	10.97	12.60	14.33	7.10
	45	< 1:12	8.00	8.71	10.22	11.85	13.61	15.48	7.85
		5:12	9.52	10.37	12.17	14.11	16.20	18.43	9.48
		7:12	10.21	11.12	13.05	15.14	17.38	19.77	10.21
		12:12	12.13	13.20	15.50	17.97	20.63	23.47	12.25
	60	< 1:12	10.56	11.50	13.50	15.65	17.97	20.44	10.65
		5:12	13.24	14.41	16.91	19.62	22.52	25.62	13.54
		7:12	14.45	15.73	18.46	21.41	24.58	27.97	14.85
		12:12	17.80	19.38	22.75	26.38	30.29	34.46	18.48
60	45	< 1:12	8.39	9.14	10.72	12.44	14.28	16.25	7.85
		5:12	9.97	10.86	12.74	14.78	16.97	19.30	9.48
		7:12	10.69	11.64	13.66	15.84	18.19	20.69	10.21
		12:12	12.67	13.80	16.19	18.78	21.56	24.53	12.25
	60	< 1:12	11.37	12.38	14.53	16.85	19.35	22.01	10.65
		5:12	14.18	15.44	18.12	21.02	24.13	27.45	13.54
		7:12	15.46	16.83	19.75	22.91	26.29	29.92	14.85
		12:12	18.98	20.66	24.25	28.13	32.29	36.74	18.48

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound force per linear foot = 0.146 kN/m, 1 pound per square foot = 47.88 Pa.

a. Tabulated lengths were derived by calculating design wind pressures in accordance with Figure28.4-1 of ASCE 7 for a building with a mean roof height of 35 feet, topographic factor, K_{zt}, equal to 1.0, and Risk Category II~~.~~ The design pressures were used to calculate forces to be resisted by solid wall segments in each sidewall. The forces to be resisted by each wall line were then divided by the default design strength of 840 pounds per linear foot of length to determine the unreduced length, UR, of solid wall length required in each sidewall. The actual mean roof height of the building shall not exceed the least horizontal dimension of the building.

b. Tabulated lengths in the "minimum" column are based on the requirement of Section 28.4.4 of ASCE 7 that the main windforce-resisting system be designed for a minimum pressure of 16 psf multiplied by the wall area of the building and 8 psf multiplied by the roof area of the building projected onto a vertical plane normal to the assumed wind direction. Tabulated lengths in shaded cells are less than the "minimum" value. Where the minimum controls, it is permitted to be reduced in accordance with Notes c, d and e. See Section R611.7.1.1.

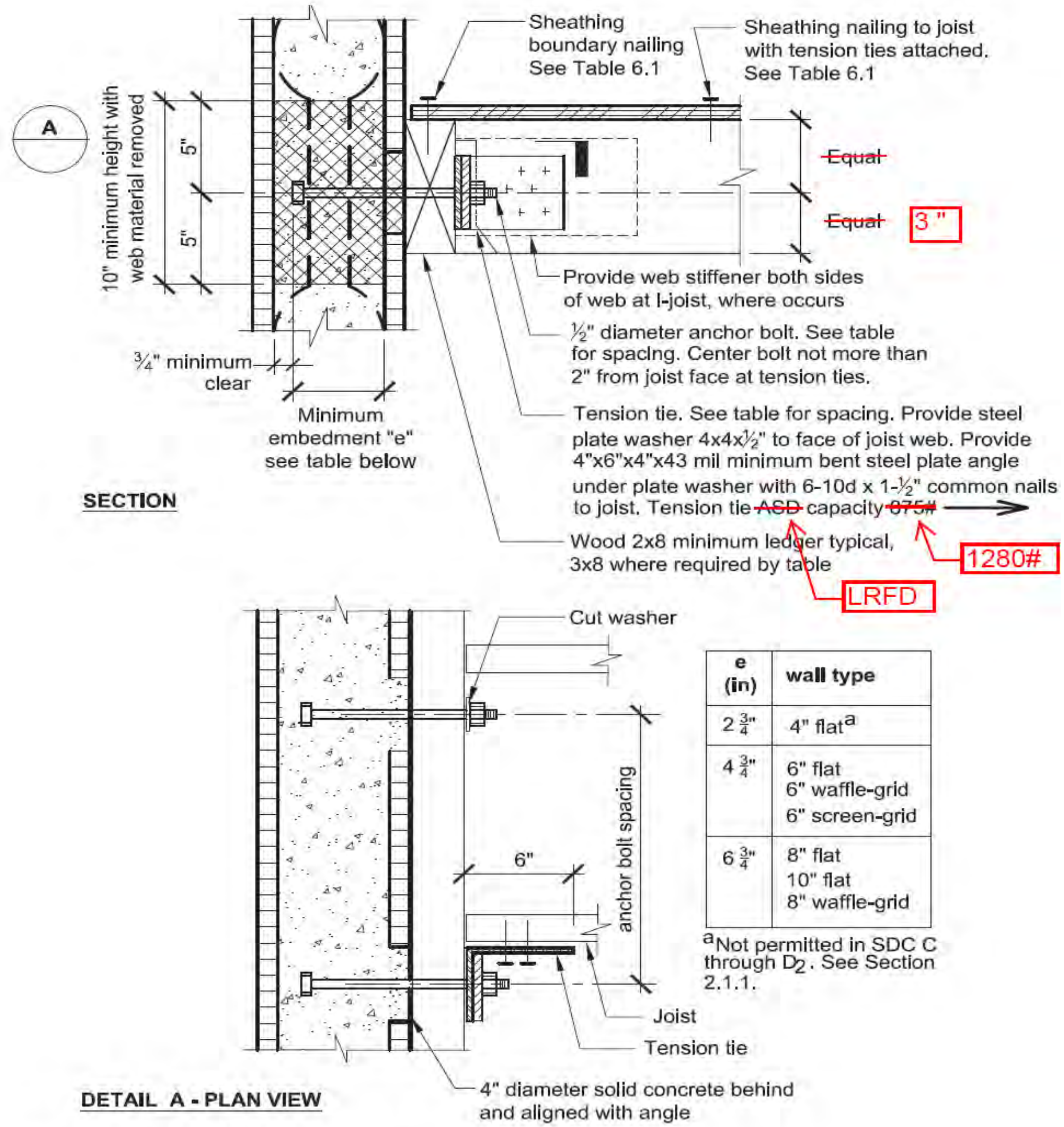
c. For buildings with a mean roof height of less than 35 feet, tabulated lengths are permitted to be reduced by multiplying by the appropriate factor, R_1, from Table R611.7(2). The reduced length shall not be less than the "minimum" value shown in the table.

d. Tabulated lengths for "one story or top story of two story" are based on a floor-to-ceiling height of 10 feet. Tabulated lengths for "first story of two story" are based on floor-to-ceiling heights of 10 feet each for the first and second story. For floor-to-ceiling heights less than assumed, use the lengths in Table R611.7(1A) , (1B) or (1C), or multiply the value in the table by the reduction factor, R_2, from Table R611.7(3).

e. Tabulated lengths are based on the default design shear strength of 840 pounds per linear foot of solid wall segment. The tabulated lengths are permitted to be reduced by multiplying by the applicable reduction factor for design strength, R_3, from Table R611.7(4).

f. The reduction factors, R_1, R_2 and R_3, in Tables R611.7(2), R611.7(3), and R611.7(4), respectively, are permitted to be compounded, subject to the limitations of Note b. However, the minimum number and minimum length of solid walls segments in each wall line shall comply with Sections R611.7.1 and R611.7.2.1, respectively.

g. For intermediate values of sidewall length, endwall length, roof slope and basic wind speed, use the next higher value, or determine by interpolation.



e (in)	wall type
2 ¾"	4" flat[a]
4 ¾"	6" flat 6" waffle-grid 6" screen-grid
6 ¾"	8" flat 10" flat 8" waffle-grid

[a]Not permitted in SDC C through D_2. See Section 2.1.1.

For SI: 1 mil = 0.0254 mm, 1 inch = 25.4 mm, 1 pound-force = 4.448 N.

FIGURE R611.9(1)
WOOD-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PERPENDICULAR

~~TABLE R611.9(1)~~
~~WOOD-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PERPENDICULAR[a, b, c]~~

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph)~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
		-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-
~~12~~	~~36~~	-	-	-	-	-	-
~~12~~	~~48~~	-	-	-	-	-	-
~~16~~	~~16~~	-	-	-	-	~~A~~	~~A~~
~~16~~	~~32~~	-	-	-	-	-	-
~~16~~	~~48~~	-	-	-	-	-	-
~~19.2~~	~~19.2~~	~~A~~	~~A~~	~~A~~	~~A~~	~~A~~	-
~~19.2~~	~~38.4~~	~~A~~	~~A~~	~~A~~	-	-	-

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(1). Use of this detail is permitted where a cell is not shaded and prohibited where shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. Letter "A" indicates that a minimum nominal 3 × 8 ledger is required.~~

TABLE R611.9(1)
WOOD-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PERPENDICULAR[a, b]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph)					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12						
12	24						
12	36						
12	48						
16	16						
16	32						
16	48						
19.2	19.2						
19.2	38.4						

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(1). Use of this detail is permitted where a cell is not shaded and prohibited where shaded.

b. Wall design per other provisions of Section R611 is required.

FIGURE R611.9(2) WOOD-FRAMED FLOOR TO SIDE OF CONCRETE WALL FRAMING PARALLEL

In Figure R611.9(2), in SECTION view note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~875#~~1280# →"

~~**TABLE R611.9(2)**~~
~~**WOOD-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PARALLEL[a, b]**~~

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85b~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
		-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-
~~12~~	~~36~~	-	-	-	-	-	-
~~12~~	~~48~~	-	-	-	-	-	-
~~16~~	~~16~~	-	-	-	-	-	-
~~16~~	~~32~~	-	-	-	-	-	-
~~16~~	~~48~~	-	-	-	-	-	-
~~19.2~~	~~19.2~~	-	-	-	-	-	-
~~19.2~~	~~38.4~~	-	-	-	-	-	-
~~24~~	~~24~~	-	-	-	-	-	-
~~24~~	~~48~~	-	-	-	-	-	-

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~
~~a. This table is for use with the detail in Figure R611.9(2). Use of this detail is permitted where a cell is not shaded and prohibited where shaded.~~
~~b. Wall design per other provisions of Section R611 is required.~~

TABLE R611.9(2)
WOOD-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PARALLEL[a, b]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12						
12	24						
12	36						
12	48						
16	16						
16	32						
16	48						
19.2	19.2						

19.2	38.4						
24	24						
24	48						

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(2). Use of this detail is permitted where a cell is not shaded and prohibited where shaded.

b. Wall design per other provisions of Section R611 is required.

FIGURE R611.9(3) WOOD-FRAMED FLOOR TO TOP OF CONCRETE WALL FRAMING PERPENDICULAR

In Figure R611.9(3), in PLAN VIEW bottom note about tension tie, revise last sentence to read: "Tension tie ~~ASD~~LRFD capacity ~~760#~~1280# for both angles (~~380#~~640# per angle) →"

~~TABLE R611.9(3)~~
~~WOOD-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR~~[a, b, c, d, e]

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
		-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-
~~12~~	~~36~~	-	-	-	-	-	-
~~12~~	~~48~~	-	-	-	-	-	-
~~16~~	~~16~~	-	-	-	-	~~6~~ ~~A~~	~~6~~ ~~B~~
~~16~~	~~32~~	-	-	-	-	~~6~~ ~~A~~	~~6~~ ~~B~~
~~16~~	~~48~~	-	-	-	-	-	-
~~19.2~~	~~19.2~~	-	-	-	~~6~~ ~~A~~	~~6~~ ~~A~~	~~6~~ ~~B~~
~~19.2~~	~~38.4~~	-	-	-	~~6~~ ~~A~~	~~6~~ ~~A~~	-
~~24~~	~~24~~	-	-	~~6~~ ~~A~~	~~6~~ ~~B~~	~~6~~ ~~A~~	-
~~24~~	~~48~~	-	-	~~6~~ ~~A~~	-	-	-

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(3). Use of this detail is permitted where cell is not shaded, prohibited where shaded.~~

~~b. Wall design per other provisions in Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.~~

~~d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(3). For the remainder of the wall, see Note b.~~

~~e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimal nominal 3 × 6 sill plate are required.~~

TABLE R611.9(3)
WOOD-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR[a, b, c, d, e]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12						6
12	24					6	6
12	36					6	6
12	48				6	6	6
16	16					6	6A
16	32				6	6	6A
16	48			6	6	6	6A
19.2	19.2				6A	6A	6B
19.2	38.4			6	6A	6A	6B
24	24			6A	6B	6B	6B
24	48		6	6A	6B	6B	8B

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(3). Use of this detail is permitted where cell is not shaded, prohibited where shaded.

b. Wall design per other provisions in Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.

d. Numbers 6 and 8 indicate~~s~~ minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(3). For the remainder of the wall, see Note b.

e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimal nominal 3 × 6 sill plate are required.

FIGURE R611.9(4) WOOD-FRAMED FLOOR TO TOP OF CONCRETE WALL FRAMING PARALLEL

In Figure R611.9(4), in PLAN VIEW note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~760#~~1280# for both angles (~~360#~~640# per angle) →"

~~TABLE R611.9(4)~~
~~WOOD-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PARALLEL~~[a, b, c, d, e]

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
		-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
-	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-

~~12~~	~~36~~	-	-	-	-	-	-
~~12~~	~~48~~	-	-	-	-	-	-
~~16~~	~~16~~	-	-	-	-	~~6 A~~	~~6 B~~
~~16~~	~~32~~	-	-	-	-	~~6 A~~	~~6 B~~
~~16~~	~~48~~	-	-	-	-	-	-
~~19.2~~	~~19.2~~	-	-	-	~~6 A~~	~~6 A~~	~~6 B~~
~~19.2~~	~~38.4~~	-	-	-	~~6 A~~	~~6 A~~	-
~~24~~	~~24~~	-	-	~~6 A~~	~~6 B~~	~~6 B~~	-
~~24~~	~~48~~	-	-	~~6 A~~	-	-	-

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(4). Use of this detail is permitted where a cell is not shaded, prohibited where shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.~~

~~d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(4). For the remainder of the wall, see Note b.~~

~~e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimal nominal 3 × 6 sill plate are required.~~

TABLE R611.9(4) WOOD-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PARALLEL[a, b, c, d, e]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12						6
12	24					6	6
12	36					6	6
12	48				6	6	6
16	16					6	6A
16	32				6	6	6A
16	48			6	6	6	6A
19.2	19.2				6A	6A	6B
19.2	38.4			6	6A	6A	6B
24	24			6A	6B	6B	6B
24	48		6	6A	6B	6B	8B

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(4). Use of this detail is permitted where a cell is not shaded, prohibited where shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.

d. Numbers 6 and 8 indicate~~s~~ minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(4). For the remainder of the wall, see Note b.

e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimal nominal 3 × 6 sill plate are required.

FIGURE R611.9(5) COLD-FORMED STEEL FLOOR TO SIDE OF CONCRETE WALL, FRAMING PERPENDICULAR

In Figure R611.9(5), in SECTION view note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~2010#~~3200# →"

~~**TABLE R611.9(5)**~~
~~**COLD-FORMED STEEL-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PERPENDICULAR**~~[a, b, c, d]

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
		-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-
~~12~~	~~36~~	-	-	-	-	-	~~6~~
~~12~~	~~48~~	-	-	-	-	~~6~~	~~6~~
~~16~~	~~16~~	-	-	-	-	-	-
~~16~~	~~32~~	-	-	-	-	-	-
~~16~~	~~48~~	-	-	-	-	~~6~~	~~6~~
~~19.2~~	~~19.2~~	-	-	-	-	-	-
~~19.2~~	~~38.4~~	-	-	-	-	-	~~6~~
~~24~~	~~24~~	-	-	-	-	-	-
~~24~~	~~48~~	-	-	-	-	~~6~~	~~6~~

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.4470 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(5). Use of this detail is permitted where a cell is not shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.~~

~~d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(5). For the remainder of the wall, see Note~~ b.

TABLE R611.9(5)
COLD-FORMED STEEL-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PERPENDICULAR[a, b, c]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12						
12	24						
12	36						
12	48						
16	16						
16	32						
16	48						
19.2	19.2						
19.2	38.4						
24	24						
24	48						

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.4470 m/s.

a. This table is for use with the detail in Figure R611.9(5). Use of this detail is permitted where a cell is not shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.

FIGURE R611.9(6) COLD-FORMED STEEL FLOOR TO SIDE OF CONCRETE WALL, FRAMING PARALLEL

In Figure R611.9(6), in SECTION view bottom note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~2010#~~3200# →"

~~TABLE R611.9(6)~~
~~COLD-FORMED STEEL-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PARALLEL~~ ~~[a, b, c, d]~~

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
				~~85C~~	~~90C~~	~~100C~~	~~110C~~
					~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~						
~~12~~	~~24~~						
~~12~~	~~36~~						~~6~~
~~12~~	~~48~~					~~6~~	~~6~~
~~16~~	~~16~~						
~~16~~	~~32~~						
~~16~~	~~48~~					~~6~~	~~6~~

~~19.2~~	~~19.2~~						
~~19.2~~	~~38.4~~						~~6~~
~~24~~	~~24~~						
~~24~~	~~48~~					~~6~~	~~6~~

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(6). Use of this detail is permitted where a cell is not shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.~~

~~d. Number 6 indicates minimum permitted nominal wall thick ness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(6). For the remainder of the wall, see Note b.~~

TABLE R611.9(6)
COLD-FORMED STEEL-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PARALLEL[a, b, c]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12						
12	24						
12	36						
12	48						
16	16						
16	32						
16	48						
19.2	19.2						
19.2	38.4						
24	24						
24	48						

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(6). Use of this detail is permitted where a cell is not shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.

FIGURE R611.9(7) COLD-FORMED STEEL FLOOR TO TOP OF CONCRETE WALL FRAMING PERPENDICULAR

In Figure R611.9(7), in PLAN VIEW note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~700#~~1280# →"

~~**TABLE R611.9(7)**~~
~~**COLD-FORMED STEEL-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR[a, b, c, d, e]**~~

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~

		-	-	~~858C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-
~~16~~	~~16~~	-	-	-	-	~~6 A~~	~~6 B~~
~~16~~	~~32~~	-	-	-	-	~~6 A~~	~~6 B~~
~~19.2~~	~~19.2~~	-	-	-	~~6 A~~	~~8 B~~	~~8 B~~
~~19.2~~	~~38.4~~	-	-	-	~~6 A~~	~~8 B~~	~~8 B~~
~~24~~	~~24~~	-	-	~~6 A~~	~~8 B~~	~~8 B~~	

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(7). Use of this detail is permitted where a cell is not shaded, prohibited where shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.~~

~~d. Numbers 6 and 8 indicate minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(7). For the remainder of the wall, see Note b.~~

~~e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^{5}/_{8}$-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.~~

TABLE R611.9(7)
COLD-FORMED STEEL-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR[a, b, c, d, e]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12	_	_	_	_	_	6
12	24	_	_	_	_	6	6
16	16	_	_	_	_	6	6 A
16	32	_	_	_	6	6	6A
19.2	19.2	_	_	_	6A	6A	6B
19.2	38.4	_	_	6	6A	6A	6B
24	24	_	_	6A	6B	6B	6B

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(7). Use of this detail is permitted where a cell is not shaded, prohibited where shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.

d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(7). For the remainder of the wall, see Note b.

e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^{5}/_{8}$-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.

FIGURE R611.9(8) COLD-FORMED STEEL FLOOR TO TOP OF CONCRETE WALL, FRAMING PARALLEL

In Figure R611.9(8), in PLAN VIEW note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~750#~~1280# →"

~~TABLE R611.9(8)~~
~~COLD-FORMED STEEL-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PARALLEL~~[~~a, b, c, d, e~~]

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
				~~85C~~	~~90C~~	~~100C~~	~~110C~~
					~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~						
~~12~~	~~24~~						
~~16~~	~~16~~					~~6 A~~	~~6 B~~
~~16~~	~~32~~					~~6 A~~	~~6 B~~
~~19.2~~	~~19.2~~				~~6 A~~	~~8 B~~	~~8 B~~
~~19.2~~	~~38.4~~				~~6 A~~	~~8 B~~	~~8 B~~
~~24~~	~~24~~			~~6 A~~	~~8 B~~	~~8 B~~	

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(8). Use of this detail is permitted where a cell is not shaded, prohibited where shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.~~

~~d. Numbers 6 and 8 indicate minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(8). For the remainder of the wall, see Note b.~~

~~e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^{5}/_{8}$-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.~~

TABLE R611.9(8)
COLD-FORMED STEEL-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PARALLEL[a, b, c, d, e]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12	-	-	-	-	-	6
12	24	-	-	-	-	6	6
16	16	-	-	-	-	6	6A

16	32	_	_	_	6	6	6A
19.2	19.2	_	_	_	6A	6A	6B
19.2	38.4	_	_	6	6A	6A	6B
24	24	_	_	6A	6B	6B	6B

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(8). Use of this detail is permitted where a cell is not shaded, prohibited where shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.

d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(8). For the remainder of the wall, see Note b.

e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.

FIGURE R611.9(9) WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR

In Figure R611.9(9), in PLAN VIEW note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~760#~~1280# both angles, ~~360#~~640# per angle →"

~~TABLE R611.9(9)~~
~~WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR~~~~[a, b, c, d, e]~~

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
		-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-
~~12~~	~~36~~	-	-	-	-	-	-
~~12~~	~~48~~	-	-	-	-	-	-
~~16~~	~~16~~	-	-	-	-	-	~~6~~
~~16~~	~~32~~	-	-	-	-	-	~~6~~
~~16~~	~~48~~	-	-	-	-	-	-
~~19.2~~	~~19.2~~	-	-	-	-	~~6~~	~~6 A~~
~~19.2~~	~~38.4~~	-	-	-	-	~~6~~	-
~~24~~	~~24~~	-	-	-	~~6 A~~	~~6 A~~	~~6 B~~
~~24~~	~~48~~	-	-	-	-	-	-

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(9). Use of this detail is permitted where cell a is not shaded, prohibited where shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.~~

~~d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(9). For the remainder of the wall, see Note b.~~

~~e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a 5/8-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.~~

TABLE R611.9(9) WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR[~~a, b, c, d, e~~]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12	-	-	-	-	-	6
12	24	-	-	-	-	-	6
12	36	-	-	-	-	6	6
12	48	-	-	-	6	6	6
16	16	-	-	-	-	6	6
16	32	-	-	-	-	6	6
16	48	-	-	-	6	6	6
19.2	19.2	-	-	-	-	6	6
19.2	38.4	-	-	-	6	6	-
24	24	-	-	-	6		
24	48	-	-	6	8B	-	-

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(9). Use of this detail is permitted where cell a is not shaded, prohibited where shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.

d. Numbers 6 and 8 indicate~~s~~ minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(9). For the remainder of the wall, see Note b.

e. Letter "B" indicates that a 5/8-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.

FIGURE R611.9(10) WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL FRAMING PARALLEL

In Figure R611.9(10), in SECTION view note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~1340#~~2140# →"

~~TABLE R611.9(10)~~
~~WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PARALLEL[a, b, c, d, e]~~

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
		-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-

~~12~~	~~36~~	-	-	-	-	-	-
~~12~~	~~48~~	-	-	-	-	-	-
~~16~~	~~16~~	-	-	-	-	~~6~~	~~6~~
~~16~~	~~32~~	-	-	-	-	~~6~~	~~6~~
~~16~~	~~48~~	-	-	-	-	~~6~~	~~6~~
~~19.2~~	~~19.2~~	-	-	-	~~6~~	~~6~~	~~6~~ ~~A~~
~~19.2~~	~~38.4~~	-	-	-	~~6~~	~~6~~	~~6~~ ~~A~~
~~24~~	~~24~~	-	-	~~6~~	~~6~~ ~~A~~	~~6~~ ~~A~~	~~6~~ ~~B~~
~~24~~	~~48~~	-	-	~~6~~	~~6~~ ~~A~~	~~6~~ ~~B~~	~~6~~ ~~B~~

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(10). Use of this detail is permitted where a cell is not shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in cells with no number.~~

~~d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(10). For the remainder of the wall, see Note b.~~

~~e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.~~

TABLE R611.9(10) WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PARALLEL[a, b, c, d, e]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12						6
12	24						6
12	36					6	6
12	48				6	6	6
16	16					6	6
16	32					6	6
16	48				6	6	6
19.2	19.2					6	6
19.2	38.4				6	6	
24	24				6		
24	48			6	8B		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(10). Use of this detail is permitted where a cell is not shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in cells with no number.

d. Numbers 6 and 8 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure

R611.9(10). For the remainder of the wall, see Note b.

e.. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.

FIGURE R611.9(11) COLD-FORMED STEEL ROOF TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR

In Figure R611.9(11), in PLAN VIEW note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~700#~~1280# →"

~~TABLE R611.9(11)~~
~~WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR~~~~[a, b, c, d, e]~~

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
				~~85C~~	~~90C~~	~~100C~~	~~110C~~
					~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~						
~~12~~	~~24~~						
~~16~~	~~16~~					~~6~~	~~6~~
~~16~~	~~32~~					~~6~~	~~6~~
~~19.2~~	~~19.2~~				~~6~~	~~6~~	~~8~~ ~~B~~
~~19.2~~	~~38.4~~				~~6~~	~~6~~	~~8~~ ~~B~~
~~24~~	~~24~~			~~6~~	~~6~~	~~8~~ ~~B~~	

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(11). Use of this detail is permitted where a cell is not shaded, prohibited where shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.~~

~~d. Numbers 6 and 8 indicate minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thick ness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(11). For the remainder of the wall, see Note b.~~

~~e. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.~~

~~For SI: 1 mil = 0.0254 mm, 1 inch = 25.4 mm, 1 pound-force = 4.448 N.~~

TABLE R611.9(11) WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR[a, b, c, d, e]

ANCHOR BOLT SPACING (inches)	TENSION TIE SPACING (inches)	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B
				110C	119C	127C	136C
					110D	117D	125D
12	12	-	-	-	-	-	6
12	24	-	-	-	-	-	6
16	16	-	-	-	-	6	6
16	32	-	-	-	-	6	6

19.2	19.2	_	_	_		6	6
19.2	38.4	_	_	_	6	6	6
24	24	_	_		6	6A	6B

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(11). Use of this detail is permitted where a cell is not shaded, prohibited where shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in unshaded cells with no number.

d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(11). For the remainder of the wall, see Note b.

e. Letter "A" indicates that a minimum nominal 3 × 6 sill plate is required. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt and a minimum nominal 3 × 6 sill plate are required.

FIGURE R611.9(12) COLD-FORMED STEEL ROOF TO TOP OF CONCRETE WALL, FRAMING PARALLEL

In Figure R611.9(12), in SECTION view note about tension tie, revise last sentence to read:
"Tension tie ~~ASD~~LRFD capacity ~~800#~~1600# →"

~~TABLE R611.9(12)~~
~~COLD-FORMED STEEL ROOF TO TOP OF CONCRETE WALL, FRAMING PARALLEL~~~~[a, b, c, d, e]~~

~~ANCHOR BOLT SPACING (inches)~~	~~TENSION TIE SPACING (inches)~~	~~BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY~~					
		~~85B~~	~~90B~~	~~100B~~	~~110B~~	~~120B~~	~~130B~~
		-	-	~~85C~~	~~90C~~	~~100C~~	~~110C~~
		-	-	-	~~85D~~	~~90D~~	~~100D~~
~~12~~	~~12~~	-	-	-	-	-	-
~~12~~	~~24~~	-	-	-	-	-	-
~~16~~	~~16~~	-	-	-	-	-	-
~~16~~	~~32~~	-	-	-	-	-	-
~~19.2~~	~~19.2~~	-	-	-	-	~~6~~	~~6~~
~~19.2~~	~~38.4~~	-	-	-	-	~~6~~	~~6~~
~~24~~	~~24~~	-	-	~~6~~	~~6~~	~~8 B~~	~~8 B~~

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.~~

~~a. This table is for use with the detail in Figure R611.9(12). Use of this detail is permitted where a cell is not shaded.~~

~~b. Wall design per other provisions of Section R611 is required.~~

~~c. For wind design, minimum 4-inch-nominal wall is permitted in cells with no number.~~

~~d. Numbers 6 and 8 indicate minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(12). For the remainder of the wall, see Note b.~~

~~e. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt is required.~~

TABLE R611.9(12) COLD-FORMED STEEL ROOF TO TOP OF CONCRETE WALL, FRAMING PARALLEL[a, b, c, d, e]

ANCHOR BOLT	TENSION TIE	BASIC WIND SPEED (mph) AND WIND EXPOSURE CATEGORY					
		115B	120B	130B	140B	150B	160B

SPACING (inches)	SPACING (inches)			110C	119C	127C	136C
					110D	117D	125D
12	12	_	_	_	_	_	6
12	24	_	_	_	_	_	6
16	16	_	_	_	_	6	6
16	32	_	_	_	_	6	6
19.2	19.2	_	_	_		6	6
19.2	38.4	_	_	_	6	6	6
24	24	_	_		6	6	6B

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. This table is for use with the detail in Figure R611.9(12). Use of this detail is permitted where a cell is not shaded.

b. Wall design per other provisions of Section R611 is required.

c. For wind design, minimum 4-inch-nominal wall is permitted in cells with no number.

d. Number 6 indicates minimum permitted nominal wall thickness in inches necessary to develop required strength (capacity) of connection. As a minimum, this nominal thickness shall occur in the portion of the wall indicated by the cross-hatching in Figure R611.9(12). For the remainder of the wall, see Note b.

e. Letter "B" indicates that a $^5/_8$-inch-diameter anchor bolt is required.

R611.9.2 Connections between concrete walls and light-framed floor systems. Connections between concrete walls and light-framed floor systems shall be in accordance with one of the following:

1. For floor systems of wood frame construction, the provisions of Section R611.9.1 and the prescriptive details of Figures R611.9(1) through R611.9(4), where permitted by the tables accompanying those figures. Portions of connections of wood-framed floor systems not noted in the figures shall be in accordance with Section R502, or AF&PA/WFCM, if applicable. Wood framing members shall be of a species having a specific gravity equal to or greater than 0.42.
2. For floor systems of cold-formed steel construction, the provisions of Section R611.9.1 and the prescriptive details of Figures R611.9(5) through R611.9(8), where permitted by the tables accompanying those figures. Portions of connections of cold-formed-steel framed floor systems not noted in the figures shall be in accordance with Section R505, or AISI S230, if applicable.
3. Proprietary connectors selected to resist loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
4. An engineered design using loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
5. An engineered design using loads and material design provisions in accordance with this code, or in accordance with ASCE 7, ACI 318, and AF&PA/NDS for wood frame construction or AISI S100 for cold-formed steel frame construction.

R611.9.3 Connections between concrete walls and light-framed ceiling and roof systems. Connections between concrete walls and light-framed ceiling and roof systems shall be in accordance with one of the following:

1. For ceiling and roof systems of wood frame construction, the provisions of Section R611.9.1 and the prescriptive details of Figures R611.9(9) and R611.9(10), where permitted by the tables accompanying those figures. Portions of connections of wood-framed ceiling and roof systems not noted in the figures shall be in accordance with Section R802, or AF&PA/WFCM, if applicable. Wood framing members shall be of a species having a specific gravity equal to or greater than 0.42.
2. For ceiling and roof systems of cold-formed-steel construction, the provisions of Section R611.9.1 and the prescriptive details of Figures R611.9(11) and R611.9(12), where permitted by the tables accompanying those figures. Portions of connections of cold-formed-steel

framed ceiling and roof systems not noted in the figures shall be in accordance with Section R804, or AISI S230, if applicable.

3. Proprietary connectors selected to resist loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
4. An engineered design using loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
5. An engineered design using loads and material design provisions in accordance with this code, or in accordance with ASCE 7, ACI 318, and AF&PA/NDS for wood-frame construction or AISI S100 for cold-formed-steel frame construction.

R611.10 Floor, roof and ceiling diaphragms. Floors and roofs in all buildings with exterior walls of concrete shall be designed and constructed as *diaphragms.* Where gable-end walls occur, ceilings shall also be designed and constructed as *diaphragms*. The design and construction of floors, roofs and ceilings of wood framing or cold-formed-steel framing serving as *diaphragms* shall comply with the applicable requirements of this code, or AF&PA/WFCM or AISI S230, if applicable. <u>Wood framing members shall be of a species having a specific gravity equal to or greater than 0.42.</u>

Reason: Background. The provisions currently in Section R611 are based on *PCA 100-2007, Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings* (PCA 100). The provisions of PCA 100-2007 are based on ACI 318-05 and ASCE 7-05, and the 2006 IBC. Recently the 2012 edition of PCA 100 was issued which is based on ACI 318-11, ASCE 7-10, and the 2012 IBC. Therefore, the purpose of this code change is to update the code's provisions to agree with PCA 100-2012; therefore, to agree with ACI 318-11, ASCE 7-10, and the 2012 IBC.

A significant change was made to the wind load provisions of ASCE 7-10 involving the basis wind speed map. Prior to the 2010 edition of ASCE 7, its wind load provisions yielded service-level design wind pressures, which were used to compute loads for use in the various load combinations. For strength design (LRFD), the computed loads were multiplied by a load factor that generally was 1.6. Over the past 20 years, seismic design provisions of ASCE 7 have been based on strength level loads, with the load factor for strength design being 1.0. Because there was a desire within the engineering community to convert the wind load provisions to strength-level forces, which would then be multiplied by a load factor of 1.0, ASCE 7-10 was revised with this in mind.

In order to reduce the load factor on wind for strength design from 1.6 to 1.0, the basic wind speeds were increased. Since wind pressure varies as the square of the wind velocity, wind speeds were increased by the square root of 1.6, which is 1.265. Computed velocities were rounded to the nearest 5 mph for areas away from the hurricane coast lines of the Atlantic Ocean and Gulf of Mexico. For example, under ASCE 7-05 for an occupancy category ("risk category" under ASCE 7-10) II structure (with an Importance Factor of 1.0), the basic wind speed was 90 mph away from the coast line. Under the new map of Figure 26.5-1A of ASCE 7-10 for Risk Category II structures, the basic wind speed away from the coast line is 115 mph (90 x 1.265 = 113.85, which was rounded to 115). Also, two additional (2) maps were created for ASCE 7-10 (Figures 26.5-1B and 26.5-1C), which allow the old wind importance factor to be abandoned. All three maps reflect revisions to basic wind speeds based on analysis of newer wind-speed data for areas near the Atlantic Ocean and Gulf of Mexico. Generally speaking, for areas away from the hurricane coast lines, wind loads calculated utilizing strength design procedures will be approximately the same under ASCE 7-10 as under ASCE 7-05. For most areas near the hurricane coast lines, wind loads under ASCE 7-10 will be somewhat less than under ASCE 7-05.

Because of the changes to basic wind speeds in ASCE 7-10, the provisions of PCA 100-2007, which are based on ASSCE 7-05, had to be revised. The grouping of basic wind speeds over the three exposure categories shown in the proposed changes to the various tables was accomplished as follows. Since most one- and two-family dwellings are constructed in exposure category B, the velocity pressures, ***q***, were calculated for a building with a mean roof height, ***h***, of 35 feet based on exposure category B, for basic wind speeds of 115, 120, 130, 140, 150 and 160 mph. Using those velocity pressures, the basic wind speeds were calculated that would result in the same velocity pressures for exposure categories C and D. For example, a basic wind speed of 160 mph in exposure B for a 35-foot high building will give the same velocity pressure as 136 mph and 125 mph in exposures C and D, respectively. These velocities and corresponding exposure categories are the limits of application of these provisions. The proposed upper limits on velocities result in design pressures that are similar to those in the existing code when considering that the load factor for strength design has been reduced from 1.6 to 1.0.

It will be noted in the proposal that the lowest tabulated wind speed for exposure B is 115 mph; whereas, the basic wind speed for California and the Pacific northwest is 110 mph. To accommodate 110 mph, it would have been necessary to expand the tables, which was not desirable. In addition, a review of the various tables will show that generally it does not make any difference since the solution for 115 mph, exposure B, is the minimum acceptable one. Also, where most construction is taking place in the area with the 110 mph basic wind speed, dwellings will be Seismic Design Category D, which these provisions do not cover.

Part 1 - Section R611.2 – See **background** reason.

Part 2 - Section R611.6 - The primary reason changes have been made to this section is due to the change in basis of the basic wind speeds of ASCE 7-10 which were discussed in the **background** reason for the change.

In addition, the existing tables are based on ACI 318-05; therefore, they are being updated to ACI 318-11. One change to ACI 318 made between the 2005 and 2011 editions increased the strength reduction factor, ***ø***, for plain concrete from 0.55 to 0.60. Everything else remaining equal, this resulted in an increase of 9% in design strength. This change resulted in more conditions (i.e., cells) where plain concrete is acceptable (i.e., #4 bars at 48 inches on center).

Other changes are essentially editorial in nature and are intended to clarify and facilitate use of the provisions. Some of these include:

1. Adding text to Section R611.6.2 and some table notes to clarify how to use the table for non-loadbearing walls, and
2. Shading of cells which signifies that plain concrete is permitted (note that some reinforcement is still required in the form of #4 bars at 48 inches on center).

Part 3 - Section R611.7 - The primary reason changes have been made to this section is due to the change in basic wind speeds of ASCE 7-10 which were discussed in the **background** reason for the change.

In addition, under ASCE 7-05 and earlier editions, the main wind-force resisting system of an enclosed or partially enclosed building had to be designed for a minimum load of 10 psf multiplied by the area of the building projected onto a vertical plane normal to the assumed wind direction. Applying these loads resulted in the unreduced length of solid wall shown under the “minimum” column of the existing tables. ASCE 7-10 changed this provision in two ways. Because of the switch to strength-based wind loads, 10 psf was multiplied by the former strength load factor, 1.6. This resulted in the status quo since the load factor on wind is now 1.0. However, a signification change was made to the load to be applied to the roof portion of the building that is projected onto the vertical plane. That load was reduced 50% from 16 to 8 psf. This change is reflected in the proposed tables by lower minimum values, and fewer shaded cells which alert the user that the minimum value governs.

Other changes are either editorial in nature, to correlate with the new changes in ASCE 7-10, or correct errors and omissions in the existing provisions.

Part 4 - Section R611.9 - The primary reason changes have been made to this section is due to the change in basic wind speeds of ASCE 7-10 which were discussed in the **background** reason for the change. Other reasons follow.

ASCE 7-10 Figure 28.4-1 includes a revised description of Load Case B governing wind blowing generally parallel to the ridge of a building. In some cases this redefined load case created controlling loads and thus required revisions to PCA 100 and the IRC.

Consistent with Table 1.1 of PCA 100 and IRC Table R301.5, the second floor live load was reduced from 40 psf to 30 psf based on sleeping rooms.

Also, consistent with the change to strength (LRFD) level wind loads, LRFD capacity calculations were used, in some cases affecting tabulated locations where details are applicable.

Part 5 - Sections R611.9.2 and R611.9.3 – Design of connections involving wood framing members requires that certain mechanical properties of the wood be known. Many mechanical properties of wood used by the structural engineer are related to the specific gravity (or density) of the wood. This property can vary widely depending upon the species of the wood. Therefore, in order to simplify the design of the prescriptive connection details in Section R611.9, it was decided that rather than have several groups of two of more wood species per group, a lower-bound value on the specific gravity would be used as the method of differentiating between species included in the scope of PCA 100-2012 and those requiring engineered design.

Part 6 - Section R611.10 - See reason for Part 5.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change updates the concrete wall provisions to agree with PCA 100-2012, ACI 318-11, ASCE 7-10 and the 2012 IBC.

Assembly Action: **None**

Final Hearing Results

RB334-13 **AS**

Code Change No: RB335-13

Original Proposal

Section(s): R611.5.1

Proponent: Stephen S. Szoke, P.E., Portland Cement Association

Revise as follows:

R611.5.1 Concrete and materials for concrete. Materials used in concrete, and concrete itself, shall conform to the requirements of this section, PCA 100, or ACI 318.

Reason: There are three design methods permitted by the code. Design and construction may be in compliance with:

The criteria of Section R611 of the IRC which is based on transcription from the *PCA100 Standard Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings*;

PCA100 Standard Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings which includes design scenarios too voluminous to be transcribed into the IRC;

ACI 318 Building Code Requirements for Structural Concrete for structures not suitable for simplistic prescriptive design.

This change simply allows materials to comply with the requirements of PCA 100 where PCA 100 is used for the design of structures

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change provides coordination with PCA 100 which is already referenced in this IRC.

Assembly Action: **None**

Final Hearing Results

RB335-13	**AS**

Code Change No: RB336-13

Original Proposal

Section(s): R611.5.1.1 (NEW), Chapter 44

Proponent: Stephen S. Szoke, P.E., Portland Cement Association/Portland Cement Association

Add new text as follows:

R611.5.1.1 Cements. The following standards as referenced in Chapter 44 shall be permitted to be used.

1. ASTM C 150
2. ASTM C 595
3. ASTM C 1157

Add new standard to Chapter 44 as follows:

ASTM

C1157 - 11 Standard Performance Specification for Hydraulic Cement

Reason: To update the specifications standards for Portland Cement, Blended Hydraulic Cement, and Hydraulic Cement referenced for use in concrete. Due to the change in the cycles for code and standards development referenced standards may not be referring the appropriate edition of standards for cement or even editions of standards that reflect cement that is available. Due to the rapid changes in the manufacturing processes due to both technological advancements and government rules and regulations, the requirements for cements are also changing more rapidly than can be accommodated by the code and referenced design standard processes. This change helps assure that cements complying with the most current edition of the standard specifications are used for construction. Without this modification and the potential to be referring an out-of-date standard specifications could result in requiring products that are no longer available. This change allows for cements with the appropriate restrictions on ingredients to be properly referenced in the IRC 2015. This change does not introduce new types of cement for use in concrete, but provides the mechanism to assure that the most recent, to the extent possible, product standard specifications are cited in the code. This change is consistent with a similar code change approved for the IBC.

Examples of the types of modifications may by ASTM International Committee C01 on Cements that need to accommodated in code development are as follows:

ASTM C150-12

Compared to ASTM C150-09 referenced in ACI 318-11, ASTM C150-12 includes revisions that:

1. Make the air permeability test the default method for determining compliance with specific surface fineness requirements and moves determination by the turbidimetric method to the optional table. This reflects industry practice.
2. Clarification on Type II (MH) moderate heat and moderate sulfate resistant cement heat index requirements, clarification on procedure for determining potential phase (Bogue) composition, and some additional minor improvements. No changes are made to the physical or chemical requirements of C150.

Additionally, compared to ASTM C150-07*a* referenced in IBC 2012 Chapter 35, ASTM C150-12 includes revisions to:

1. Distinguish between organic and inorganic processing additions and include a limit of 5% on inorganic processing additions and 1% on organic processing additions.
2. Modify procedures for determining potential phase composition to account for effect of inorganic processing additions in cement on potential phase composition calculations.
3. Include provisions for a Type II (MH) designation for moderate heat and moderate sulfate resistant cement.
4. Various other minor improvements. Again no changes were made to the physical or chemical requirements of C150 for portland cements.

The variations in product that will result from the use of C150-12 versus C150-07 will not adversely impact the performance of concrete with regard to compliance with ACI 318, PCA 100, or the provisions of the IRC.

C595-12

Compared to C595-09 referenced in ACI 318-11, ASTM C595-12 includes revisions to:

1. Include provisions for a new Type IL portland-limestone blended cement designation for cement containing from 5% to 15% limestone. C595 Type IL has same physical requirements as Type IP and IS (<70), which are also comparable to ASTM C150 physical requirements. Portland-limestone cement provides an alternative for improving the sustainability of concrete.
2. Several clarifications and improvements to the C595 provisions for Type IT ternary blended cements.
3. Clarifications and improvements to C595 naming practice used to identify amount slag, pozzolan or limestone contained in blended cements.

Additionally, compared to C595-08a referenced in IBC 2012 Chapter 35, ASTM C595-12 also includes provisions for Type IT ternary blended cement (cements containing portland cement with either a combination of two different pozzolans, or slag cement and a pozzolan, a pozzolan and a limestone, or a slag cement and a limestone). Ternary blended cements have the same physical requirements as Type IT and Type IS (<70) cements. Ternary blended cements were first introduced in the 2009 edition of ASTM C595.

The variations in product that will result from the use of C595-12 versus C595-08a will not adversely impact the performance of concrete with regard to compliance with ACI 318, PCA-100, or the provisions of the IRC.

ASTM C1157-11

Compared to C1157-09 referenced in ACI 318-11, ASTM C595-12 includes revisions to:

1. Include provisions for distinguishing between air entraining and non air-entraining C1157 cements with appropriate designations and limits consistent with those of ASTM C150 and C595 for air entraining and non air entraining cements.
2. A minor modification to correct the significant figures for minimum strength limits for SI unit values listed in Table 1.

The variations in product that will result from the use of C1157-12 versus C1157-09 will not adversely impact the performance of concrete with regard to compliance with ACI 318, PCA 100, or the provisions of the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, ASTM D 1157 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.
The update for ASTM C150-07 and ASTM C595-08a is in the ADM proposal which is heard by the Administrative Code Development Committee. The promulgator ASTM has proposed to update to ASTM C150-~~07~~ 12 and ASTM C595-~~08a~~ 12.

Public Hearing Results

For staff analysis of the content of ASTMC1157-11 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: Approved as Submitted

Committee Reason: Adds new standards for cement to correlate with the IBC.

Assembly Action: None

Final Hearing Results

RB336-13 AS

Code Change No: RB340-13

Original Proposal

Section(s): R612.3, Chapter 44

Proponent: Jessica Ferris, Association of Millwork Distributors (jferris@amdweb.com)

Revise as follows:

R612.3 Testing and labeling. Exterior windows and sliding doors shall be tested by an *approved* independent laboratory, and bear a *label* identifying manufacturer, performance characteristics and *approved* inspection agency to indicate compliance with AAMA/WDMA/CSA 101/I.S.2/A440. Exterior side-hinged doors shall be tested and *labeled* as conforming to AAMA/WDMA/CSA 101/I.S.2/A440 or AMD 100, or comply with Section R612.5.

Add new standard to Chapter 44 as follows:

AMD Association of Millwork Distributors
10047 Robert Trent Jones Parkway
New Port Richey, FL 34655-4649

AMD 100 - Structural Performance Rating of Side-Hinged Exterior Door Systems and Procedures for Component Substitution

Reason: The purpose of this proposed code change is to add a new standard to this section of the code, which provides manufacturers of side-hinged exterior doors the option to certify to a structural standard that includes procedures for component substitution.

Incorporating reference to the AMD 100 standard in Section 612.3 will provide producers of side-hinged exterior door systems (SHEDS) with an acceptable alternative method for testing and labeling structural performance requirements. AMD 100 allows for the interchange or substitution of components while maintaining a structurally rated system, which eases the burden of having to test each door configuration assembled for the marketplace. Like AAMA/WDMA/CSA 101/I.S.2/A440, AMD 100 utilizes the ASTM E330 test method for obtaining design pressure ratings of SHEDS.

SHEDS have requirements that are quite different from exterior windows and sliding doors, and as such, have different considerations. The door industry is comprised of not only manufacturers but also smaller distributor and pre-hanger companies, dealers, and builders that purchase their door components from multiple suppliers and interchange these components in their systems regularly depending on customer needs. AMD 100 upgrades SHEDS without negatively affecting this supply chain.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, AMD 100 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of AMD 100 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The issue of component substitution for tested side hinged exterior door has been a controversy for years. Industry now has an ANSI approved standard to address this and it is now needed in the code.

Assembly Action: **None**

Final Hearing Results

RB340-13	AS

Code Change No: RB343-13

Original Proposal

Section(s): R612.3.1, Chapter 44

Proponent: Jeff Inks, Window and Door Manufacturers Association

Revise as follows:

R612.3.1 Comparative analysis. Structural wind load design pressures for window and door units different than the size tested in accordance with Section R612.3 shall be permitted to be different than the design value of the tested unit when determined in accordance with one of the following comparative analysis methods:

1. Structural wind load design pressures for window and door units smaller than the size tested in accordance with Section R612.3 shall be permitted to be higher than the design value of the tested unit provided such higher pressures are determined by accepted engineering analysis. All components of the smaller unit shall be the same as those of the tested unit. Where such calculated design pressures are used, they shall be validated by an additional test of the window or door unit having the highest allowable design pressure.

2. In accordance with WDMA I.S. 11.

Add new standard to Chapter 44 as follows:

WDMA

I.S. 11-13 Industry Standard for Analytical Method for Design Pressure (DP) Ratings of Fenestration Products.

Reason: Comparative analysis based on accepted engineering methods provides a proven, accurate and reliable means for determining design pressures of different sized products within a fenestration product line based on testing of specimen unit/s from the respective line. This alleviates the need for costly testing of all sizes within the line saving considerable construction costs and providing greater design flexibility without incurring additional time and costs, especially for specialty/custom products, for testing that isn't necessary in order to determine the correct DP.

While the current provision has been and continues to be widely utilized for the reasons stated above, it is limited only to allowing comparative analysis for units smaller than the unit tested, not larger. However, as indicated above, comparative analysis can also be effectively used to accurately determine DP ratings for fenestration products that are larger in width and/or height than the actual tested specimen provided proper analytical methods are followed. In that case, comparative analysis for determining DP of units larger than tested unit should also be permitted by the IRC for that purpose as long as proper engineering analysis is required.

The intent of this proposal is to provide for that by allowing for comparative analysis to also be used on units larger than the tested unit if determined in accordance with WDMA I.S. 11. Method #1 above is the existing language without change and remains limited to units that are smaller which is appropriate. Proposed method #2, WDMA I.S. 11 - *Industry Standard for Analytical Method for Design Pressure (DP) Ratings of Fenestration Products*, provides more comprehensive alternative methods appropriate for using comparative analysis to determine DP of units different in size, both smaller and larger, than that of the tested unit/s within a product line The comparative analysis methods included in WDMA I.S. 11 are based on accepted engineering analysis which must also be sealed by a licensed Professional Engineer (PE) making it technically sound for use in the IRC for this purpose.

Copies of the standard are being submitted to ICC for ICC and IRC code committee review accordingly. The standard is also available on WDMA's website via the following link: https://www.wdma.com/OnlineBookstore/tabid/61/pid/20/WDMA-I-S-11-09-Voluntary-Analytical-Method-for-Design-Pressure-Rating-of-Fenestration-Products-PDF-Download.aspx

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, WDMA I.S with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of WDMA I.S. 11-13 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This change adds a method for DP rating based on comparative analysis for units larger than tested. The new standard will provide a cost effective alternative to testing.

Assembly Action: **None**

Final Hearing Results

RB343-13 **AS**

Code Change No: RB344-13

Original Proposal

Section(s): Table R613.5(1)

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE R613.5(1)
MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP OR LIGHT-FRAME ROOF ONLY (inches)[a]

For SI: 1 inch = 25.4, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479. kPa.

N/A = Not applicable.

a. Design assumptions:
~~Deflection criteria: *L*/240~~
~~Roof load: 7 psf.~~
~~Ceiling load: 5 psf.~~
~~Wind loads based on Table R301.2(2).~~
~~Strength axis of facing materials applied vertically~~.
Maximum deflection criteria: L/240.
Maximum roof dead load: 10 psf.
Maximum roof live load: 70 psf.
Maximum ceiling dead load: 5 psf.
Maximum ceiling live load: 20 psf.
Wind loads based on Table R301.2 (2).
Strength axis of facing material applied vertically.
N/A indicates not applicable.

(Portions of Table not shown remain unchanged)

TABLE R613.5(2)
MINIMUM THICKNESS FOR SIP WALSL SUPPORTING SIP OR LIGHT-FRAME ONE STORY AND ROOF (inches)[a]

For SI: 1 inch = 25.4, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479. kPa.

N/A = Not applicable.

a. Design assumptions:
~~Deflection criteria: *L*/240~~
~~Roof load: 7 psf.~~
~~Ceiling load: 5 psf.~~
~~Second floor live load: 30 psf.~~
~~Second floor dead load: 10 psf.~~
~~Second floor dead load from walls: 10 psf.~~
~~Wind loads based on Table R301.2(2).~~
~~Strength axis of facing materials applied vertically~~.
Maximum deflection criteria: L/240.
Maximum roof dead load: 10 psf.
Maximum roof live load: 70 psf.
Maximum ceiling dead load: 5 psf.
Maximum ceiling live load: 20 psf.
Maximum second floor dead load: 10 psf.
Maximum second floor live load: 30 psf.
Maximum second floor dead load from walls: 10 psf.
Maximum first floor dead load: 10 psf.
Maximum first floor live load: 40 psf.

Wind loads based on Table R301.2 (2).
Strength axis of facing material applied vertically.
N/A indicates not applicable.

(Portions of Table not shown remain unchanged)

Reason: This change proposal corrects an error in the 2012 IRC. In the 2007-2008 code cycle with Code Change Proposal RB 178-07/08, the footnotes in Tables R613.5(1) and (2) were changed to the above footnotes with the exception of the phrase. "Strength axis of facing material applied vertically." This phrase was added in the 2009-2010 code cycle with code change proposal RB 129-09/10. Unfortunately when the underlined phrase was added, the rest of the footnotes were returned to the 2006 format. This is the fault of the submitter in that at the time RB 129-09/10 was written, the 2009 IRC had not been published. As a result the phrase "Strength axis of facing material applied vertically" was added to the footnotes of the then current 2006 IRC. When the 2009 IRC was made available, the submitter forgot to go back and change to the updated footnotes. Please note that only the phrase above was underlined in change RB 129-09/10.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB344-13 **AS**

Code Change No: RB345-13

Original Proposal

Section(s): R613.7

Proponent: Edward L. Keith, APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

R613.7 Drilling and notching. The maximum vertical chase penetration in SIPs shall have a maximum side dimension of 2 inches (51 mm) centered in the panel. Vertical chases shall have a minimum spacing of 24-inches (610 mm) on center. Maximum of two horizontal chases shall be permitted in each wall panel - one at 14 inches (360 mm) plus or minus 2 inches (51 mm) from the bottom of the panel and one ~~at mid-height of the wall panel~~ ~~core~~ at 48 inches (1 220 mm) plus or minus 2 inches (51 mm) from the bottom edge of the SIPs panel. The maximum allowable penetration size in a wall panel shall be as shown on the manufacturer's shop drawings circular or rectangular with a maximum dimension of 12 inches (300 mm). Overcutting of holes in facing panels shall not be permitted.

Reason: The initial wording was written based on an 8-ft tall wall. As Section R613 permits up to 10-ft tall walls, the horizontal chases, which are used for switch-box wiring, need to be properly placed at 48 inches from the bottom edge of the SIPs panel. A plus or minus tolerance was placed on the dimension to ease use in the field.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change will provide for location at the proper height for electrical switch boxes in a SIPs wall.

Assembly Action: **None**

Final Hearing Results

RB345-13	**AS**

Code Change No: RB346-13

Original Proposal

Section(s): R613.7

Proponent: Edward L. Keith, APA – The Engineered Wood Association/Structural Insulated Panel Association (ed.keith@apawood.org)

Revise as follows:

R613.7 Drilling and notching. The maximum vertical chase penetration in SIPs shall have a maximum side dimension of 2 inches (51 mm) centered in the panel core. Vertical chases shall have a minimum spacing of 24-inches (610 mm) on center. Maximum of two horizontal chases shall be permitted in each wall panel - one at 14 inches (360 mm) from the bottom of the panel and one at mid-height of the wall panel. ~~The maximum allowable penetration size in a wall panel shall be circular or rectangular with a maximum dimension of 12 inches (300 mm). Overcutting of holes in facing panels shall not be permitted.~~ <u>Additional penetrations are permitted where justified by analysis.</u>

Reason: This proposal takes extraneous information out of the IRC. The portion proposed for removal relates to information that must be provided by the panel manufacturer as it is only by considering the specific loads and structural geometry that such recommendation can be made. Simply providing a maximum hole size prescriptively is worthless if there is not an accompanying limitation on how many may be permitted in a given wall length. We have been unable to get such a limitation placed in the IRC for the last two cycles. Without such a limitation it is prudent to eliminate the maximum hole size provision as having the provision without limits can lead to potentially unsafe applications, while permitting additional penetrations where justified by analysis.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The deleted language has no limit on how many holes can be present and may cause an unsafe condition. The new language will control the quantity of holes that may be cut.

Assembly Action: **None**

Final Hearing Results

RB346-13	AS

Code Change No: RB349-13

Original Proposal

Section(s): R109.1.5.1, R202 (NEW), R702.3, R702.3.1, R702.3.2, R702.3.3, R702.3.5, Table R702.3.5, R702.3.6, R702.3.7, Table R702.3.7, R702.5, R703.11.2.1, R703.11.2.2,

Proponent: Michael Gardner, Gypsum Association (mgardner@gypsum.org)

Revise as follows:

R109.1.5.1 Fire-resistance-rated construction inspection. Where fire-resistance-rated construction is required between *dwelling units* or due to location on property, the *building official* shall require an inspection of such construction after all lathing and/or ~~wallboard is~~ gypsum board or gypsum panel products are in place, but before any plaster is applied, or before ~~wallboard~~ board or panel joints and fasteners are taped and finished.

Add new definition as follows:

GYPSUM PANEL PRODUCT. The general name for a family of sheet products consisting essentially of gypsum.

Revise as follows:

R702.3 Gypsum board and gypsum panel products.

R702.3.1 Materials. All gypsum board and gypsum panel product materials and accessories shall conform to ASTM C 22, C 475, C 514, C1002, C 1047, C 1177, C 1178, C 1278, C 1396 or C 1658 and shall be installed in accordance with the provisions of this section. Adhesives for the installation of gypsum board and gypsum panel products shall conform to ASTM C 557.

R702.3.2 Wood framing. Wood framing supporting gypsum board and gypsum panel products shall not be less than 2 inches (51 mm) nominal thickness in the least dimension except that wood furring strips not less than 1-inch by 2-inch (25 mm by 51 mm) nominal dimension may be used over solid backing or framing spaced not more than 24 inches (610 mm) on center.

R702.3.3 Cold-formed steel framing. Cold-formed steel framing supporting gypsum board and gypsum panel products shall not be less than 1 1/4 inches (32 mm) wide in the least dimension. Nonload-bearing cold-formed steel framing shall comply with ASTM C645. Load-bearing cold-formed steel framing and all cold- formed steel framing from 0.033 inch to 0.112 inch (1 mm to 3 mm) thick shall comply with ASTM C 955.

R702.3.5 Application. Maximum spacing of supports and the size and spacing of fasteners used to attach gypsum board and gypsum panel products shall comply with Table R702.3.5. Gypsum sheathing shall be attached to exterior walls in accordance with Table R602.3(1). Gypsum board and gypsum panel products shall be applied at right angles or parallel to framing members. All edges and ends of gypsum board and gypsum panel products shall occur on the framing members, except those edges and ends that are perpendicular to the framing members. Interior gypsum board shall not be installed where it is directly exposed to the weather or to water.

R702.3.6 Fastening. Screws for attaching gypsum board and gypsum panel products to wood framing shall be Type W or Type S in accordance with ASTM C 1002 and shall penetrate the wood not less than

5/8 inch (16 mm). Gypsum board and gypsum panel products shall be attached to cold-formed steel framing with minimum No. 6 screws. Screws for attaching gypsum board and gypsum panel products to cold-formed steel framing less than 0.033 inch (1 mm) thick shall be Type S in accordance with ASTM C 1002 or bugle head style in accordance with ASTM C 1513 and shall penetrate the steel not less than 3/8 inch (9.5 mm). Screws for attaching gypsum board and gypsum panel products to cold-formed steel framing 0.033 inch to 0.112 inch (1 mm to 3 mm) thick shall be in accordance with ASTM C 954 or bugle head style in accordance with ASTM C 1513. Screws for attaching gypsum board and gypsum panel products to structural insulated panels shall penetrate the wood structural panel facing not less than 7/16 inch (11 mm).

R702.3.7 Horizontal gypsum board diaphragm ceilings. ~~Use of gypsum~~ Gypsum board and gypsum panel products shall be permitted on wood joists to create a horizontal *diaphragm* in accordance with Table R702.3.7. Gypsum board and gypsum panel products shall be installed perpendicular to ceiling framing members. End joints of adjacent courses of board and panels shall not occur on the same joist. The maximum allowable *diaphragm* proportions shall be 11/2:1 between shear resisting elements. Rotation or cantilever conditions shall not be permitted. Gypsum board or gypsum panel products shall not be used in *diaphragm* ceilings to resist lateral forces imposed by masonry or concrete construction. All perimeter edges shall be blocked using wood members not less than 2-inch by 6-inch (51 mm by 152 mm) nominal dimension. Blocking material shall be installed flat over the top plate of the wall to provide a nailing surface not less than 2 inches (51 mm) in width for the attachment of the gypsum board or gypsum panel product.

R702.5 Other finishes. Wood veneer paneling and hardboard paneling shall be placed on wood or cold-formed steel framing spaced not more than 16 inches (406 mm) on center. Wood veneer and hard board paneling less than 1/4-inch (6mm) nominal thickness shall not have less than a 3/8-inch (10mm) gypsum board or gypsum panel product backer. Wood veneer paneling not less than 1/4-inch (6 mm) nominal thickness shall conform to ANSI/HPVA HP-1. Hardboard paneling shall conform to CPA/ANSI A135.5.

R703.11.2.1 Basic wind speed not exceeding 90 miles per hour and Exposure Category B. Where the basic wind speed does not exceed 90 miles per hour (40 m/s), the Exposure Category is B and gypsum ~~wall~~ board, gypsum panel product or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 11/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C 578, 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C 1289, or 1-inch-thick (25 mm) (nominal) expanded polystyrene per ASTM C 578.

R703.11.2.2 Basic wind speed exceeding 90 miles per hour or Exposure Categories C and D. Where the basic wind speed exceeds 90 miles per hour (40 m/s) or the Exposure Category is C or D, or all conditions of Section R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Tables R301.2(2) adjusted for height and exposure using Table R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum ~~wall~~ board, gypsum panel product, or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.
2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum ~~wall~~ board, gypsum panel product or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.

TABLE R702.3.5
MINIMUM THICKNESS AND APPLICATION OF GYPSUM BOARD AND GYPSUM PANEL PRODUCTS

THICKNESS OF GYPSUM BOARD OR GYPSUM PANEL PRODUCTS (inches)	APPLICATION	ORIENTATION OF GYPSUM BOARD OR GYPSUM PANEL PRODUCTS TO FRAMING	MAXIMUM SPACING OF FRAMING MEMBERS (inches o.c.)	MAXIMUM SPACING OF FASTENERS (inches)		SIZE OF NAILS FOR APPLICATION TO WOOD FRAMING[c]
				Nails[a]	Screws[b]	
Application without adhesive						
3/8	Ceiling[d]	Perpendicular	16	7	12	13 gage, 1 1/4" long, 19/64" head; 0.098" diameter, 1 1/4" long, annular-ringed; or 4d cooler nail, 0.080" diameter, 1 3/8" long, 7/32" head.
	Wall	Either direction	16	8	16	
1/2	Ceiling	Either direction	16	7	12	13 gage, 1 3/8" long, 19/64" head; 0.098" diameter, 1 1/4" long, annular-ringed; 5d cooler nail, 0.086" diameter, 1 5/8" long, 15/64" head; or gypsum board nail, 0.086″ diameter, 1 5/8" long, 9/32" head.
	Ceiling[d]	Perpendicular	24	7	12	
	Wall	Either direction	24	8	12	
	Wall	Either direction	16	8	16	
5/8	Ceiling	Either direction	16	7	12	13 gage, 1 5/8" long, 19/64"head; 0.098" diameter, 1 3/8" long, annular-ringed; 6d cooler nail, 0.092" diameter, 1 7/8" long, 1/4" head; or gypsum board nail, 0.0915" diameter, 1 7/8" long, 19/64" head.
	Ceiling[e]	Perpendicular	24	7	12	
	Wall	Either direction	24	8	12	
	Wall	Either direction	16	8	16	
Application with adhesive						
3/8	Ceiling[d]	Perpendicular	16	16	16	Same as above for 3/8" gypsum board and gypsum panel products
	Wall	Either direction	16	16	24	
1/2 or 5/8	Ceiling	Either direction	16	16	16	Same as above for 1/2" and 5/8" gypsum board, and gypsum panel products respectively
	Ceiling[d]	Perpendicular	24	12	16	
	Wall	Either direction	24	16	24	
Two 3/8 layers	Ceiling	Perpendicular	16	16	16	Base ply nailed as above for 1/2" gypsum board and gypsum panel product; face ply installed with adhesive
	Wall	Either direction	24	24	24	

For SI: 1 inch = 25.4 mm.

a. For application without adhesive, a pair of nails spaced not less than 2 inches apart or more than 2 1/2 inches apart may be used with the pair of nails spaced 12 inches on center.

b. Screws shall be in accordance with Section R702.3.6. Screws for attaching gypsum board or gypsum panel products to structural insulated panels shall penetrate the wood structural panel facing not less than 7/16 inch.

c. Where cold-formed steel framing is used with a clinching design to receive nails by two edges of metal, the nails shall be not less than 5/8 inch longer than the gypsum board or gypsum panel product thickness and shall have ringed shanks. Where the cold-formed steel framing has a nailing groove formed to receive the nails, the nails shall have barbed shanks or be 5d, 13 1/2 gage, 15/8 inches long, 15/64-inch head for 1/2-inch gypsum board or gypsum panel product; and 6d, 13 gage, 1 7/8 inches long, 15/64-inch head for 5/8-inch gypsum board or gypsum panel product.

d. Three-eighths-inch-thick single-ply gypsum board or gypsum panel product shall not be used on a ceiling where a water-based textured finish is to be applied, or where it will be required to support insulation above a ceiling. On ceiling applications to receive a water-based texture material, either hand or spray applied, the gypsum board or gypsum panel product shall be applied perpendicular to framing. When applying a water-based texture material, the minimum gypsum board thickness shall be increased from 3/8 inch to 1/2 inch for 16-inch on center framing, and from 1/2 inch to 5/8 inch for 24-inch on center framing or 1/2-inch sag-resistant gypsum ceiling board shall be used.

e. Type X gypsum board or gypsum panel products for garage ceilings beneath habitable rooms shall be installed perpendicular to the ceiling framing and shall be fastened at maximum 6 inches o.c. by minimum $1^7/_8$ inches 6d coated nails or equivalent drywall screws.

TABLE R702.3.7
SHEAR CAPACITY FOR HORIZONTAL WOOD-FRAMED GYPSUM BOARD DIAPHRAGM CEILING ASSEMBLIES

MATERIAL	THICKNESS OF MATERIAL (min.) (inch)	SPACING OF FRAMING MEMBERS (max.) (inch)	SHEAR VALUE[a, b] (plf of ceiling)	MINIMUM FASTENER SIZE[c, d]
Gypsum board or gypsum panel product	$^1/_2$	16 o.c.	90	5d cooler or wallboard nail; $1^5/_8$-inch long; 0.086-inch shank; $^{15}/_{64}$-inch head
Gypsum board or gypsum panel product	$^1/_2$	24 o.c.	70	5d cooler or wallboard nail; $1^5/_8$-inch long; 0.086-inch shank; $^{15}/_{64}$-inch head

For SI: 1 inch = 25.4 mm, 1 pound per linear foot = 1.488 kg/m.

a. Values are not cumulative with other horizontal diaphragm values and are for short-term loading caused by wind or seismic loading. Values shall be reduced 25 percent for normal loading.

b. Values shall be reduced 50 percent in Seismic Design Categories D_0, D_1, D_2 and E.

c. $1^1/_4$-inch, #6 Type S or W screws may be substituted for the listed nails.

d. Fasteners shall be spaced not more than 7 inches on center at all supports, including perimeter blocking, and not less than $^3/_8$ inch from the edges and ends of the gypsum board or gypsum panel product.

Reason: This proposal inserts the term gypsum panel product in Chapter 7 where relevant. It also revises Section 109, and adds a definition for gypsum panel products to Chapter 2. It parallels a proposal that was approved and incorporated into the IBC during the 2012 Group A hearing process.

Gypsum panel product is a term that was created by the gypsum manufacturing industry to describe gypsum sheet products that are manufactured unfaced or with a facing other than paper. Glass mat-faced and unfaced gypsum sheet materials are examples of gypsum panel products.

The process of installing a gypsum board and a gypsum panel is identical in nearly every instance addressed by the code. While the ASTM manufacturing standards for many gypsum panel products (ref. C 1278; C1178; C1658; C1177) were incorporated into Chapter 7 during the past decade, the general text of Chapter 7 was not updated to reflect the incorporation of the materials manufactured to the manufacturing standards. This proposal addresses this issue.

A proposal being submitted by the Building Code Action Committee will add a definition for gypsum board to the IRC. The definitions for gypsum board and gypsum panel product are extracted from ASTM International Standard C 11, *Standard Terminology Relating to Gypsum and Related Building Materials and Systems*. Other sections of the IRC requiring parallel modification will be addressed in subsequent editions of the code.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change updates the code for terminology for gypsum products to be consistent with ASTM standards and the IBC.

Assembly Action: **None**

Final Hearing Results

RB349-13 **AS**

Code Change No: RB350-13

Original Proposal

Section(s): R702.3.3, Chapter 44

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org)

Revise as follows:

R702.3.3 Cold-formed steel framing. Cold-formed steel framing supporting gypsum board shall not be less than 11/4 inches (32 mm) wide in the least dimension. Nonload-bearing cold-formed steel framing shall comply with AISI S220 and ASTM C 645, Section 10. Load-bearing cold-formed steel framing ~~and all cold- formed steel framing from 0.033 inch to 0.112 inch (1 mm to 3 mm)~~ ~~thick~~ shall comply with AISI S200 and ASTM C 955, Section 8.

Add new standards to Chapter 44 as follow:

AISI

AISI S200—12 North American Standard for Cold-formed Steel Framing-General Provisions
AISI S220—11 North American Standard for Cold-formed Steel Framing-Nonstructural Members

Reason: This proposal represents the results of a major effort to synchronize and coordinate the industry standards related to cold-formed steel framing. ASTM Committees C11 and A05, and AISI have been working within the steel framing industry on this "Code Synchronization" effort, the goal of which is to organize and maintain a single path for the building code requirements of cold-formed steel light frame construction products. To this end, a new document, AISI S220, was developed to contain all the necessary requirements for nonload-bearing (nonstructural) products. AISI S220 represents a clarification and coordination of industry requirements. The Steel Framing Industry Association (SFIA), the Steel Stud Manufacturers Association (SSMA), the Association of the Wall and Ceiling Industry (AWCI), and the Gypsum Association (GA) all participated in this effort.

The proper integration of AISI S220 into the IRC requires the following changes in Section R702.3.3:

- Because of the addition of the reference for nonload-bearing cold-formed steel framing, the lower limit of the minimum base thickness has been deleted.
- AISI S200 and AISI S220 have been added to the section as the primary references. Only ASTM C645 Section 10, and ASTM C955 Section 8, which cover the requirements for the Penetration Test for screws, have been retained. These sections provide a procedure for evaluating the member's ability to pull the head of a screw below the surface of gypsum sheathing. At this time, AISI S220 does not include this test. Future editions may include it, allowing for the eventual deletion of the specific references to ASTM C645 and C955. AISI S200 and AISI S220 incorporate the material and manufacturing provisions previously included in ASTM C955 and ASTM C645 respectively. Limiting the specific references to ASTM C645 Section 10 and C955 Section 8 removes the "dual paths to code compliance", which has caused confusion in the cold-formed steel framing industry.

Additionally, changes have been made to Chapter 44 to reflect the necessary changes to the referenced standards.

Please note that a coordinating proposal for the IBC – Proposal S245-12 – was approved as submitted in the ICC Group A cycle last year.

AISI has posted a review copy of AISI S220 on their website. To obtain a copy, please do the following:

Go to: www.steel.org
Click on the link "*AISI Codes and Standards*"
Then click on the link "*Standards and Specifications*"

Then click on the title of the standard, which is at the top of the list under "*New Standards: To Be Referenced in Future Codes*"

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, AISI S200 and AISI S220 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of AISI S200-12 and AISI S220-11 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon proponent's published reason and it introduces new standards that will coordinate the CFSF requirements with the IBC.

Assembly Action: **None**

Final Hearing Results

RB350-13 **AS**

Code Change No: RB351-13

Original Proposal

Section(s): R702.3.5, R702.3.6

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee (bajnaic@chesterfield.gov), and Adolf Zubia, Chairman IAFC Fire and Life Safety Section, representing ICC Fire Code Action Committee

Revise as follows:

R702.3.5 Application. ~~Maximum spacing of~~ Supports ~~and the size~~ and ~~spacing of~~ fasteners used to attach gypsum board shall comply with Table R702.3.5. Gypsum sheathing shall be attached to exterior walls in accordance with Table R602.3(1). Gypsum board shall be applied at right angles or parallel to framing members. All edges and ends of gypsum board shall occur on the framing members, except those edges and ends that are perpendicular to the framing members. Interior gypsum board shall not be installed where it is directly exposed to the weather or to water.

~~R702.3.6~~ <u>R702.3.5.1Screw</u> Fastening. Screws for attaching gypsum board to wood framing shall be Type W or Type S in accordance with ASTM C 1002 and shall penetrate the wood not less than 5/8 inch (16 mm). Gypsum board shall be attached to cold-formed steel framing with minimum No. 6 screws. Screws for attaching gypsum board to cold-formed steel framing less than 0.033 inch (1 mm) thick shall be Type S in accordance with ASTM C 1002 or bugle head style in accordance with ASTM C 1513 and shall penetrate the steel not less than 3/8 inch (9.5 mm). Screws for attaching gypsum board to cold-formed steel framing 0.033 inch to 0.112 inch (1 mm to 3 mm) thick shall be in accordance with ASTM C 954 or bugle head style in accordance with ASTM C 1513. Screws for attaching gypsum board to structural insulated panels shall penetrate the wood structural panel facing not less than 7/16 inch (11 mm).

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC). These ICC committees were established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the these committees have held 6 open meetings and numerous workgroup meetings which included members of the committees as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the CAC website at: http://www.iccsafe.org/cs/CAC/Pages/default.aspx.

The intent is to clarify the application of Table R702.3.5, and that the fastening requirements of current Section R702.3.6 are actually a subsection of Section R702.3.5 and the referenced table. There are no technical changes to current text.

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB351-13 **AS**

Code Change No: RB352-13

Original Proposal

Section(s): R202, Table R702.3.5, R1001.11, Table N1102.4.1.1 (IECC R402.4.1.1)

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaiC@chesterfield.gov)

Revise as follows:

TABLE R702.3.5
MINIMUM THICKNESS AND APPLICATION OF GYPSUM BOARD

e. Type X gypsum board for garage ceilings beneath habitable rooms shall be installed perpendicular to the ceiling framing and shall be fastened at maximum 6 inches o.c. by minimum $1^7/_8$ inches 6d coated nails or equivalent ~~drywall~~ length screws. Screws shall comply with Section R702.3.6.

(Portions of Table not shown remains unchanged)

Add new definition as follows:

GYPSUM BOARD. The generic name for a family of sheet products consisting of a noncombustible core primarily of gypsum with paper surfacing. Gypsum wallboard, gypsum sheathing, gypsum base for gypsum *veneer* plaster, exterior gypsum soffit board, predecorated gypsum board and water-resistant gypsum backing board complying with the standards listed in Section R702.3 and Part IX of this code are types of gypsum board.

Revise as follows:

R1001.11 Fireplace clearance. All wood beams, joists, studs and other combustible material shall have a clearance of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The air space shall not be filled, except to provide fire blocking in accordance with Section R1001.12.

Exceptions:

1. Masonry fireplaces *listed* and *labeled* for use in contact with combustibles in accordance with UL 127 and installed in accordance with the manufacturer's installation instructions are permitted to have combustible material in contact with their exterior surfaces.
2. When masonry fireplaces are part of masonry or concrete walls, combustible materials shall not be in contact with the masonry or concrete walls less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
3. Exposed combustible trim and the edges of sheathing materials such as wood siding, flooring and ~~drywall~~ gypsum board shall be permitted to abut the masonry fireplace side walls and hearth extension in accordance with Figure R1001.11, provided such combustible trim or sheathing is a minimum of 12 inches (305 mm) from the inside surface of the nearest firebox lining.
4. Exposed combustible mantels or trim may be placed directly on the masonry fireplace front surrounding the fireplace opening providing such combustible materials are not placed within 6 inches (152 mm) of a fireplace opening. Combustible material within 12 inches (306 mm) of the fireplace opening shall not project more than $^1/_8$ inch (3 mm) for each 1-inch (25 mm) distance from such an opening.

Revise as follows:

TABLE N1102.4.1.1 (R402.4.1.1)
AIR BARRIER AND INSULATION INSTALLATION

COMPONENT	CRITERIA[a]
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated, and sealed to the ~~drywall~~ gypsum board.
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or ~~drywall~~. gypsum board.

(Portions of Table not shown remains unchanged)

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The term drywall is used as an apparent synonym for gypsum board in the International Residential Code in three instances. In a fourth instance, it is used as an adjective to describe a specific fastener.

The term drywall, however, is not defined in the IRC. As a result, references to it should be removed from the code and replaced with technically correct language.

Unfortunately, the IRC does not include a definition for the technically proper term for drywall: gypsum board. To correct this, the proposal adds a definition for gypsum board that is identical to the definition for gypsum board that will appear in the 2015 edition of the International Building Code. The IBC definition was modified by approved proposal S304-12 during the Group A hearings in 2012.

The proposed definition is also technically identical to the definition contained in the ASTM standards referenced in Section R702.3.

Section R1001.11 and Table N1102.4.1.1 are amended by removing the term drywall and substituting the term gypsum board. Footnote e of Table R702.3.5 is amended by removing the term drywall, adding the term length, and adding a reference to Section R702.3.6.

Standards defining screws appropriate for the application of gypsum board are defined in R702.3.6. Adding the term length to the footnote clarifies that any screw used as a substitute for a nail in a fire-resistive installation of gypsum board must be of an equivalent length to the nail prescribed for the installation.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. It removes the term drywall and replaces it with the proper term and definition.

Assembly Action: **None**

Final Hearing Results

RB352-13 **AS**

Code Change No: RB353-13

Original Proposal

Section(s): R302.6, Table R702.3.5

Proponent: Robert Rice, Josephine County, OR, representing Oregon Building Officials Association (structdesigner@yahoo.com)

Revise as follows:

R302.6 Dwelling/garage fire separation. The garage shall be separated as required by Table R302.6. Attachment of gypsum board shall comply with Table R702.3.5. Openings in garage walls shall comply with Section R302.5. ~~This~~ The wall separation provisions of Table R302.6 ~~does~~ do not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall.

TABLE R702.3.5
MINIMUM THICKNESS AND APPLICATION OF GYPSUM BOARD

THICKNESS OF GYPSUM BOARD (inches)	APPLICATION	ORIENTATION OF GYPSUM BOARD TO FRAMING	MAXIMUM SPACING OF FRAMING MEMBERS (inches o.c.)	MAXIMUM SPACING OF FASTENERS (inches)		SIZE OF NAILS FOR APPLICATION TO WOOD FRAMING[c]
				Nails[a]	Screws[b]	
Application without adhesive						
$^{3}/_{8}$	Ceiling[d]	Perpendicular	16	7	12	13 gage, $1^{1}/_{4}$" long, $^{19}/_{64}$" head; 0.098" diameter, $1^{1}/_{4}$" long, annular-ringed; or 4d cooler nail, 0.080" diameter, $1^{3}/_{8}$" long, $^{7}/_{32}$" head.
	Wall	Either direction	16	8	16	
$^{1}/_{2}$	Ceiling	Either direction	16	7	12	13 gage, $1^{3}/_{8}$" long, $^{19}/_{64}$" head; 0.098" diameter, $1^{1}/_{4}$" long, annular-ringed; 5d cooler nail, 0.086" diameter, $1^{5}/_{8}$" long, $^{15}/_{64}$" head; or gypsum board nail, 0.086″ diameter, 1 $^{5}/_{8}$" long, $^{9}/_{32}$" head.
	Ceiling[d]	Perpendicular	24	7	12	
	Wall	Either direction	24	8	12	
	Wall	Either direction	16	8	16	
$^{5}/_{8}$	Ceiling	Either direction	16	7	12	13 gage, $1^{5}/_{8}$" long, $^{19}/_{64}$" head; 0.098" diameter, $1^{3}/_{8}$" long, annular-ringed; 6d cooler nail, 0.092" diameter, $1^{7}/_{8}$" long, $^{1}/_{4}$" head; or gypsum board nail, 0.0915" diameter, $1^{7}/_{8}$" long, $^{19}/_{64}$" head.
	Ceiling[e]	Perpendicular	24	7	12	
	Type X at garage ceiling beneath habitable rooms	Perpendicular	24	6	6	1 7/8 inches 6d coated nails or equivalent drywall screws.
	Wall	Either direction	24	8	12	13 gage, $1^{5}/_{8}$" long, $^{19}/_{64}$" head; 0.098" diameter, $1^{3}/_{8}$" long, annular-ringed; 6d cooler nail, 0.092" diameter, $1^{7}/_{8}$" long, $^{1}/_{4}$" head; or gypsum board nail, 0.0915" diameter, $1^{7}/_{8}$" long, $^{19}/_{64}$" head.
	Wall	Either direction	16	8	16	
Application with adhesive						

$^3/_8$	Ceiling[d]	Perpendicular	16	16	16	Same as above for $^3/_8$" gypsum board
	Wall	Either direction	16	16	24	
$^1/_2$ or $^5/_8$	Ceiling	Either direction	16	16	16	Same as above for $^1/_2$" and $^5/_8$" gypsum board, respectively
	Ceiling[d]	Perpendicular	24	12	16	
	Wall	Either direction	24	16	24	
Two $^3/_8$ layers	Ceiling	Perpendicular	16	16	16	Base ply nailed as above for $^1/_2$" gypsum board; face ply installed with adhesive
	Wall	Either direction	24	24	24	

For SI: 1 inch = 25.4 mm.

a. For application without adhesive, a pair of nails spaced not less than 2 inches apart or more than $2^1/_2$ inches apart may be used with the pair of nails spaced 12 inches on center.

b. Screws shall be in accordance with Section R702.3.6. Screws for attaching gypsum board to structural insulated panels shall penetrate the wood structural panel facing not less than $^7/_{16}$ inch.

c. Where cold-formed steel framing is used with a clinching design to receive nails by two edges of metal, the nails shall be not less than $^5/_8$ inch longer than the gypsum board thickness and shall have ringed shanks. Where the cold-formed steel framing has a nailing groove formed to receive the nails, the nails shall have barbed shanks or be 5d, $13^1/_2$ gage, $^{15}/_8$ inches long, $^{15}/_{64}$-inch head for $^1/_2$-inch gypsum board; and 6d, 13 gage, $1^7/_8$ inches long, $^{15}/_{64}$-inch head for $^5/_8$-inch gypsum board.

d. Three-eighths-inch-thick single-ply gypsum board shall not be used on a ceiling where a water-based textured finish is to be applied, or where it will be required to support insulation above a ceiling. On ceiling applications to receive a water-based texture material, either hand or spray applied, the gypsum board shall be applied perpendicular to framing. When applying a water-based texture material, the minimum gypsum board thickness shall be increased from $^3/_8$ inch to $^1/_2$ inch for 16-inch on center framing, and from $^1/_2$ inch to $^5/_8$ inch for 24-inch on center framing or $^1/_2$-inch sag-resistant gypsum ceiling board shall be used.

~~e. Type X gypsum board for garage ceilings beneath habitable rooms shall be installed perpendicular to the ceiling framing and shall be fastened at maximum 6 inches o.c. by minimum $1^7/_8$ inches 6d coated nails or equivalent drywall screws.~~

Reason: The existing code requires 5/8" Type X gypsum board on garage ceilings when there are habitable rooms above. The general requirement for separations is stated in R302.6 and that section refers to Table R302.6 (shown below) for the specific requirements. The code also has special attachment requirements for this application that are different from other gypsum board attachments. The problem with the current code is that the requirement for the attachment is in a footnote to Table R702.3(5) and is often overlooked. This proposal is to move the requirement for the attachment from the footnote of Table R702.3(5) to the table itself. A sentence is added to R302.6 to point the user to the attachment requirements in Table R702.3(5).

TABLE R302.6
DWELLING/GARAGE SEPARATION

SEPARATION	MATERIAL
From the residence and attics	Not less than $^1/_2$-inch gypsum board or equivalent applied to the garage side
From all habitable rooms above the garage	Not less than $^5/_8$-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than $^1/_2$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^1/_2$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

In addition, since Section R302.6 refers to the Table that covers both walls and ceilings, language is added to clarify the existing language. The current text says, "This provision does not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall". As currently written, it says the provisions of R302.6 don't apply which is the whole section R302.6. Since R302.6 is scoping in nature and sends the user to Table R702.3(5) for technical requirements this change makes it clear that the ceiling requirements still apply.

This proposal does not change any requirements in the existing code.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The new language will exclude alternative materials.

Assembly Action: **None**

Final Hearing Results

RB353-13	**AS**

Code Change No: RB354-13

Original Proposal

Section(s): R702.3.8

Proponent: Michael Gardner, Gypsum Association (mgardner@gypsum.org)

Revise as follows:

R702.3.8 Water-resistant gypsum backing board. Gypsum board used as the base or backer for adhesive application of ceramic tile or other required nonabsorbent finish material shall conform to ASTM C 1396, C 1178 or C1278. Use of water-resistant gypsum backing board shall be permitted on ceilings. ~~here framing spacing does not exceed 12 inches (305 mm) on center for 1/2-inch-thick (12.7 mm) or 16 inches (406 mm) for 5/8-inch-thick (16 mm) gypsum board.~~ Water-resistant gypsum board shall not be installed over a Class I or II vapor retarder in a shower or tub compartment. Cut or exposed edges, including those at wall intersections, shall be sealed as recommended by the manufacturer.

Reason: The supplemental framing requirement in R702.3.8 was placed in the Uniform Building Code many decades ago when concerns about sagging of ceiling-applied water-resistant gypsum board were more pronounced. It has become irrelevant because of contemporary board manufacturing practices that incorporate lighter weight water-resistance additives. The newer additives also make the core of the board stiffer and less susceptible to sag.

The gypsum board application standards, ASTM C840 and GA-216, have been modified to eliminate prescriptive requirements mandating the installation of supplemental framing support members when water-resistant gypsum board is applied to a ceiling. The ASTM C 840 standard is a consensus standard and reflects the input of manufacturers, contractors, and other interested parties.

Identical language was removed from Chapter 25 of the IBC during the Group 'A' hearings in 2012. The intent of this proposal is to make the 2015 IRC consistent with referenced industry standards and the 2015 IBC and to remove `language that has become an occasionally overlooked catch-point for applicators and designers.

Standard wallboard and water-resistant gypsum board are manufactured to the same standard, ASTM C 1396. The humidified deflection and flexural strength tolerances for both products are identical. On the basis of the manufacturing standard, water-resistant gypsum board is no more susceptible to sag than standard wallboard.

Cost Impact: The code change proposal will not increase the cost of construction. Will create a cost savings a fewer framing members will be required.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB354-13 **AS**

Code Change No: RB355-13

Original Proposal

Section(s): R702.4.2, Table R702.4.2 (NEW), Chapter 44

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement* and Self

Revise as follows:

R702.4.2 Backer Boards **~~Fiber-cement, fiber-mat reinforced cementitious backer units, glass mat gypsum backers and fiber-reinforced gypsum backers.~~** ~~Fiber-cement, fiber mat reinforced cementitious backer units, glass mat gypsum backers or fiber-reinforced gypsum backers in compliance with ASTM C 1288, C 1325, C 1178 or C 1278, respectively, and installed in accordance with manufacturers' recommendations shall be~~ Materials used as backers for wall tile in tub and shower areas and wall panels in shower areas shall be of materials listed in Table R702.4.2, and installed in accordance with the manufacturer's recommendations.

R702.4.2
BACKER BOARD MATERIALS

MATERIAL	STANDARD
Glass mat gypsum backing panel	ASTM C 1178
Fiber-reinforced gypsum panels	ASTM C 1278
Nonabestos fiber-cement backer board	ASTM C 1288 or ISO 8336, Category C
Nonasbestos fiber mat reinforced cementitious backer units	ASTM C 1325

Add new standard to Chapter 44 as follows:

ISO

ISO 8336 Fibre-Cement Flat Sheets – Product Specification and Test Methods

Reason: The current wording is cumbersome for the backer board materials permitted for use in this section. The text is revised to reference permitted backer board materials now defined in new TABLE R702.4.2 where all 4 permitted products would now be listed. This revision also makes the addition of future recognized products to the Code easier by simple addition to the table. Performance requirements of ISO 8336, *Fibre-cement flat sheets – Product specification and test methods*, have been harmonized with the performance requirements of ASTM C1288, *Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets*. Fiber-cement producers in Mexico, Central and South America, Europe, Asia, Australia and New Zealand currently manufacture and test their fiber-cement products for compliance with ISO 8336. The inclusion of this Standard reference in the IRC will permit manufacturers worldwide to demonstrate product compliance to IBC requirements. The addition of a reference to ISO 8336 in the Code removes a barrier to trade.

IBC Section 2509.2 has, as a result of the Group A IBC Code Hearings, been revised to adopt this format for approved product presentation. The addition of the new referenced ISO standard and "product category" were also approved during the Group A IBC Code Hearings. This proposed revision brings the two building codes (IBC & IRC) and the applicable code sections and standards references into general alignment.

Cost Impact: The code change proposal will not increase the cost of construction because the proposed code change is editorial in nature to better clarify and present the backer board products currently recognized in the Code.

Analysis: A review of the standard proposed for inclusion in the code, ISO 8336 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ISO8336 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: Based upon the committee's previous action on RB256-13 and RB257-13. Also, this is consistent with the IBC structural committee action in Group A.

Assembly Action: **None**

Final Hearing Results

RB355-13	**AS**

Code Change No: RB357-13

Original Proposal

Section(s): R202 (NEW), Table R702.7.1

Proponent: Michael D. Fischer, Kellen Company, representing the Center for the Polyurethanes Industry (mfischer@kellencompany.com)

Revise as follows:

TABLE R702.7.1
CLASS III VAPOR RETARDERS

CLIMATEZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a]
Marine 4	Vented cladding over wood structural panels. Vented cladding over fiberboard. Vented cladding over gypsum. ~~Insulated sheathing~~ Continuous insulation with *R*-value ^{3} 2.5 over 2 × 4 wall. ~~Insulated sheathing~~ Continuous insulation with *R*-value ^{3} 3.75 over 2 × 6 wall.
5	Vented cladding over wood structural panels. Vented cladding over fiberboard. Vented cladding over gypsum. ~~Insulated sheathing~~ Continuous insulation with *R*-value ≥5 over 2 × 4 wall. ~~Insulated sheathing~~ Continuous insulation with *R*-value ≥7.5 over 2 × 6 wall.
6	Vented cladding over fiberboard. Vented cladding over gypsum. ~~Insulated sheathing~~ Continuous insulation with *R*-value ≥7.5 over 2 × 4 wall. ~~Insulated sheathing~~ Continuous insulation with *R*-value ≥11.25 over 2 × 6 wall.
7 and 8	~~Insulated sheathing~~ Continuous insulation with *R*-value ≥10 over 2 × 4 wall. ~~Insulated sheathing~~ Continuous insulation with *R*-value ≥15 over 2 × 6 wall.

For SI: 1 pound per cubic foot = 16 kg/m^3.

a. Spray foam with ~~a minimum density of 2 lb/ft3, and~~ a maximum permeance of 1.5 perms at the installed thickness, applied to the interior cavity side of wood structural panels, fiberboard, insulating sheathing or gypsum is deemed to meet the ~~insulating sheathing~~ *continuous insulation* requirement where the spray foam *R*-value meets or exceeds the specified ~~insulating sheathing~~ *continuous insulation* *R* value.

Add new definition as follows:

CONTINUOUS INSULATION. Insulation that is uncompressed and continuous across all structural members without thermal bridges other than fasteners and *service* openings. It is installed on the interior or exterior or is integral to any *opaque* surface of the *building envelope.*

Reason: The current IRC vapor retarder requirements specify product application based upon spray foam density. This proposal replaces the density requirement with a permeance requirement that is more appropriate for the intended requirement. Additionally, it will allow the use of more products that meet the intent of the provision but that may fall out of the arbitrary density specification. The addition of the continuous insulation definition is for consistency with ASHRAE 90.1 and other IECC proposals.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

CONTINUOUS INSULATION (ci). ~~Insulation that is uncompressed and~~ Insulating material that is continuous across all structural members without thermal bridges other than fasteners and *service* openings. It is installed on the interior or exterior or is integral to any *opaque* surface of the *building envelope.*

Committee Reason: Approval was based upon the proponent's published reason. The modification corrects the definition to match ASHRAE 90.1 and the IECC.

Assembly Action: **None**

Final Hearing Results

RB357-13 **AM**

Code Change No: RB359-13

Original Proposal

Section(s): R703.1

Proponent: Rob Pickett, RobPickett &Associates, LLC, representing Log Homes Council (robpickett@vermontel.net)

Revise as follows:

R703.1 General. Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing as described in Section R703.8.

<u>**Exception**: Log walls designed and constructed in accordance with the provisions of the ICC-400.</u>

Reason: Where exterior walls are constructed using logs, the log components and joinery system provide the exterior covering, structure, thermal barrier, and interior covering all in one assembly. Log walls are an alternative method of construction that are to be designed and constructed in accordance with ICC400. Weather protection is specifically covered in 305.1.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB359-13 **AS**

Code Change No: RB363-13

Original Proposal

Section(s): R703.2

Proponent: Jerry Anderson, City of Overland Park, KS, representing self (jerry.anderson@opkansas.org)

Revise as follows:

R703.2 Water-resistive barrier. One layer of No. 15 asphalt felt, free from holes and breaks, complying with ASTM D 226 for Type 1 felt or other approved water-resistive barrier shall be applied over studs or sheathing of all exterior walls.
Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm). The felt or other approved material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1.

Exception: Omission of the water-resistive barrier is permitted in the following situations:

1. In detached accessory buildings.
2. Under exterior wall finish materials as permitted in Table R703.4.
3. ~~Under paperbacked stucco lath when the paper backing is an approved water-resistive barrier.~~

Reason: The purpose of the code change is to add clarity to the code. The 3rd exception to the requirement for a water resistive barrier has often caused confusion. The requirements for water-resistive barriers as they pertain to exterior plaster (stucco) are found in Section R703.6.3. It is not necessary to have section R703.2 address a product used for exterior plaster when section R703.6.3 properly addresses the requirements pertaining to water-resistive barriers for exterior plaster. The exception makes the code confusing.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB363-13	**AS**

Code Change No: RB366-13

Original Proposal

Section(s): R703.4, R703.11.2.1, R703.11.2.2

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org); Jay Crandell, P.E., ARES Consulting

Revise as follows:

R703.4 Attachments. Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other approved aluminum, stainless steel, zinc-coated or other approved corrosion-resistive fasteners. Where the ~~basic~~ ultimate design wind speed per Figure R301.2(4)A is ~~110~~ 140 miles per hour (~~49~~ 63 m/s) or higher, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

R703.11.2.1 Basic wind speed not exceeding ~~90~~ 115 miles per hour and Exposure Category B. Where the ~~basic~~ ultimate design wind speed does not exceed ~~90~~ 115 miles per hour (~~40~~ 51 m/s), the Exposure Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 1 1/4 inches (32mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C578, 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C1289, or 1-inch-thick (25 mm)(nominal) expanded polystyrene perASTMC578.

R703.11.2.2 Basic wind speed exceeding ~~90~~ 115 miles per hour or Exposure Categories C and D. Where the ultimate design ~~basic~~ wind speed exceeds ~~90~~ 115 miles per hour (~~40~~ 51 m/s) or the Exposure Category is C or D, or all conditions of Section R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Tables R301.2(2) adjusted for height and exposure using Section R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer’s product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the vinyl siding’s design wind pressure rating shall be multiplied by 0.39.

2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding’s design wind pressure rating shall be multiplied by 0.27.

Reason: The purpose of this code change is to bring the wind provisions of the IRC in line with the 2012 IBC and ASCE 7-10. As a result of the schedule changes implemented during the 2009-2010 ICC code development cycle, there was not sufficient time to revise the IRC to fully implement the new ultimate wind speed basis of ASCE 7-10 and the 2012 IBC, due to the extent of prescriptive IRC provisions and tables which are directly related to basic wind speed.. New maps based on the ASCE 7-10 ultimate wind speed data but converted back down to nominal (ASD) basis were provided in the IRC. This has led to a fair amount of confusion among those stakeholders who work with both codes.

A working group of stakeholders including NAHB, the major material associations, ASCE, and the Insurance Institute for Business and Home Safety developed a series of IRC proposals to implement the new ultimate wind speed basis. This proposal updates wind speed triggers in Chapter 7 for attachment of wall cladding and for vinyl siding installed over foam sheathing to the equivalent ultimate design wind speed.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change aligns the wind speed in the IRC with the 2012 IBC and ASCE 7-10.

Assembly Action: **None**

Final Hearing Results

RB366-13	**AS**

Code Change No: RB367-13

Original Proposal

Section(s): R703.4, Table R703.5 (NEW)

Proponent: Andrew Herseth, US Dept of Homeland Security, Federal Emergency Management Agency (FEMA) and Glenn Overcash, URS Corporation representing FEMA

Revise as follows:

R703.4 Attachments. Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other *approved* aluminum, stainless steel, zinc-coated or other *approved* corrosion-resistive fasteners. The use of Table R703.4 shall be limited according to the building mean roof height, ultimate design wind speed in accordance with Figure R301.2(4)A, and exposure category in accordance with Section R301.2.1.4 as shown in Table R703.5. Where ~~the basic wind speed in accordance with Figure R301.2(4)A is 110 miles per hour (49 m/s) or higher~~ the limits of Table R703.5 are exceeded, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3). For the determination of wall covering attachment, component and cladding loads shall be determined using an effective wind area of 10 ft^2.

TABLE R703.5
LIMITS FOR ATTACHMENT PER TABLE R703.4

Maximum Mean Roof Height			
Basic Wind Speed (mph-3-second gust)	**Exposure**		
	B	C	D
115	NL	50'	20'
120	NL	30'	DR
130	60'	15'	DR

NL = not limited by Table R703.5, DR = Design Required
For SI: 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s

Reason: The proposal is intended to better establish the current limits of the prescriptive fastening table for wall coverings. The prescriptive fastening requirements in Table R703.4 are limited to a maximum design pressure of 30 psf. According to Table R301.2(2), for Zone 5 and an effective wind area of 10 ft^2, the maximum negative pressure for a basic wind speed of 110 mph is 29.1 psf. This value – less than 30 psf – correlates directly with the 110 mph limitation in Section R703.4. However, the tabulated pressures in Table R301.2(2) are for an assumed Exposure B site condition and a mean roof height of 30 feet. For residential buildings with a basic wind speed of 110 mph and Exposure C or D, or a mean roof height greater than 30 feet, the maximum negative pressure would be substantially higher than 30 psf. For example, consider the case of a residential building located in Exposure C, with a mean roof height of 45 ft. The adjustment factor from Table R301.2(3) would be 1.53. The resulting maximum negative design pressure for a basic wind speed of 110 mph would be (29.1 psf) x 1.53 = 44.5 psf. This wall cladding load far exceeds the current implied limitation of Table R703.4 which is 30 psf.

Table R703.5 has been added to simplify the determination of whether prescriptive fastening provisions of Table R703.4 apply to a specific building. The limits in the table indicate where component and cladding pressures exceed 30 psf as a function of wind speed exposure and mean roof height. In most cases, especially in areas with lower wind speeds, the prescriptive fastening requirements in Table R703.4 will be verified as applicable. Chapter 7 of ICC 600 includes prescriptive attachment schedules for exterior wall coverings that may be applied when mean roof height limits per Table R703.5 are exceeded.

FEMA P-499, *Home Builder's Guide to Coastal Construction* (FEMA, 2009), includes Technical Fact Sheet 5.3 which addresses the attachment of siding in areas where wind loads for wall cladding exceed 30 psf as a result of wind speed, and/or exposure category and/or roof mean height by recommending the selection of a siding product rated for those conditions or higher.

The manufacturer's product literature or installation instructions should specify the fastener type, size and spacing, and any other installation details such as requirements for the sheathing materials behind vinyl siding that is needed to achieve the product rating.

New language is also added to require design wind pressures to be determined using an effective wind are of 10 ft^2. For wall cladding, the effective wind area will be governed by the effective wind area of an individual fastener which will almost always be less than 10 ft^2.Guidance for Determining Site-Specific Loads in Chapter 8 of FEMA P-55, *Coastal Construction Manual* (FEMA, 2011), recommends that "for cladding and fasteners, the effective wind area should not be greater than the area that is tributary to an individual fastener. In ASCE 7-10, there is no adjustment for wind areas less than 10 ft2; therefore, sheathing suction loads (should be) based on an effective wind area of 10 ft2 for different zones on the roof."

Changing the trigger for using Table R703.4 from a wind speed limit to a pressure limit will result in better correlation of the actual limits of the table. The new attachment criteria would also make IRC consistent w/ ICC 600 and the Florida Building Code (FBC) where attachment provisions for exterior wall coverings are pressure-triggered.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

R703.4 Attachments. Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other *approved* aluminum, stainless steel, zinc-coated or other *approved* corrosion-resistive fasteners. ~~The use of Table R703.4 shall be limited according to the building mean roof height, ultimate design wind speed in accordance with Figure R301.2(4)A, and exposure category in accordance with Section R301.2.1.4 as shown in Table R703.5.~~ Where the <u>design wind pressure exceeds 30 psf or where the</u> limits of Table R703.5 are exceeded, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3). For the determination of wall covering attachment, component and cladding loads shall be determined using an effective wind area of 10 ft^2.

TABLE R703.5
LIMITS FOR ATTACHMENT PER TABLE R703.4

Maximum Mean Roof Height			
~~Basic~~ <u>Ultimate</u> Wind Speed (mph-3-second gust)	**Exposure**		
	B	C	D
115	NL	50'	20'
120	NL	30'	DR
130	60'	15'	DR
<u>140</u>	<u>35'</u>	<u>DR</u>	<u>DR</u>

NL = not limited by Table R703.5, DR = Design Required
For SI: 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s

Committee Reason: The change provides for a method to determine that the limits of fastening in Table R703.4 are not exceeded. The modification clarifies the new language and corrects the table.

Assembly Action: None

Final Hearing Results

RB367-13 AM

Code Change No: RB368-13

Original Proposal

Section(s): Table R703.4, Chapter 44

Proponent: Louis Wagner, Wagner in the Woods, representing Composite Panel Association (lwagner@fiberboard.org)

Revise as follows:

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

k. Hardboard siding shall comply with CPA/ANSI A135.6. When used as architectural trim it shall comply with CPA/ANSI A135.7.

(Portions of Table not shown remain unchanged)

Add new standard to Chapter 44 as follows:

CPA

ANSI A135.7 – 12 Engineered Wood Trim

Reason: A new hardboard standard has been completed under the ANSI consensus process.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, CPA /ANSI A135.7with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ANSI A135.7 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This change brings a new standard for hardboard into the code.

Assembly Action: **None**

Final Hearing Results

RB368-13 **AS**

Code Change No: RB369-13

Original Proposal

Section(s): R703.5.1, R703.5.3, Table R703.5.1(2) (New), Table R703.5.1(3) (NEW), Table R703.5.2, R703.5.3.1, R905.7.5, Table R905.7.5(2) (NEW), R905.8.6

Proponent: David Roodvoets, DLR Consultants, representing Cedar Shake & Shingle Bureau

Revise as follows:

R703.5.1 Application. Wood shakes or shingles shall be applied either single-course or double-course over nominal $^1/_2$-inch (13 mm) wood-based sheathing or to furring strips over $^1/_2$-inch (13 mm) nominal nonwood sheathing . A permeable water-resistive barrier shall be provided over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm). Where furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25 mm by 102 mm) and shall be fastened horizontally to the studs with 7d or 8d box nails and shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.5.2. The spacing between adjacent shingles to allow for expansion shall ~~not exceed $^1/_4$ inch (6 mm)~~ be 1/8 inch (3 mm) to ¼ inch (6 mm) apart and between adjacent shakes, ~~it~~ shall ~~not exceed $^1/_2$ inch (13 mm)~~ be 3/8 inch (10 mm) to ½ inch (13 mm) apart. The offset spacing between joints in adjacent courses shall be a minimum of $1^1/_2$ inches (38 mm).

TABLE R703.5.1(2)
SINGLE COURSE SIDEWALL FASTENERS

Product Type	Nail Type & Minimum Length
R & R and Sanded Shingles	**Type (in)**
16” and 18” shingles	3d Box 1 1/4
24” Shingles	4d Box 1 1/2
Grooved Shingles	**Type (in)**
16” and 18” shingles	3d Box 1 1/4
24” shingles	4d Box 1 ½
Split and Sawn Shakes	**Type (in)**
18” Straight-Split Shakes	5d Box 1 3/4
18” and 24” Handsplit Shakes	6d Box 2
24” Tapersplit Shakes	5d Box 1 3/4
18” and 24” Tapersawn Shakes	6d Box 2

TABLE R703.5.1(3)
DOUBLE COURSE SIDEWALL FASTENERS

Product Type	Nail Type & Minimum Length
R & R and Sanded Shingles	**Type (in)**
16” and 18” and 24” shingles	5d Box 1 ¾ or same size casing nails
Grooved Shingles	**Type (in)**
16” and 18” and 24”shingles	5d Box 1 3/4
Split and Sawn Shakes	**Type (in)**
18” Straight-Split Shakes	7d Box 2 ¼ or 8d 2 1/2
18” and 24” Handsplit Shakes	7d Box 2 ¼ or 8d 2 1/2
24” Tapersplit Shakes	7d Box 2 ¼ or 8d 2 1/2
18” and 24” Tapersawn Shakes	7d Box 2 ¼ or 8d 2 1/2

TABLE R703.5.2
MAXIMUM WEATHER EXPOSURE FOR WOOD SHAKES AND SHINGLES ON EXTERIOR WALLS[a,b,c]
(Dimensions are in inches)

LENGTH	EXPOSURE FOR SINGLE COURSE	EXPOSURE FOR DOUBLE COURSE
Shingles[a]		
16	~~7 ½~~ 7	12[b]
18	~~8 ½~~ 8	14[c]
24	~~11 ½~~ 10 ½	16[d]
Shakes[a]		
18	~~8 ½~~ 8	14
24	~~11 ½~~ 10 ½	18

For SI: 1 inch = 25.4 mm.

a. Dimensions given are for No. 1 grade.
b. A maximum ~~10-inch~~ 9-inch exposure is permitted for No. 2 grade.
c. A maximum ~~11-inch~~ 10inch exposure is permitted for No. 2 grade.
d. A maximum 14-inch exposure is permitted for No. 2 grade.

~~**R703.5.3 Attachment.** Each shake or shingle shall be held in place by two hot-dipped zinc-coated, stainless steel, or aluminum nails or staples. The fasteners shall be long enough to penetrate the sheathing or furring strips by a minimum of 1/2 inch (13 mm) and shall not be overdriven.~~

703.5.3 Attachment. Wood shakes or shingles shall be installed according to this chapter and the manufacturer's installation instructions. Each shake or shingle shall be held in place by two~~.~~ stainless steel Type 304 , Type 316 or hot-dipped zinc coated galvanized (conforming to minimum standard ASTM A 153 D (1.0 oz./ft^2)) corrosion resistant box nails in accordance with Table R703.5.1(2) or R703.5.1 (3). Alternatively, 16 gauge stainless steel Type 304 or Type 316 staples with crown widths 7/16 inch (11 mm) minimum, ¾ inch (19 mm) maximum shall be used and the crown of the staple shall be placed parallel with the butt of the shake or the shingle. In single-course application, the fasteners shall be concealed by the course above and shall be driven approximately 1 inch (25 mm) above the butt line of the succeeding course and ¾" (19 mm) from the edge. In double-course applications, the exposed shake or shingle shall be face-nailed with two fasteners, driven approximately 2 inches (51 mm) above the butt line and 3/4 inch (19 mm) from each edge. Fasteners installed within 15 miles 24 km) of salt water coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated in accordance with Section R902 or pressure-impregnated-preservative-treated shakes or shingles in accordance with AWPA U1 shall be, stainless steel Type 316. The fasteners shall be long enough to penetrate and shall penetrate the sheathing or furring strips by a minimum of ½ inch (13mm) and shall not be overdriven. Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.

~~**R703.5.3.1 Staple attachment.** Wood shakes or shingles shall be installed according to this chapter and the manufacturer's installation instructions. Staples for untreated (natural) wood shakes or wood shingles shall be 16 gauge Stainless Steel Type 304,Type 316 (Fasteners installed within 15 miles of salt water coastal areas shall be stainless steel Type 316.) Staples shall not be less than 16 gauge and shall have a crown width of not less than minimum 7/16 inch (11mm), maximum of ¾" and the crown of the staples shall be parallel with the butt of the shake or shingle.~~
~~In single-course application, the fasteners shall be concealed by the course above and shall be driven approximately 1 inch (25mm) above the butt line of the succeeding course and ¾" (19mm) from the edge. In double-course applications, the exposed shake or shingle shall be face-nailed with two casing nails staples, driven approximately 2 inches (51mm) above the butt line and 3/4" inch (19mm) from each edge. In all application, staples shall be concealed by the course above. With shingles wider than 810 inches (203254mm) two additional nails staples shall be required and shall be nailed driven approximately 1 inch (25mm) apart near the center of the shingle. Fasteners for fire-retardant-treated (as defined in section R902.2) shingles, shakes or pressure-impregnated-preservative-treated shingles or shakes in accordance with AWPA U1 shall be Stainless Steel Type 316, applied as above. Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.~~

Revise as follows:

R905.7.5 Application. Wood shingles shall be installed according to this chapter and the manufacturer's installation instructions. Wood shingles shall be laid with a side lap not less than 1 ½" (38mm) between joints in courses, and no two joints in any three adjacent courses shall be in direct alignment. Spacing between shingles shall not be less than ¼" to 3/8" (6mm to 10mm). Weather exposures for wood shingles shall not exceed those set in Table R905.7.5. Fasteners for untreated (naturally durable) wood shingles shall be ~~corrosion resistant with a minimum penetration of ½ inch (13mm) into the sheathing~~. ~~For sheathing less than ½ inch (13mm) in thickness, the fasteners shall extend through the sheathing.~~ stainless steel Type 304, Type 316 or hot-dipped zinc coated galvanized (conforming to minimum standard ASTM A 153 D (1.0 oz./ft^2)) box nails in accordance with table R905.7.5 (2). Alternatively, 16 gauge stainless steel Type 304, or Type 316 staples with crown widths 7/16" (11mm) minimum, ¾" (19 mm) maximum shall be used. Fasteners installed within 15 miles (24km) of salt water coastal areas shall be stainless steel Type 316. All fasteners shall have a minimum penetration into the sheathing of ¾ inch (19 mm). For roof sheathing less than ~~½"~~ ¾" in (19 mm) thickness, each fastener shall ~~extend~~ penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle positioned ~~no more than ¾" from each edge and no more than 1 inch (25mm) above the exposure line.~~ in accordance with the manufacturers installation instructions. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316 and applied as above. Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.

TABLE R905.7.5 (2)
NAIL REQUIREMENTS FOR WOOD SHAKES AND WOOD SHINGLES

Shakes	**ASTM F 1667 Nail Type and Minimum Length**
18" Straight-Split	5d Box 1 ¾"
18" and 24" Handsplit and Resawn	6d Box 2
24" Tapersplit	5d Box 1 ¾"
18" and 24" Tapersawn	6d Box 2
Shingles	**ASTM F 1667 Nail Type and Minimum Length**
16" and 18"	3d Box 1 ¼"
24"	4d Box 1 ½"

R905.8.6 Application. Wood shakes shall be installed according to this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than 1 ½" (38mm) between joints in adjacent courses. Spacing between shakes in the same course shall be 3/8 inch to 5/8 inch (9.5mm to 15.9mm) for shakes ~~and~~ including tapersawn shakes ~~of naturally durable wood shall be 3/8 inch to 5/8 inch (9.5 mm to 15.9 mm) for preservative-treated taper sawn shakes.~~ Weather exposures for wood shakes shall not exceed those set in Table R905.8.6. Fasteners for untreated (naturally durable) wood shakes shall be ~~corrosion resistant with a minimum penetration of ½ inch (12.7mm) into the sheathing~~. ~~For sheathing less than ½ inch (13mm) thick, the fasteners shall extend through the sheathing.~~ stainless steel Type 304, Type 316 or hot-dipped zinc coated galvanized (conforming to minimum standard ASTM A 153 D (1.0 oz./ft^2)) corrosion resistant box nails in accordance with Table R905.7.5.(2). Alternatively, 16 gauge Type 304 or Type 316 stainless steel staples, with crowns width 7/16" minimum, ¾" maximum shall be used. Fasteners installed within 15 miles (24 km) of salt water coastal areas shall be stainless steel Type 316. All fasteners shall have a minimum penetration into the sheathing of ¾" inch (19 mm). Where the roof is less than ¾" (19 mm) thick, each fastener shall penetrate through the sheathing. Wood shakes shall be attached to the roof with two fasteners per shake positioned ~~no more than 1 inch (25mm) no more than 2inches (25 mm) above the exposure line.~~ in accordance with the manufacturer's installation instructions Fasteners for fire-retardant-treated (as defined in section R902) shakes or pressure-impregnated-preservative-treated shakes of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316 and applied as above. Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.

Reason: There are known cases of wood shakes and shingles falling off roofs due to the use of inferior fasteners and rather than waiting for these incidents to include wall applications it is a proactive measure to increase the specifics of the fasteners used. Specifying “corrosion resistant” is no longer sufficient; the type of fastener to be used is determined by various environmental factors and product types. Increased specifics will improve wall system integrity and lifespan.

Shakes and shingles shall not be applied with the vertical edges tight together as doing this does not leave room for expansion. Defining the spacing requirements further will eliminate this incorrect application method which causes fish-mouthing, cupping and curling.

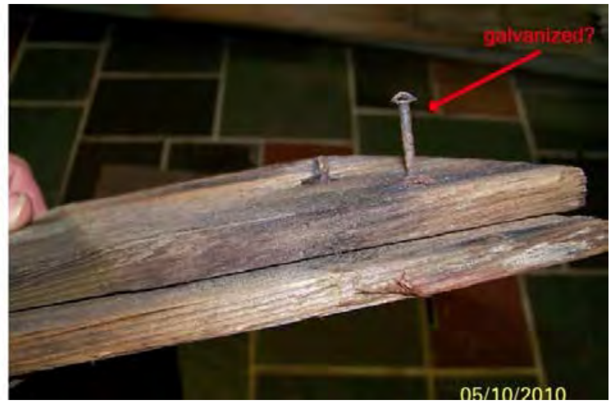
There are known cases of wood shakes and shingles falling off roofs due to the use of inferior fasteners. Specifying “corrosion resistant” is no longer sufficient; the type of fastener to be used is determined by various environmental factors and product type. Increased specifics will improve roof system integrity and lifespan.

Penetration into sheathing more than ½” thick must be at minimum ¾” or all the way through the sheathing in order to attach the product strongly enough to hold in place and prevent loosening of the fastener.

This change simplifies the code.

Following are examples of the failures that this code change is designed to prevent:

Shingles falling off buildings because of corroded fasteners or fasteners that did not adequately penetrate the substrate.



Cost Impact: The increased cost of these changes in comparison to the cost of the entire wall application is negligible.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal provides little or no substantiation. There is no substantiation for the cost impact that was provided. This should be reworked with the modification that was ruled out of order and brought back.

Assembly Action: **None**

Public Comments

Public Comment 1:

David L. Roodvoets, DLR Consultants, representing Cedar Shake & Shingle Bureau #2, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R703.5.1 Application. Wood shakes or shingles shall be installed according to this chapter and the manufacturer's installation instructions. Wood shakes or shingles shall be applied either single-course or double course over nominal ½ -inch (13mm) wood-based sheathing, or to furring strips over 1/2-inch (13mm) nominal non-wood sheathing. A ~~permeable~~ water-resistive barrier shall be provided over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51mm) and vertical overlaps of not less than 6 inches (152mm). Where horizontal furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25mm by 76mm or 25mm by 102 mm) and shall be fastened ~~horizontally~~ to the studs with minimum 7d box nails spaced a distance on center equal to the actual weather exposure of the shake or shingle, not to exceed the maximum exposure specified in Table R703.5.2. When installing shakes or shingles over a non-permeable water resistive barrier, furring strips shall be placed first vertically over the barrier and, in addition horizontal furring strips shall be fastened to the vertical furring strips prior to attaching the shakes or shingles to the horizontal furring strips. The spacing between adjacent shingles to allow for expansion shall be 1/8" (3) mm to ¼" (6mm) apart ~~and~~ between adjacent shakes shall be 3/8" (10 mm) to ½" (13mm) apart. The offset spacing between joints in adjacent courses shall be a minimum 1½inches (38mm).

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: In response to testimony at the committee hearing the requirement for a permeable water-resistive barrier (WRB) is deleted. If a non-permeable water-resistive barrier is installed, continued durability and functionality requires that the shakes or shingles be spaced away from the WRB with furring strips. Literature and experience show that wood based exterior sidings perform best when there is a vertical channel behind the siding, but since the shakes and shingles must be nailed on horizontal furring there is a need for vertical furring to create the vertical air channel and the horizontal furring to create a nailing support. This is supported in "Reroofing and Residing to Save Energy", Building and Construction Technology Program, Department of Environmental Conservation, University of Massachusetts at Amherst.
Historically Cedar Sakes & Shingles have performed well when vapor permeable WRB's are used over wood. This is supported by the APA publication "Build Energy Efficient Walls" Form J440 The Engineered Wood Association.
The change requiring adding vertical and horizontal furring over WRB's will add cost to the construction, however it will also make the use of continuous insulation and non-permeable WRB's practical and durable. In fact the entire wall is expected to have superior moisture performance.
Other changes have eliminated redundant references not required in this section. Wording changes to clarify that 7d box nails are minimal and larger nails can be used where required for increased strength.

- Table 703.5.2 is unchanged from the original public proposal, however there were questions about the effect of the proposed changes on the cost of construction. This proposed code change reduces the exposure length of the shingles and shakes. The change is required as the longer exposure lengths allowed in the code are no longer considered practical. Exposure lengths have been decreased in accordance with manufacturers installation requirements that have been in installation manuals since 2002, and in practice in most areas long before that. Although the changes in size as proposed in this code change will theoretically increase costs, no practical change in cost is implicated as products installed according to manufacturers' requirements complied with this table. This change will increase the cost of construction over the costs if the current minimum code requirements are followed.

Public Comment 2:

David L. Roodvoets, DLR Consultants, representing Cedar Shake & Shingle Bureau #2, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Table R703.5.1(2)
Nail Requirements for Wood Shakes and Wood Shingles

Single Course Sidewall Fasteners			
Product Type	**Nail Type & Minimum length**	**Minimum Head Diameter**	**Minimum Shank Thickness**
R & R and Sanded Shingles			
16" and 18" shingles	3d box - 1 ¼"	0.19"	0.08"
24" Shingles	4d box - 1 ½"	0.19"	0.08"
Grooved Shingles			
16" and 18" shingles	3d box - 1 ¼"	0.19"	0.08"
24" shingles	4d box - 1 ½"	0.19"	0.08
Split and Sawn Shakes			
18" Straight-Split Shakes	5d box - 1 ¾"	0.19"	0.08"
18" and 24" Handsplit Shakes	6d box - 2"	0.19"	0.0915"
24" Tapersplit Shakes	5d Box-1 3/4	0.19"	0.08"
18" and 24" Tapersawn Shakes	6d Box- 2	0.19"	0.0915"

TableR703.5.1 (3)
Nail Requirements for Wood Shakes and Wood Shingles

Double Course Sidewall Fasteners			
Product Type	**Nail Type & Minimum length**	**Minimum Head Diameter**	**Minimum Shank Thickness**
R & R and Sanded Shingles			
16" and 18" and 24" shingles	5d box - 1 ¾" Or same size casing nail	0.19"	0.08"
Grooved Shingles			
16" and 18" and 24"shingles	5d box - 1 ¾"	0.19"	0.08"
Split and Sawn Shakes			
18" Straight-Split Shakes	7d box - 2 ¼" or 8d box 2 ½"	0.19"	0.099"
18" and 24" Handsplit Shakes	7d box - 2 ¼" or 8d box 2 ½"	0.19"	0.099"
24" Tapersplit Shakes	7d box - 2 ¼" or 8d box 2 ½"	0.19"	0.099"
18" and 24" Tapersawn Shakes	7d box - 2 ¼" or 8d box 2 ½"	0.19"	0.099"

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: In accordance with comments made at the public hearing the Tables now prescribe minimum length, head diameter and thickness of the fasteners to be used.

Public Comment 3:

David L. Roodvoets, DLR Consultants, representing Cedar Shake & Shingle Bureau #2, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Table R 905.7.5 (2)

Nail Requirements for Wood Shakes and Wood Shingles

Shakes	**~~ASTM F1667~~ Nail Type and Minimum Length**	**Minimum Head Size**	**Minimum Shank Diameter**
18" Straight-Split	5d Box 1 ¾"	0.19'	.080"
18" and 24" Handsplit and Resawn	6d Box 2	0.19"	.0915"
24" Tapersplit	5d Box 1 ¾"	0.19"	.080"
18" and 24" Tapersawn	6d Box 2	0.19"	.0915"
Shingles	**~~ASTM F1667~~ Nail Type and Minimum Length**		
16" and 18"	3d Box 1 ¼"	0.19"	.080"
24"	4d Box 1 ½"	0.19"	.080"

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: In accordance with comments made at the public hearing the Tables now prescribe minimum length, head diameter and thickness of the fasteners to be used.

Public Comment 5:

David L. Roodvoets, DLR Consultants, representing Cedar Shake & Shingle Bureau #2, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R905.7.5 Application. Wood shingles shall be installed according to this chapter and the manufacturer's installation instructions. Wood shingles shall be laid with a side lap not less than 1 ½" (38mm) between joints in courses, and no two joints in any three adjacent courses shall be in direct alignment. Spacing between shingles shall not be less than ¼" to 3/8" (6mm to 10mm). Weather exposures for wood shingles shall not exceed those set in Table R905.7.5. Fasteners for untreated (naturally durable) wood shingles shall be ~~stainless steel Type 304, Type 316 or hot-dipped zinc coated galvanized (conforming to minimum standard ASTM A 153 D (1.0 oz./ft^2))~~ box nails in accordance with table R905.7.5 (2). Nails shall be stainless steel Type 304 or Type 316 or hot-dipped galvanized, with a coating weight of ASTM A 153 Class D (1.0 oz/ft^2) Alternatively, two 16 gauge stainless steel Type 304, or Type 316 staples with crown widths 7/16" (11mm) minimum, ¾" (19 mm) maximum shall be used. Fasteners installed within 15 miles (24km) of salt water coastal areas shall be stainless steel Type 316. All fasteners shall have a minimum penetration into the sheathing of ¾ inch (19 mm). For roof sheathing less than ¾" in (19 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle positioned in accordance with the manufacturers installation instructions. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316 and applied as above. ~~Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.~~ . Fastener packaging shall bear a label indicating the appropriate grade material or coating weight.

R905.8.6 Application. Wood shakes shall be installed according to this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than 1 ½" (38mm) between joints in adjacent courses. Spacing between shakes in the same course shall be 3/8 inch to 5/8 inch (9.5mm to 15.9mm) for shakes including tapersawn shakes Weather exposures for wood shakes shall not exceed those set in Table R905.8.6. Fasteners for untreated (naturally durable) wood shakes shall be ~~stainless steel Type 304, Type 316 or hot-dipped zinc coated galvanized (conforming to minimum standard ASTM A 153 D (1.0 oz./ft^2)) corrosion resistant~~ box nails in accordance with Table R905.7.5.(2). Nails shall be stainless steel Type 304 or Type 316 or hot-dipped galvanized, with a coating weight of ASTM A 153 Class D (1.0 oz/ft^2) Alternatively, two 16 gauge Type 304 or Type 316 stainless steel staples, with crowns width 7/16" minimum, ¾" maximum shall be used. Fasteners installed within 15 miles (24 km) of salt water coastal areas shall be stainless steel Type 316. All fasteners shall have a minimum penetration into the sheathing of ¾" inch (19 mm). Where the roof is less than ¾" (19 mm) thick, each fastener shall penetrate through the sheathing. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions Fasteners for fire-retardant-treated (as defined in section R902) shakes or pressure-impregnated-preservative-treated shakes of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316 and applied as above. ~~Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.~~ . Fastener packaging shall bear a label indicating the appropriate grade material or coating weight.

(Portions of code change proposal not shown remain unchanged)

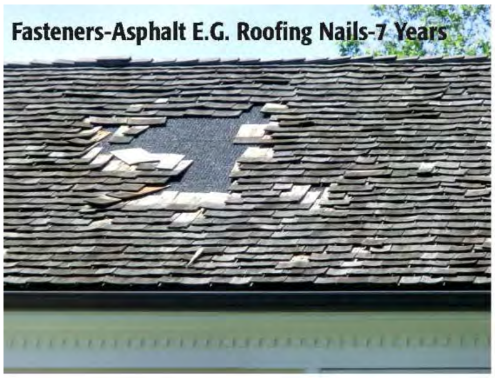
Commenter's Reason: This modification is to clean up difficult language in the original proposal, and require labeling of the fasteners.

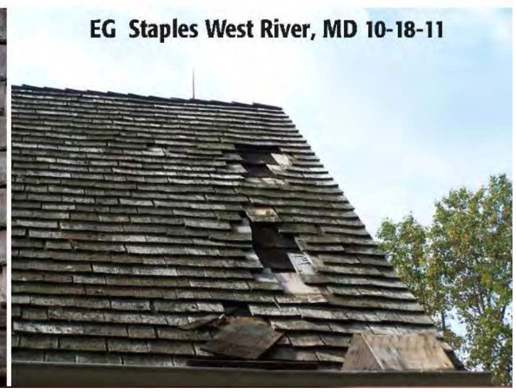
The primary reason for these code changes is the need to more clearly define the fasteners required.
There are known cases of wood shakes and shingles falling off roofs due to the use of inferior fasteners. Specifying "corrosion resistant" is no longer sufficient; the type of fastener to be used is determined by various environmental factors and product type. Increased specifics will improve roof system integrity and lifespan. The code currently requires more corrosion resistant fasteners in several applications as noted in **R402.1.1 Fasteners. (**Fasteners used *below grade*----shall be of Type 304 or 316 stainless steel.

(From Randall Shackelford in committee approved proposed code change RB176-13)"There has been a lot of work done on fasteners and connectors in contact with treated wood in the last 8-10 years. All the testing and historical performance of stainless steel were based on the traditional use of 300 series stainless steel. Yet there are many types of stainless steel, and some are much less corrosion resistant than others. By limiting the types of stainless steel to these specific series, it ensures that the stainless steel fasteners will be corrosion resistant when exposed to treated wood."

Corrosion of fasteners has been found relatively far inland, the 15 mile requirement reduces the possibility of fastener corrosion. It is supported by the Stainless Steel Institutes recommendations.

Penetration into sheathing more than ½" thick must be at minimum ¾" or all the way through the sheathing in order to attach the product strongly enough to hold in place and prevent loosening of the fastener.





Final Hearing Results

RB369-13	**AMPC1, 2, 3, 5**

Code Change No: RB371-13

Original Proposal

Section(s): R603.9.2, R603.9.5, Table R603.9.5(1) (NEW), Table R603.9.5(2) (NEW), Table R603.9.5(3) (NEW), Table R603.9.5(4), R603.9.5.1 (NEW), R603.9.5.2 (NEW), Table R703.7(2)

Proponent: J. Daniel Dolan, P.E., Ph.D., Washington State University, representing self (jddolan@wsu.edu)

Revise as follows:

TABLE R703.7(2)
STONE OR MASORY VENEER LIMITATIONS AND REQUIREMENTS,
ONE- AND TWO-FAMILY DETACHED DWELLINGS, ~~WOOD FRAMING,~~ SEISMIC DESIGN CATERGORIES D_0, D_1, AND D_2

SEISMIC DESIGN CATEGORY	NUMBER OF ~~WOOD~~ FRAMED STORIES[a]	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION OR FOUNDATION WALL (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf)[b]
D_0	1	20[c]	4	40
	2	20[c]	4	40
	3	30[d]	4	40
D_1	1	20[c]	4	40
	2	20[c]	4	40
	3	20[c]	4	40
D_2	1	20[c]	3	30
	2	20[c]	3	30

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa, 1 pound-force = 4.448 N.

a. Cripple walls are not permitted in Seismic Design Categories D_0, D_1 and D_2.

b. Maximum weight is installed weight and includes weight of mortar, grout and lath, and other materials used for installation.

c. The veneer shall not exceed 20 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls, or 30 feet in height with an additional 8 feet for gable end walls where the lower 10 feet has a backing of concrete or masonry wall. See also story height limitations of Section R301.3.

d. The veneer shall not exceed 30 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls. See also story height limitations of Section R301.3.

R603.9.2 Determination of minimum length of full height sheathing. The minimum length of full height sheathing on each *braced wall line* shall be determined by multiplying the length of the *braced wall line* by the percentage obtained from Table R603.9.2(1) and by the plan aspect-ratio adjustment factors obtained from Table R603.9.2(2). The minimum length of full height sheathing shall not be less than 20 percent of the *braced wall line* length.

To be considered full height sheathing, structural sheathing shall extend from the bottom to the top of the wall without interruption by openings. Only sheathed, full height wall sections, uninterrupted by openings, which are a minimum of 48 inches (1219 mm) wide, shall be counted toward meeting the minimum percentages in Table R603.9.2(1). In addition, structural sheathing shall comply with all of the following requirements:

1. Be installed with the long dimension parallel to the stud framing (i.e., vertical orientation) and shall cover the full vertical height of wall from the bottom of the bottom track to the top of the top track of each *story*. Installing the long dimension perpendicular to the stud framing or using shorter segments shall be permitted provided that the horizontal joint is blocked as described in Item 2.

2. Be blocked when the long dimension is installed perpendicular to the stud framing (i.e., horizontal orientation). Blocking shall be a minimum of 33 mil (0.84 mm) thickness. Each horizontal structural sheathing panel shall be fastened with No. 8 screws spaced at 6 inches (152 mm) on center to the blocking at the joint.
3. Be applied to each end (corners) of each of the exterior walls with a minimum 48-inch-wide (1219 mm) panel.

Exception: When stone or masonry veneer is installed, the required length of length of full-height sheathing and overturning anchorage required shall be determined in accordance with Section R603.9.5.

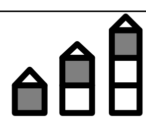
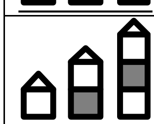
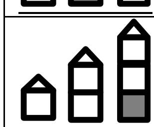
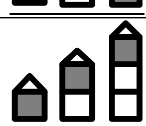
~~**R603.9.5 Structural sheathing for stone and masonry veneer.** In Seismic Design Category C, where stone and masonry veneer is installed in accordance with Section R703.7, the length of structural sheathing for walls supporting one *story*, roof and ceiling shall be the greater of the amount required by Section R603.9.2 or 36 percent, modified by Section R603.9.2 except Section R603.9.2.2 shall not be permitted.~~

R603.9.5 Structural sheathing for stone and masonry veneer. Where stone and masonry veneer are installed in accordance with Section R703.7, the length of full-height sheathing for exterior and interior wall lines backing or perpendicular to and laterally supporting walls with veneer shall comply with this section.

R603.9.5.1 Seismic Design Category C. In Seismic Design Category C, the length of structural sheathing for walls supporting one story, roof and ceiling shall be the greater of the amount required by Section R603.9.2, except Section R603.9.2.2 shall be permitted.

R603.9.5.2 Seismic Design Categories D_0, D_1, and D_2. In Seismic Design Categories D_0, D_1, and D_2, The required length of structural sheathing and overturning anchorage shall be determined in accordance with Tables R603.9.5(1), R603.9.5(2), R603.9.5(3), and R603.9.5(4). Overturning anchorage shall be installed on the doubled studs at the end of each full height wall segment.

TABLE R603.9.5(1)
REQUIRED LENGTH OF FULL HEIGHT SHEATHING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 33-MIL COLD-FORMED STEEL FRAMING AND 6-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING

SEISMIC DESIGN CATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)						SINGLE-STORY HOLD-DOWN FORCE (pounds)	CUMMULATIVE HOLD-DOWN FORCE (pounds)
		10	20	30	40	50	60		
		MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE							
D_0		3.3	4.7	6.1	7.4	8.8	10.2	3,360	--
		5.3	8.7	12.1	15.4	18.8	22.2	3,360	6,720
		7.3	12.7	18.0	23.4	28.8	34.2	3,360	10,080
D_1		4.1	5.8	7.5	9.2	10.9	12.7	3,360	--

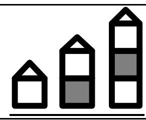
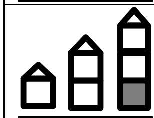
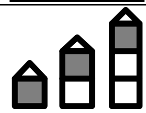
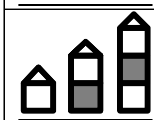
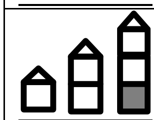
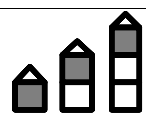
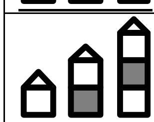
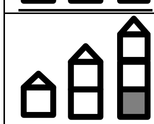
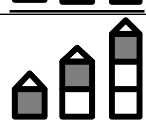
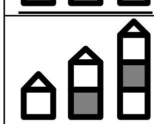
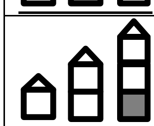
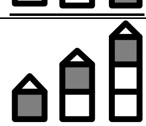
		6.6	10.7	14.9	19.1	23.3	27.5	3,360	6,720
		9/0	15.7	22.4	29.0	35.7	42.2	3,360	10,080
D_2		5.7	8.2	10.6	13.0	15.4	17.8	3,360	--
		9.2	15.1	21.1	27.0	32.9	38.8	3,360	6,720
		12.7	22.1	31.5	40.9	50.3	59.7	3,360	10,080

TABLE R603.9.5(2)
REQUIRED LENGTH OF FULL HEIGHT SHEATHING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 43-MIL COLD-FORMED STEEL FRAMING AND 6-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING

SEISMIC DESIGN CATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)						SINGLE-STORY HOLD-DOWN FORCE (pounds)	CUMMULATIVE HOLD-DOWN FORCE (pounds)
		10	20	30	40	50	60		
		MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE							
D_0		2.8	4.0	5.1	6.3	7.5	8.7	3,960	--
		4.5	7.4	10.2	13.1	16.0	18.8	3,960	7,920
		6.2	10.7	15.3	19.9	24.4	29.0	3,960	11,880
D_1		3.5	4.9	6.4	7.8	9.3	10.7	3,960	--
		5.6	9.1	12.7	16.2	19.8	23.3	3,960	7,920
		7.7	13.3	19.0	24.6	30.3	35.9	3,960	11,880
D_2		4.9	6.9	9.0	11.0	13.1	15.1	3,960	--

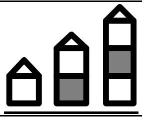
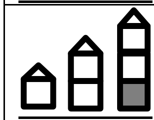
		7.8	12.9	17.9	22.9	27.9	32.9	3,960	7,920
		10.8	18.8	26.7	34.7	42.7	50.7	3,960	11,880

TABLE R603.9.5(3)
REQUIRED LENGTH OF FULL HEIGHT SHEATHING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 33-MIL COLD-FORMED STEEL FRAMING AND 4-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING

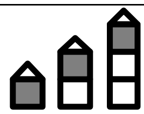
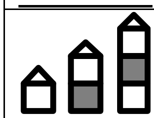
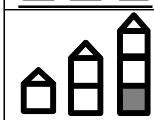
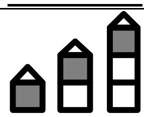
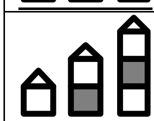
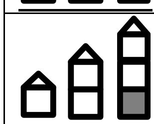
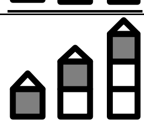
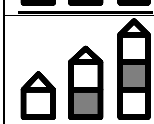
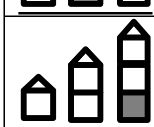
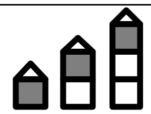
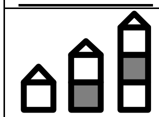
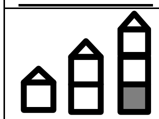
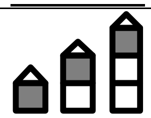
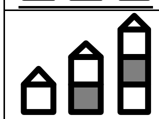
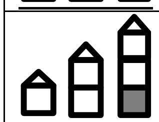
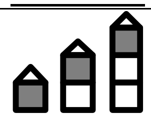
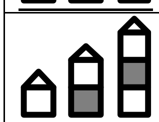
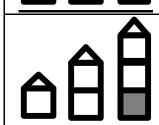
SEISMIC DESIGN CATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)						SINGLE-STORY HOLD-DOWN FORCE (pounds)	CUMMULATIVE HOLD-DOWN FORCE (pounds)
		10	20	30	40	50	60		
		MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE							
D_0		2.5	3.6	4.6	5.7	6.8	7.8	4,392	--
		4.0	6.6	9.2	11.8	14.4	17.0	4,392	8,784
		5.6	9.7	13.8	17.9	22.0	26.2	4,392	13,176
D_1		3.1	4.4	5.7	7.1	8.4	9.7	4,392	--
		5.0	8.2	11.4	14.6	17.8	21.0	4,392	8,784
		6.9	12.0	17.1	22.2	27.3	32.4	4,392	13,176
D_2		4.4	6.2	8.1	10.0	11.8	13.7	4,392	--
		7.1	11.6	16.1	20.6	25.1	29.7	4,392	8,784
		9.7	16.9	24.1	31.3	38.5	45.7	4,392	13,176

TABLE R603.9.5(4)
REQUIRED LENGTH OF FULL HEIGHT SHEATHING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 43-MIL COLD-FORMED STEEL FRAMING AND 4-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING

SEISMIC DESIGN CATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)						SINGLE-STORY HOLD-DOWN FORCE (pounds)	CUMMULATIVE HOLD-DOWN FORCE (pounds)
		10	20	30	40	50	60		
		MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE							
D_0		1.9	2.7	3.4	4.2	5.0	5.8	5,928	--
		3.0	4.9	6.8	8.8	10.7	12.6	5,928	11,856
		4.1	7.2	10.2	13.3	16.3	19.4	5,928	17,784
D_1		2.3	3.3	4.3	5.2	6.2	7.2	5,928	--
		3.7	6.1	8.5	10.8	13.2	15.6	5,928	11,856
		5.1	8.9	12.7	16.5	20.2	24.0	5,928	17,784
D_2		3.3	4.6	6.0	7.4	8.7	10.1	5,928	--
		5.2	8.6	11.9	15.3	18.6	22.0	5,928	11,856
		7.2	12.5	17.9	23.2	28.5	33.8	5,928	17,784

Reason: The original provisions for anchoring masonry chimneys to residential buildings were developed with the concept of anchoring to wood framing. Cold-formed steel framing can function equivalently in this respect to wood framing, except that the connections between the members, and possibly the size of the members, have to be adjusted for the different types of fasteners used and to prevent the failure mechanisms in steel from occurring.

Table R703.7(2): The table regulating the number of stories that masonry veneer can be used on in the three high seismic zones is changed from specifying wood only to allow cold-formed steel to be used in the same situations. The subsequent parts of the code change provide the required framing detailing changes (i.e. overturning connections) to support the forces generated by the masonry during an earthquake.

R603.9.2: An exception to the method for determining the length of full height sheathing is required to increase the length required to account for the increased lateral loads associated with the increase in mass of the masonry veneer. The exception is simply a pointer to a revised section that provides the correct lengths for each of the Seismic Design Categories associated with high seismic regions.

R603.9.5: This part of the change is the real significant change required to insure that cold-formed steel framing can resist the higher lateral loads associated with the use of masonry in high seismic regions. The values in the four tables are based on the allowable design values provided in the AISI S213-07 wS1-09, *North American Standard for Cold-Formed Steel Framing -- Lateral Design,* in Table C2.1-3 for 33 mil and 43 mil stud thicknesses and 6-inch and 4-inch screw spacing around the perimeter. The assumption of uniform acceleration with respect to height as is allowed by ASCE 7-10 for the simplified method of seismic analysis was used. The maximum acceleration for each seismic zone was used for each seismic design category. It is assumed that the in-line framing concept of cold-formed steel light-frame construction provides the continuous load path required to transfer the overturning loads to the foundation.

Similar assumptions to those made for determining overturning anchorage requirements to those made for wood framing were made for these calculations. The assumptions concerning building configuration included 1) the walls have 20% of the area as door and window openings, 2) the masonry seismic weight that contributed to the lateral forces only included the wall veneer perpendicular to the direction of analysis (i.e., the masonry veneer would support its own seismic weight when loaded in plane.), 3) the story height for each floor was 10 ft., and 4) all of the masonry was 4-inch thick clay masonry for 40 psf dead load.

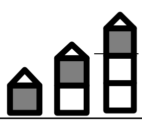
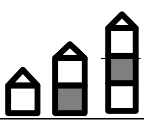
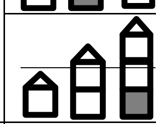
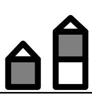
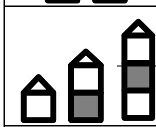
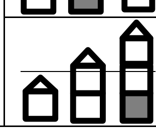
Cost Impact: This change will increase the cost of construction if stone masonry veneer is used in high seismic regions because it was not previously allowed. However, the increased cost is associated with allowing the option to use stone and masonry veneer in these regions where it is currently not allowed.

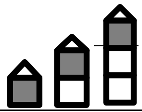
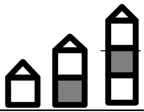
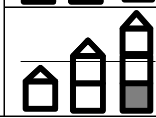
Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE R603.9.5(4)
REQUIRED LENGTH OF FULL HEIGHT SHEATHING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 43-MIL COLD-FORMED STEEL FRAMING AND 4-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING

SEISMIC DESIGN CATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)						SINGLE-STORY HOLD-DOWN FORCE (pounds)	CUMMULATIVE HOLD-DOWN FORCE (pounds)
		10	20	30	40	50	60		
		MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE							
D_0		1.9	2.7	3.4	4.2	5.0	5.8	5,928	--
		3.0	4.9	6.8	8.8	10.7	12.6	5,928	11,856
		~~4.1~~	~~7.2~~	~~10.2~~	~~13.3~~	~~16.3~~	~~19.4~~	~~5,928~~	~~17,784~~
D_1		2.3	3.3	4.3	5.2	6.2	7.2	5,928	--
		3.7	6.1	8.5	10.8	13.2	15.6	5,928	11,856
		~~5.1~~	~~8.9~~	~~12.7~~	~~16.5~~	~~20.2~~	~~24.0~~	~~5,928~~	~~17,784~~

SEISMIC DESIGN CATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)						SINGLE-STORY HOLD-DOWN FORCE (pounds)	CUMMULATIVE HOLD-DOWN FORCE (pounds)
		10	20	30	40	50	60		
		MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE							
D_2		3.3	4.6	6.0	7.4	8.7	10.1	5,928	--
		5.2	8.6	11.9	15.3	18.6	22.0	5,928	11,856
		~~7.2~~	~~12.5~~	~~17.9~~	~~23.2~~	~~28.5~~	~~33.8~~	~~5,928~~	~~17,784~~

Committee Reason: This change provides for masonry veneer to be used with cold-formed steel framing in high seismic areas. The modification limits Table R603.9.5(4) to two stories since the overturning anchorage for 3 story is marginal.

Assembly Action: **None**

Final Hearing Results

RB371-13 **AM**

Code Change No: RB374-13

Original Proposal

Section(s): Table R703.4, R703.7, R703.12

Proponent: Jason Thompson, National Concrete Masonry Association representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

Revise as follows:

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL		NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]					
					Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
Horizonal aluminum[e]	Without insulation	0.019[f]	Lap	Yes	0.120 nail $1^{1}/_{2}$″ long	0.120 nail 2″ long	0.120 nail 2″ long	0.120 nail[y]	Not allowed	Same as stud spacing
		0.024	Lap	Yes	0.120 nail $1^{1}/_{2}$″ long	0.120 nail 2″ long	0.120 nail 2″ long	0.120 nail[y]	Not allowed	
	With insulation	0.019	Lap	Yes	0.120 nail $1^{1}/_{2}$″ long	0.120 nail $2^{1}/_{2}$″ long	0.120 nail $2^{1}/_{2}$″ long	0.120 nail[y]	0.120 nail $1^{1}/_{2}$" long	
Anchored veneer: brick, concrete, masonry or stone		2	Section R703	Yes	See Section R703 and Figure R703.7[g]					
Adhered veneer: concrete, stone or masonry[w]		—	Section R703	Yes ~~Note w~~	~~See Section R703.6.1[g] or in accordance with the manufacturer's instructions.~~ <u>See Section R7803.12.</u>					
Hardboard[k] Panel siding-vertical		$^{7}/_{16}$	—	Yes	Note m	Note m	Note m	Note m	Note m	6^{2} panel edges 12^{2} inter. sup.[n]
Hardboard[k] Lap-siding-horizontal		$^{7}/_{16}$	Note p	Yes	Note o	Note o	Note o	Note o	Note o	Same as stud spacing 2 per bearing
Steel[h]		29 ga.	Lap	Yes	0.113 nail $1^{3}/_{4}$" Staple-$1^{3}/_{4}$"	0.113 nail $2^{3}/_{4}$" Staple-$2^{1}/_{2}$"	0.113 nail $2^{1}/_{2}$" Staple-$2^{1}/_{4}$"	0.113 nail[v] Staple[v]	Not allowed	Same as stud spacing
Particleboard panels		$^{3}/_{8}$ - $^{1}/_{2}$	—	Yes	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	box nail[v]	6d box nail (2″ × 0.099″), $^{3}/_{8}$ not allowed	6″ panel edge, 12" inter. sup.
		$^{5}/_{8}$	—	Yes	6d box nail (2″ × 0.099″)	8d box nail ($2^{1}/_{2}$″ × 0.113″)	8d box nail ($2^{1}/_{2}$″ × 0.113″)	box nail[v]	6d box nail (2″" × 0.099″)	

Wood structural panel[i] ANSI/APA-PRP 210 siding[i] (exterior grade)	$^{3}/_{8}$ - $^{1}/_{2}$	Note p	Yes	0.099 nail-2"	0.113 nail-2$^{1}/_{2}$"	0.113 nail-2 ½"	0.113 nail[v]	0.099 nail-2²	6" panel edges, 12" inter. sup.
Wood structural panel lapsiding	$^{3}/_{8}$ - $^{1}/_{2}$	Note p Note x	Yes	0.099 nail-2"	0.113 nail-2$^{1}/_{2}$"	0.113 nail-2 ½"	0.113 nail[x]	0.099 nail-2"	8″ along bottom edge
Vinyl siding[l]	0.035	Lap	Yes	0.120 nail (shank) with a 0.313 head or 16-gage staple with $^{3}/_{8}$ to $^{1}/_{2}$-inch crown[y, z]	0.120 nail (shank) with a 0.313 head or 16-gage staple with $^{3}/_{8}$ to $^{1}/_{2}$-inch crown[y]	0.120 nail (shank) with a 0.313 head or 16-gage staple with $^{3}/_{8}$ to $^{1}/_{2}$-inch crown[y]	0.120 nail (shank) with a 0.313 head per Section R703.11.2	Not allowed	16 inches on center or specified by the manufacturer instructions or test report
Wood[j] rustic, drop	$^{3}/_{8}$ Min	Lap	Yes	Fastener penetration into stud-1"				0.113 nail-2$^{1}/_{2}$" Staple-2"	Face nailing up to 6" widths, 1 nail per bearing; 8" widths and over, 2 nails per bearing
Shiplap	$^{19}/_{32}$ Average	Lap	Yes	Fastener penetration into stud-1"				0.113 nail-2$^{1}/_{2}$" Staple-2"	Face nailing up to 6" widths, 1 nail per bearing; 8" widths and over, 2 nails per bearing
Bevel	$^{7}/_{16}$								
Butt tip	$^{3}/_{16}$	Lap	Yes						
Fiber cement panel siding[q]	$^{5}/_{16}$	Note q	Yes Note u	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r, v]	4d common corrosion-resistant nail[r]	6" o.c. on edges, 12" o.c. on intermed. studs
Fiber cement lap siding[s]	$^{5}/_{16}$	Note s	Yes Note u	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r, v]	6d common corrosion-resistant nail or 11-gage roofing nail[r]	Note t

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.
b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.
c. Staples shall have a minimum crown width of $^{7}/_{16}$-inch outside diameter and be manufactured of minimum 16-gage wire.
d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.
e. Aluminum nails shall be used to attach aluminum siding.
f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.
g. All attachments shall be coated with a corrosion-resistant coating.
h. Shall be of approved type.

i. Three-eighths-inch plywood shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. Plywood $^1/_2$-inch or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.
j. Wood board sidings applied vertically shall be nailed to horizontal nailing strips or blocking set 24 inches on center. Nails shall penetrate $1^1/_2$ inches into studs, studs and wood sheathing combined or blocking.
k. Hardboard siding shall comply with CPA/ANSI A135.6.
l. Vinyl siding shall comply with ASTM D 3679.
m. Minimum shank diameter of 0.092 inch, minimum head diameter of 0.225 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
n. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.
o. Minimum shank diameter of 0.099 inch, minimum head diameter of 0.240 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
p. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.
q. See Section R703.10.1.
r. Fasteners shall comply with the nominal dimensions in ASTM F 1667.
s. See Section R703.10.2.
t. Face nailing: one 6d common nail through the over lap ping planks at each stud. Concealed nailing: one 11 gage $1^1/_2$ inch long galv. roofing nail through the top edge of each plank at each stud.
u. See Section R703.2 exceptions.
v. Minimum nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
~~w. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and shall comply with the requirements in Sections 6.1 and 6.3 of TMS-402 ACI 530/ASCE 5.~~
~~x~~ w. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.
~~y~~ y. Minimum fastener length must accommodate sheathing and penetrate framing 0.75 inches or in accordance with the manufacturer's installation instructions.

R703.7 Anchored stone and masonry veneer, general. Anchored stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4 and Figure R703.7. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first *story* above-grade plane and shall not exceed 5 inches (127 mm) in thickness. See Section R602.10 for wall bracing requirements for masonry veneer for wood-framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for cold-formed steel construction.

Exceptions:

1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
2. For detached one- or two-family *dwellings* in Seismic Design Categories D_0, D_1 and D_2, exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.

R703.12 Adhered masonry veneer ~~installation~~. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and the requirements in Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5. Adhered masonry veneer shall be installed in accordance with Section R703.6.1, Article 3.3 C of TMS 602/ACI 530.1/ASCE 6, or the manufacturer's instructions.

Reason: The changes proposed consolidate and clarify the requirements for adhered masonry veneer into Section R703.12. Sections 6.1 and 6.3 of TMS 402 list prescriptive requirements for adhered veneers; such as weight limits and minimum adhesion strength between the adhered veneer and its backing. Section R703.6.3 defines minimum water-resistive barrier requirements.

The footnote w to Table R703.4 is proposed to be deleted and these requirements are incorporated into Section 703.12 where they are less likely to be overlooked. The method of installing adhered veneer varies depending upon the substrate to which it is bonded. For wood sheathing, metal lathe is used in accordance with R703.6.1. For concrete or masonry backing, Article 3.3 C of TMS 602 details prescriptive installation requirements.

The term 'anchored' is proposed to be added to the charging language of Section R703.7 to help clarify and differentiate these requirements from those for adhered veneer.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

The following is errata that was not posted to the ICC website.

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
Adhered veneer: concrete, stone or masonry~~[w]~~	—	Section R703	Yes ~~Note w~~	~~See Section R703.6.1[g] or in accordance with the manufacturer's instructions.~~ See Section R703.12.					

(Portions of table not shown remain unchanged)

R703.7 Anchored stone and masonry veneer, general. Anchored stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4 and Figure R703.7. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first *story* above-grade plane and shall not exceed 5 inches (127 mm) in thickness. See Section R602.10 for wall bracing requirements for masonry veneer for wood-framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for cold-formed steel construction.

Exceptions:

1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
2. For detached one- or two-family *dwellings* in Seismic Design Categories D_0, D_1 and D_2, exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.

(Portions of proposal not shown remain unchanged)

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB374-13 **AS**

Code Change No: RB376-13

Original Proposal

Section(s): Figure R703.7

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

FIGURE R703.7
TYPICAL MASONRY VENEER WALL DETAILS

For SI: 1 inch = 25.4 mm.
a. See Sections R703.7.5, R703.7.6 and R703.8.
b. See Sections R703.2 and R703.7.4.
c. See Section R703.7.4.2 and Table R703.7.4.
d. See Section R703.7.3.
e. Figure R703.7 illustrates typical construction details for a masonry veneer wall. For the actual mandatory requirements of the code, see the indicated sections of text. Other details of masonry veneer wall construction shall be permitted provided the requirements of the indicated sections of text met.

(No change to Figure)

Reason: The purpose of this code change is to address potential misapplication of, and particularly improper enforcement of, the masonry veneer wall details. The existing details do not capture all of the possible window head, window sill, and foundation details which can occur in a masonry veneer wall assembly. For example, the current head and sill detail shows a wood window aligned within the wall studs, yet most windows installed today are vinyl, and in many cases the actual window sashes, panes, etc. are outboard of the stud wall. Similarly, most builders provide one course of CMU, or step back the top of a concrete wall, such that floor framing bears far enough above grade to avoid decay resistance requirements. As currently shown, not only the sill plate, but the floor joists, wall studs, and wall sheathing would all need to be preservative-treated or of naturally decay-resistant species because they would not meet the clearances of Section R317.

By retitling both portions of the detail as “typical” and adding the proposed footnote, the code will be clear that the veneer wall details are somewhat schematic, and that it is the code provisions (or, where applicable, manufacturer’s instructions for windows, flashing and other elements) that provide the mandatory requirements. This is in keeping with similar titles and notes in other sections of the code, such as Figures R602.3(1), R613.8, and P2903.10 (for “typical”) and Table R703.7.3.1 or Figures B-11 and B-12 for the note. The specific text of the note mirrors the note provided with Table R1001.1 for masonry fireplaces and chimneys.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent’s published reason.

Assembly Action: **None**

Final Hearing Results

RB376-13	**AS**

Code Change No: RB378-13

Original Proposal

Section(s): R703.8, Chapter 44

Proponent: Theresa A. Weston, PhD., DuPont Building Innovations (theresa.a.weston@usa.dupont.com)

Revise as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. <u>Mechanically attached flexible flashings shall comply with AAMA 712.</u> Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:
   1.1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall also incorporate flashing or protection at the head and sides.
   1.2. In accordance with the flashing design or method of a registered design professional.
   1.3. In accordance with other approved methods.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Add new standard to Chapter 44 as follows:

AAMA

<u>AAMA 712-11Voluntary Specification for Mechanically Attached Flexible Flashing</u>

Reason: This proposal will add new requirements to the code for mechanically attached flexible flashing materials. Water entry at interfaces, including those around fenestration, has been a significant cause of construction defects. Setting minimum standards for the materials used at these interfaces is important to the durability of construction. Material property/performance requirements are currently included in the code only for self-adhered flashings, but should also be included for other types of systems. AAMA 712 was developed by industry to insure that mechanically attached flexible flashing materials meet minimum performance specifications. This proposal incorporates this industry standard by reference into the code. The properties and quality of flashing materials are crucial to successful implementation of the water management in wall systems.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, AAMA 712 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of AAMA 712-11 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This brings a new standard for window and door flashing into the code and will allow an option.

Assembly Action: **None**

Final Hearing Results

RB378-13 **AS**

Code Change No: RB379-13

Original Proposal

Section(s): R703.8, Chapter 44

Proponent: Theresa A. Weston, PhD., DuPont Building Innovations (theresa.a.weston@usa.dupont.com)

Revise as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. <u>Fluid applied membranes used as flashing shall comply with AAMA 714.</u> Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:
   1.1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall also incorporate flashing or protection at the head and sides.
   1.2. In accordance with the flashing design or method of a registered design professional.
   1.3. In accordance with other approved methods.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Add new standard to Chapter 44 as follows:

AAMA

<u>AAMA 714-12 Voluntary Specification for Liquid Applied Flashing Used to Create a Water-Resistive Seal around Exterior Wall Openings in Buildings</u>

Reason: This proposal will add new requirements to the code for fluid –applied membranes used as flashing materials. Water entry at interfaces, including those around fenestration, has been a significant cause of construction defects. Setting minimum standards for the materials used at these interfaces is important to the durability of construction. Material property/performance requirements are currently included in the code only for self-adhered flashings, but should also be included for other types of systems. AAMA 714, was developed by industry to insure that fluid-applied material meet minimum performance specifications. This proposal incorporates this industry standard by reference into the code. The properties and quality of flashing materials are crucial to successful implementation of the water management in wall systems.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, AAMA 714 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of AAMA 714-12 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: Approved as Modified

Modify the proposal as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid applied membranes used as flashing in exterior walls shall comply with AAMA 714. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. ~~Fluid applied membranes used as flashing shall comply with AAMA 714.~~ Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:

(Portions of proposal not shown remain unchanged)

Committee Reason: This brings a new standard for fluid applied flashing into the code. The modification moves the text into the general section such that the standard for fluid applied flashing will apply to all openings.

Assembly Action: None

Final Hearing Results

RB379-13 AM

Code Change No: RB380-13

Original Proposal

Section(s): R703.8

Proponent: James D. Katsaros, DuPont Building Innovations (james.d.katsaros@dupont.com)

Revise as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier complying with Section 703.2 for subsequent drainage. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:
   1.1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall also incorporate flashing or protection at the head and sides.
   1.2. In accordance with the flashing design or method of a registered design professional.
   1.3. In accordance with other approved methods.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Reason: This proposal provides a pointer to the code section which specifies water-resistive barriers and their installation. Because the flashing integration with the water-resistive barrier is critical to the performance of the envelope system, it is critical that the water-resistive barrier is installed correctly. This pointer, while not changing the existing code requirements, will add emphasis to the criticality of integration and performance of the entire system.

Correct installation and integration of flashing and water-resistive barrier systems is a significant cause of moisture related construction defects. A recent study (K.R. Grosskopf, P. Oppenheim and T. Brennan, "Preventing Defect Claims In Hot, Humid Climates" ASHRAE Journal, July 2008) reported "*findings from participants who were involved in more than 17,000 combined total construction defect claims indicate that 84% of claims are associated with moisture-related defects in building envelope systems (69%) and building mechanical systems (15%). More than half (53%) of all defects are caused by faulty installation.*"

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB380-13	**AS**

Code Change No: RB381-13

Original Proposal

Section(s): R703.9, R703.9.1, R703.9.2, R703.9.2.1, R703.9.2.2, R703.9.3, R703.9.4, R703.9.4.1, R703.9.4.2

Proponent: Jesse J Beitel, Hughes Associates, Inc. representing EIFS Industry Members Association

Revise as follows:

R703.9 Exterior insulation and finish system (EIFS)/EIFS with drainage. Exterior Insulation and Finish Systems (EIFS) shall comply with this chapter and Section~~s~~ R703.9.1. ~~and R703.9.3.~~ EIFS with drainage shall comply with this chapter and Section~~s~~ R703.9.2~~, R703.9.3 and R703.9.4~~.

R703.9.1 Exterior insulation and finish systems (EIFS). EIFS shall comply with ~~ASTM E 2568.~~ all of the following:

1. EIFS shall comply with ASTM E 2568.
2. EIFS shall be limited to applications over concrete or masonry wall assemblies (substrates).
3. Flashing of EIFS shall be provided in accordance with the requirements of Section R703.8.
4. EIFS shall be installed in accordance with the manufacturer's installation instructions.
5. The EIFS shall terminate not less than 6 inches (152 mm) above the finished ground level.
6. Decorative trim shall not be face nailed through the EIFS.

R703.9.2 Exterior insulation and finish system (EIFS) with drainage. EIFS with drainage shall comply with all of the following: ~~ASTM E 2568 and shall have an average minimum drainage efficiency of 90 percent when tested in accordance with ASTM E 2273.~~

1. EIFS with drainage shall comply with ASTM E 2568.
2. EIFS with drainage shall be required over all wall assemblies with the exception of concrete and masonry wall assemblies (substrates).
3. EIFS with drainage shall have an average minimum drainage efficiency of 90 percent when tested in accordance with ASTM E 2273.
4. The water-resistive barrier shall comply with Section R703.2 or ASTM E 2570.
5. The water-resistive barrier shall be applied between the EIFS and the wall sheathing.
6. Flashing of EIFS with drainage shall be provided in accordance with the requirements of Section R703.8.
7. EIFS with drainage shall be installed in accordance with the manufacturer's installation instructions.

8. The EIFS with drainage shall terminate not less than 6 inches (152 mm) above the finished ground level.

9. Decorative trim shall not be face nailed through the EIFS with drainage.

~~**R703.9.2.1 Water-resistive barrier.** The water-resistive barrier shall comply with Section R703.2 or ASTM E 2570.~~

~~**R703.9.2.2 Installation.** The water-resistive barrier shall be applied between the EIFS and the wall sheathing.~~

~~**R703.9.3 Flashing, general.** Flashing of EIFS shall be provided in accordance with the requirements of Section R703.8.~~

~~**R703.9.4 EIFS/EIFS with drainage installation.** All EIFS shall be installed in accordance with the manufacturer's installation instructions and the requirements of this section.~~

~~**R703.9.4.1 Terminations.** The EIFS shall terminate not less than 6 inches (152 mm) above the finished ground level.~~

~~**R703.9.4.2 Decorative trim.** Decorative trim shall not be face nailed though the EIFS.~~

Reason: When the EIFS section was added to the IRC in the 2009 edition, it was industry's position that EIFS (also known as "barrier" EIFS or EIFS without drainage) would be limited to applications over concrete or masonry substrates. It was also the industry's intent that EIFS with drainage shall be required on framed/sheathed walls constructed under the IRC. These applications were and still are consistent with the ICC Evaluation Service Reports for these products.

In examining the the existing Code text, it appears that the industry's intent may not be clear. For example, in Section 703.1.1, Exception 2 allows an "opt out" for the need for a means of drainage in the exterior wall envelope if it can meet the requirements of ASTM E331. Thus, while an EIFS "barrier" system could meet this requirement, the industry does not recommend this application on residential framed/sheathed construction. This restriction is consistent with the various EIFS manufacturer's ICC-ES Reports.

Thus, the proposed Code proposal provides clear language that addresses this potential issue.

Additionally, upon review of the existing Code section, there appears to be several areas that were unclear as to the requirements for the EIFS and/or the EIFS with drainage. As such, the section has been reordered so as to provide clarity for the requirements of each type of EIFS.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB381-13	**AS**

Code Change No: RB382-13

Original Proposal

Section(s): R703.10.1, Chapter 44

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement* and self

Revise as follows:

R703.10.1 Panel siding. Fiber-cement panels shall comply with the requirements of ASTM C 1186, Type A, minimum Grade II <u>or ISO 8336, Category A, minimum Class 2</u>. Panels shall be installed with the long dimension either parallel or perpendicular to framing. Vertical and horizontal joints shall occur over framing members and shall be sealed with caulking, covered with battens or shall be designed to comply with Section R703.1. Panel siding shall be installed with fasteners according to Table R703.4 or *approved* manufacturer's installation instructions.

Add new standard to Chapter 44 as follows:

ISO

<u>8336 – Fibre-Cement Flat Sheets – Product Specification and Test Methods</u>

Reason: Performance requirements of ISO 8336, *Fibre-cement flat sheets – Product specification and test methods*, have been harmonized with the performance requirements of ASTM C1186, *Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets*. Fiber-cement siding producers in Mexico, Central and South America, Europe, Asia, Australia and New Zealand currently manufacture and test their fiber-cement siding products for compliance with ISO 8336. The inclusion of this Standard reference in the IBC will permit manufacturers worldwide to demonstrate product compliance to IBC requirements. The addition of a reference to ISO 8336 in the Code removes a barrier to trade. Additional editorial changes are proposed to clarify the nature of the required vertical and/or horizontal joint protection to include reference to *approved* caulking and the recognition of both vertical or horizontal shiplap joints as a means of protecting the joints as is also common with wood panel siding.

IBC Section 1405.16.1 has, as a result of the IBC Group A Code Hearings, been revised to adopt this additional Standards reference (see attached Committee Action). This proposed revision brings the two building codes (IBC & IRC) and the applicable code sections and standards references into general alignment.

Cost Impact: The code change proposal will not increase the cost of construction because the product is already recognized for use in the Code. Reference to compliance with this alternative standard, an International Standard requiring the same performance as the ASTM Standard, will reduce barriers to trade by allowing foreign products complying with ISO 8336, Category A, minimum Class 2, market access to the United States without the need for additional product compliance documentation.

Analysis: A review of the standard proposed for inclusion in the code, ISO 8336 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ISO 8336 relative to CP#28, Section 3.6, please visit: <u>http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf</u>

Committee Action: **Approved as Submitted**

Committee Reason: The committee feels this is consistent with the action for the IBC in Group A but would urge the proponent to submit a public comment to bring it closer to alignment with the IBC.

Assembly Action: **None**

Public Comments

Public Comment:

John Mulder, Intertek Testing Services NA, Inc., representing James Hardie Building Products, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R703.10.1 Panel siding. Fiber-cement panels shall comply with the requirements of ASTM C 1186, Type A, minimum Grade II or ISO 8336, Category A, minimum Class 2. Panels shall be installed with the long dimension either parallel or perpendicular to framing. Vertical and horizontal joints shall occur over framing members and shall be ~~sealed~~ <u>protected</u> with caulking, <u>or</u> ~~covered~~ with battens<u>,</u> or <u>flashing, or be vertical or horizontal shiplap, or otherwise</u> ~~shall be~~ designed to comply with Section R703.1. Panel siding shall be installed with fasteners according to Table R703.4 or *approved* manufacturer's installation instructions.

Commenter's Reason: The proposed additional revisions bring this section of the IRC in to alignment with the equivalent section of the IBC, Section1405.16.1, previously approved during the April 2012 IBC Committee Hearings (see below action)

<u>As approved for 2015 IBC:</u>

FS170-12

For staff analysis of the content of ISO 8336-2009 relative to CP#28, Section 3.6, please visit: <u>http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf</u>.

Committee Action: **Approved as Modified**

Modify proposal as follows:

1405.16.1 Panel siding. Fiber-cement panels shall comply with the requirements of ASTM C1186, Type A, minimum Grade II or ISO 8336, Category A, minimum Class 2. Panels shall be installed with the long dimension either parallel or perpendicular to framing. Vertical and horizontal joints shall occur over framing members and shall be protected with ~~*approved*~~ caulking, or with battens, or flashing, or be vertical or horizontal shiplap, or otherwise designed to comply with Section 1403.2. Panel siding shall be installed with fasteners in accordance with the *approved* manufacturer's instructions.

Final Hearing Results

RB382-13	**AMPC**

Code Change No: RB383-13

Original Proposal

Section(s): R202 (NEW), Table R703.4, R703.11.1.1, R703.11.1.2 (NEW), R703.11.1.3 (NEW)

Proponent: Matt Dobson, Vinyl Siding Institute (mdobson@vinylsiding.org)

Revise as follows:

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

For SI: 1 inch = 25.4 mm.

y. Minimum fastener length must ~~accommodate~~ be sufficient to penetrate sheathing other nailable substrate and ~~penetrate~~ framing ~~0.75 inches~~ a total of a minimum of 1 ¼ inches or in accordance with the manufacturer's installation instructions.

z. ~~Where approved by the manufacturer's instructions or test report siding shall be permitted to be installed with fasteners penetrating not less than 0.75 inches through wood or wood structural sheathing with or without penetration into the framing.~~ Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing.

(Portions of Table not shown remain unchanged)

R703.11.1.1 Fasteners. Unless specified otherwise by the manufacturer's instructions, fasteners for vinyl siding shall be 0.120 shank diameter nail with a 0.313 head or 16 gauge staple with a 3/8 to 1/2-inch crown.

R703.11.1.2 Penetration Depth. Unless specified otherwise by the manufacturer's instructions, fasteners shall penetrate into building framing. The total penetration into sheathing, furring framing or other nailable substrate shall be 1-1/4 inches. Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend a minimum of ¼ inch beyond the opposite face of the sheathing or nailable substrate.

R703.11.1.3 Spacing. Unless specified otherwise by the manufacturer's instructions, the maximum spacing between fasteners for horizontal siding shall be 16 inches, and for vertical siding 12 inches both horizontally and vertically. Where specified by the manufacturer's instructions and supported by a test report, greater fastener spacing is permitted.

~~R703.11.1.1~~ **R703.11.1.4 Vinyl soffit panels.** Soffit panels shall be individually fastened to a supporting component such as a nailing strip, fascia or subfascia component or as specified by the manufacturer's instructions.

Add new definition as follows:

NAILABLE SUBSTRATE. A product or material such as framing, sheathing, or furring, composed of wood or wood-based materials, or other materials and fasteners providing equivalent fastener withdrawal resistance under transverse load.

Reason: Currently information on vinyl siding fastener specifications, penetration, and spacing is found only in Table 703.4 and its footnotes. The first purpose of this proposal is to place those requirements into code text where they are more easily found and can be more clearly stated.

The second reason is to ensure that certain requirements, which have been implied but not explicitly stated in the codes, are included. Vinyl siding can be used in conjunction with a variety of sheathing types, some of which contribute to resisting fastener withdrawal, and some which don't. It is necessary to ensure that, regardless of the sheathing type, the total penetration into a material capable of holding fasteners is equivalent to what was used during testing of the siding. For typical siding installations, this is ¾ inch into framing plus approximately ½ inch through wood sheathing, for a total of 1-1/4 inch of penetration into "nailable" material. This minimum penetration would be required unless a different penetration is specified in the manufacturer's instructions. A definition of "nailable substrate" is added to define what is considered to be "nailable".

Where the siding is used over a non-nailable material, then the total penetration must still be achieved, in this case by using a fastener long enough to accommodate the thickness of non-nailable material and penetrate the full 1-1/4 inches into framing or a combination of framing and other nailable material. By stating the requirement in terms of the total required penetration, rather than only in terms of framing penetration, it should be clear what penetration is needed for all installations.

This is not a new requirement, but needs to be more explicitly stated. The definition of nailable substrate and requirement for minimum total penetration into nailable substrate have already been added to several ICC-ES Evaluation Reports.

In addition to the above, the maximum fastener spacing for both horizontal and vertical siding has been added to the code text. The IRC previously had no provision for fastener spacing for vertical siding; the proposed requirement is the same as that currently in the IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

For SI: 1 inch = 25.4 mm.

y. Minimum fastener length must be sufficient to penetrate sheathing other nailable substrate and framing a total of a minimum of 1 ¼ inches or in accordance with the manufacturer's installation instructions.

z. ~~Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing.~~

(Portions of Table not shown remain unchanged)

R703.11.1.2 Penetration Depth. Unless specified otherwise by the manufacturer's instructions, fasteners shall penetrate into building framing. The total penetration into sheathing, furring framing or other nailable substrate shall be <u>a minimum of</u> 1-1/4 inches. Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend a minimum of ¼ inch beyond the opposite face of the sheathing or nailable substrate.

NAILABLE SUBSTRATE. A product or material such as framing, sheathing, or furring, composed of wood or wood-based materials, or other materials and fasteners providing equivalent fastener withdrawal resistance ~~under transverse load~~.

Committee Reason: Approval was based upon the proponent's published reason. The modification deletes text that is not needed and adds minimum dimension to the penetration depth.

Assembly Action: None

Final Hearing Results

RB383-13 AM

Code Change No: RB385-13

Original Proposal

Section(s): Table R703.4, R703.11.2

Proponent: Matt Dobson, Vinyl Siding Institute (mdobson@vinylsiding.org)

Revise as follows:

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
Insulated Vinyl Siding[aa]	035 (vinyl siding layer only)	Lap	Yes	0.120 nail (shank) with a 0.313 head or 16 gauge crown[y,z]	0.120 nail (shank) with a 0.313 head or 16 gauge crown[y]	0.120 nail (shank) with a 0.313 head or 16 gauge crown[y]	0.120 nail (shank) with a 0.313 head per Section R703.11.2	Not Allowed	16 inches on center or specified by manufacturer instructions, test report or other sections of this code.

(Portions of Table not shown remain unchanged)

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.
b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.
c. Staples shall have a minimum crown width of $^7/_{16}$-inch outside diameter and be manufactured of minimum 16-gage wire.
d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.
e. Aluminum nails shall be used to attach aluminum siding.
f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.
g. All attachments shall be coated with a corrosion-resistant coating.
h. Shall be of approved type.
i. Three-eighths-inch plywood shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. Plywood $^1/_2$-inch or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.
j. Wood board sidings applied vertically shall be nailed to horizontal nailing strips or blocking set 24 inches on center. Nails shall penetrate $1^1/_2$ inches into studs, studs and wood sheathing combined or blocking.
k. Hardboard siding shall comply with CPA/ANSI A135.6.
l. Vinyl siding shall comply with ASTM D 3679.
m. Minimum shank diameter of 0.092 inch, minimum head diameter of 0.225 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
n. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.
o. Minimum shank diameter of 0.099 inch, minimum head diameter of 0.240 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
p. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.
Q . See Section R703.10.1.
r. Fasteners shall comply with the nominal dimensions in ASTM F 1667.

s. See Section R703.10.2.
t. Face nailing: one 6d common nail through the over lap ping planks at each stud. Concealed nailing: one 11 gage $1^1/_2$ inch long galv. roofing nail through the top edge of each plank at each stud.
u. See Section R703.2 exceptions.
v. Minimum nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
w. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and shall comply with the requirements in Sections 6.1 and 6.3 of TMS-402 ACI 530/ASCE 5.
x. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.
y. Minimum fastener length must accommodate sheathing and penetrate framing 0.75 inches or in accordance with the manufacturer's installation instructions.
z. Where approved by the manufacturer's instructions or test report siding shall be permitted to be installed with fasteners.
aa. Insulated vinyl siding shall comply with ASTM D 7793.

R703.11.2 Foam plastic sheathing. Vinyl siding and insulated vinyl siding used with foam plastic sheathing shall be installed in accordance with Section R703.11.2.1, R703.11.2.2, or R703.11.2.3.

Reason: There is general consensus among manufacturers on the installation practices for insulated vinyl siding, including several requirements the can be integrated into the installation requirements in Table R703.4. Installation specifications are very similar to vinyl siding.

These include:

- Minimum thickness requirement from ASTM D7793
- That the siding must be installed over a water-resistive Barrier
- Size of nail and/or staple and penetration depth into the stud
- Provision for how it should be installed over foam sheathing
- Fastener spacing
- Installation over foam sheathing should be treated the same as vinyl siding, the principals of section R703.11.2 will apply

Additional footnotes "aa", "y" and "z" refer to the ASTM standard for insulated vinyl siding, ASTM D7793, and fastening prescriptions similar to vinyl siding involving penetration into the stud 0.75 inches and an allowance for variation to this requirement when approved by the manufacturer.

An additional reference was added to the use of vinyl siding with foam plastic sheathing to include insulated vinyl siding. The application of insulated vinyl siding with foam sheathing is the same as vinyl siding, therefore the provision can simply apply.

For more information, go to www.insulatedsiding.info.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. Consistent with the committee action on RB386-13

Assembly Action: **None**

Final Hearing Results

RB385-13 **AS**

Code Change No: RB386-13

Original Proposal

Section(s): R202 (New), R703.13 (New), R703.13.1 (New), Chapter 44

Proponent: Matt Dobson, Vinyl Siding Institute (mdobson@vinylsiding.org)

Add new text as follows:

703.13 Insulated vinyl siding. Insulated vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D7793 by an approved quality control agency.

703.13.1 Insulated vinyl siding and accessories. Insulated vinyl siding and accessories shall be installed in accordance with manufacturer's installation instructions.

Add new definition as follows:

INSULATED VINYL SIDING. A vinyl cladding product with manufacturer-installed foam plastic insulating material as an integral part of the cladding product, having a minimum thermal resistance of R-2.

Add new standard to Chapter 44 as follows:

ASTM

D 7793 – 12 Standard Specification for Insulated Vinyl Siding

Reason: This definition is based on the current ASTM standard for insulated vinyl siding, ASTM D7793. Insulated vinyl siding has been available for over ten years and is now certified to an ASTM standard by an approved quality control agency. Therefore, it makes sense to introduce the standard and third party certification into the code as insulated vinyl siding grows and is embraced as a form of a cladding and home insulation. Performance requirements are specified by ASTM, ensuring that insulated vinyl siding can meet the necessary demands as a cladding and home insulation.

This change also provides a method for building officials to verify that insulated vinyl siding is code compliant, since there are separate standards for vinyl siding and insulated vinyl siding.

- Insulated vinyl siding is vinyl siding with rigid foam insulation laminated or permanently attached to the panel.
- In energy codes and energy efficiency programs, insulated siding is recognized as a form of "continuous insulation," or insulation installed on the exterior of the building that helps reduce energy loss through framing or other building material.
- Insulated siding products that bear the Certified Insulated Siding Label and are found on VSI's *Official List of Certified Products and Colors* have been independently certified by a third-party, accredited quality control agency to meet or exceed ASTM D7793.

Certified insulated vinyl siding**:**

- Meets or exceeds the industry standard for quality and performance (ASTM D7793), as verified by an independent, accredited quality control agency through twice yearly, unannounced plant inspections, product testing and quality review.
- Has demonstrated a minimum thermal resistance, or R-value, of at least R-2.0, as verified by an independent quality control agency.
- Withstands the impacts of recommended installation procedures.
- Lies straight on a flat wall and does not buckle under normal conditions.
- Weathers the effects of sunshine, rain and heavy winds of at least 110 mph.
- Meets manufacturer's advertised specifications for length, width, thickness and gloss.
- Can be identified by a variety of program logos and/or labels.
- Meets or exceeds the industry standard for performance (ASTM D7793), as verified by an independent, accredited quality control agency through twice yearly, unannounced plant inspections, product testing and quality review.

Fire Performance

Due to vinyl's chlorine base, the siding portion of insulated siding does not readily ignite and burn and resists flame spread. Vinyl siding routinely demonstrates a Class A flame spread rating (that is, a flame spread index of 25 or less when tested under ASTM E84). Rigid vinyl will not sustain combustion without an external source of heat and will tend to self-extinguish if that heat is removed. Foam plastics used in the insulation portion contain a flame retardant designed to limit rapid flame spread. Foam plastic insulation products are tested and classified for flame spread and smoke-development under ASTM E84/UL 723 by Underwriters Laboratories and other certified agencies.

Moisture Performance
Insulated siding provides a supplemental rain screen that reduces the amount of water that reaches the underlying water-resistive barrier. With a properly applied water-resistive barrier, insulated siding minimizes moisture penetration from the exterior into the wall assembly and provides a way for moisture to readily drain and dry. The presence of a layer of thermal insulation filling the space between the insulated siding and the wall sheathing also aids in the moisture management system.

For more information, go to www.insulatedsiding.info.

Cost Impact: The code change proposal will increase the cost of construction. This change will have minimal cost impact as there are products on the market certified.

Analysis: A review of the standard proposed for inclusion in the code, ASTM D 7793 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ASTM D7793-12 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Public Comments

Public Comment:

Matthew Dobson, representing Vinyl Siding Institute, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

D 7793 – ~~12~~13 Standard Specification for Insulated Vinyl Siding

Commenter's Reason: This change simply modifies the approved change to ensure the code has most up to date version of this standard. Over the course of the past few months the standard has been updated to include refinement of certain testing protocols necessary to ensure proper product evaluation including: 1) alternative test methods for demonstrating adhesive qualification; 2) the effect of differential thermal expansion is handled through distortion testing rather than through thermal expansion coefficient; and 3) evaluation of laps for siding that does not include laps, such as vertical siding, is eliminated. By referencing this 13 standard vs. the 12 standard these important refinements will be included and certified products will be consistent with the code requirements.

Final Hearing Results

RB386-13 **AMPC**

Code Change No: RB387-13

Original Proposal

Section(s): R202 (NEW), Table R703.4, R703.13 (NEW), R703.13.1 (NEW), R703.13.1.1 (NEW), R703.13.1.2 (NEW), R703.13.2 (NEW), R703.13.2.1 (NEW), Chapter 44

Proponent: Matt Dobson, Vinyl Siding Institute (mdobson@vinylsiding.org)

Revise as follows:

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
Polypropylene Siding[aa]	Not applicable.	Lap	Yes	Section 703.13.1	Not Allowed	As specified by the manufacturer instructions, test report or other sections of this code.	Polypropylene Siding[aa]	Not applicable.	Lap

(Portions of Table not shown remain unchanged)

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.
b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.
c. Staples shall have a minimum crown width of $^7/_{16}$-inch outside diameter and be manufactured of minimum 16-gage wire.
d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.
e. Aluminum nails shall be used to attach aluminum siding.
f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.
g. All attachments shall be coated with a corrosion-resistant coating.
h. Shall be of approved type.
i. Three-eighths-inch plywood shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. Plywood $^1/_2$-inch or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.
j. Wood board sidings applied vertically shall be nailed to horizontal nailing strips or blocking set 24 inches on center. Nails shall penetrate $1^1/_2$ inches into studs, studs and wood sheathing combined or blocking.
k. Hardboard siding shall comply with CPA/ANSI A135.6.
l. Vinyl siding shall comply with ASTM D 3679.
m. Minimum shank diameter of 0.092 inch, minimum head diameter of 0.225 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
n. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.
o. Minimum shank diameter of 0.099 inch, minimum head diameter of 0.240 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
p. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.
q. See Section R703.10.1.

r. Fasteners shall comply with the nominal dimensions in ASTM F 1667.
s. See Section R703.10.2.
t. Face nailing: one 6d common nail through the over lap ping planks at each stud. Concealed nailing: one 11 gage $1^1/_2$ inch long galv. roofing nail through the top edge of each plank at each stud.
u. See Section R703.2 exceptions.
v. Minimum nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
w. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and shall comply with the requirements in Sections 6.1 and 6.3 of TMS-402 ACI 530/ASCE 5.
x. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.
y. Minimum fastener length must accommodate sheathing and penetrate framing 0.75 inches or in accordance with the manufacturer's installation instructions.
z. Where approved by the manufacturer's instructions or test report siding shall be permitted to be installed with fasteners penetrating not less than 0.75 inches through wood or wood structural sheathing with or without penetration into the framing.
aa. Polypropylene siding shall comply with ASTM D7254.

703.13 Polypropylene siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D7254 by an approved quality control agency.

703.13.1 Polypropylene siding and accessories shall be installed in accordance with manufacturer's installation instructions.

703.13.1.1 Polypropylene siding shall be installed over and attached to sheathing or other substrate, composed of wood or wood-based material with minimum thickness of 7/16 -inch, or other materials and fasteners having equivalent withdrawal resistance.

703.13.1.2 Fastener requirements. Unless otherwise specified in the approved manufacturer's instructions, nails shall be corrosion resistant, with a minimum 0.120 shank and minimum 0.313 head diameter and fully penetrate sheathing or penetrate the substrate a minimum 3/4 inch. The end of the fastener shall extend a minimum of ¼ inch beyond the opposite face of the sheathing or nailable sheathing. Staples are not permitted.

703.13.2 Polypropylene siding shall comply with section 703.13.2.1

703.13.2.1 Polypropylene siding shall not be installed on walls with a fire separation distance of less than 5 feet (1524 mm) and walls not closer than 10 feet to a building on another lot.

> **Exception:** Walls perpendicular to the line used to determine the *fire separation distance*.

Add new definition as follow:

POLYPROPYLENE SIDING. A shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases contains fillers or reinforcements, that is used to clad *exterior walls* or buildings.

Add new standard to Chapter 44 as follows:

ASTM

D 7254 Standard Specification for Polypropylene (PP) Siding

Reason: This change mirrors requirements for polypropylene siding in the 2012/2015 International Building Code (IBC), by adding them to the International Residential Code.

This provision sets minimum performance requirements for polypropylene siding and requires a third party quality control agency to verify compliance to an internationally accepted ASTM standard. Additionally, confusion in the marketplace and by building officials on use of polypropylene siding vs. vinyl siding is removed, as appropriate installation and use of polypropylene siding are detailed.

The proposed definition conforms to the definition in the IBC and ASTM D7254 standard. Use of polypropylene siding is also limited on walls that face each other in high density settings, similar to the intent of the requirement in the IBC.

Not all polypropylene siding products on the market today are third party certified to internationally accepted standards which set minimum performance; our industry believes there should be minimum performance requirements for compliance with the building code.


The *VSI Product Certification Program* added certification of polypropylene siding in 2010. Additionally, several manufacturers have code compliant evaluation reports for their products. The *VSI Product Certification Program* allows manufacturers to certify, with independent third-party verification by an approved quality control agency, that certain polypropylene siding meets or exceeds the ASTM D7254 Standard Specification for Polypropylene (PP) Siding. The program is not exclusive to VSI members and any manufacturer can participate. It has been in place since 1998 when vinyl siding certification began.

Polypropylene siding certified through the program is verified by a third-party, approved quality control agency to meet or exceed the ASTM D7254 Standard Specification for Polypropylene (PP) Siding. Certified polypropylene siding is tested to:

- Weather the elements over time without cracking, chipping, flaking, pitting, or peeling.
- Meet impact resistance requirements.
- Withstand wind pressures equivalent to 110 mph or more.
- Demonstrate flame spread performance equivalent to or better than wood materials commonly used in building construction.

Although polypropylene siding panels are specific to each manufacturer, there is general consensus among manufacturers on several installation requirements. These include:

- Use of a water-resistive barrier
- Substrate installed with polypropylene siding panels, typically OSB or plywood, must have a minimum fastener withdrawal resistance because fastener spacing varies from 5 inches to 12 inches. The fasteners must have a substrate to penetrate because they will not penetrate studs in most cases because of the typical 16 inch on center spacing.
- No attachment directly over studs
- Fastener size and length are specified; staples are not allowed
- Manufacturer specified fastener spacing

Specifications for installation, including underlayment and fasteners, are necessary for polypropylene siding, so building officials and specifiers recognize the differences between installation of vinyl siding and polypropylene siding.

For more information on polypropylene siding, go to http://www.polypropylenesiding.org/.

Cost Impact: This change will have minimal cost impact as many products on the market are already certified.

Analysis: A review of the standard proposed for inclusion in the code, ASTM D 7254 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

For staff analysis of the content of ASTM D7254-07 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: Approved as Modified

Modify the proposal as follows:

R703.13 Polypropylene siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D7254 by an approved quality control agency.

R703.13.1 Polypropylene siding and accessories shall be installed in accordance with manufacturer's installation instructions.

R703.13.1.1 Polypropylene siding shall be installed over and attached to wood structural panel sheathing ~~or other substrate, composed of wood or wood-based material~~ with minimum thickness of 7/16 -inch~~,~~ or other substrate, composed of wood or wood-based material ~~materials~~ and fasteners having equivalent withdrawal resistance.

R703.13.1.2 Fastener requirements. Unless otherwise specified in the approved manufacturer's instructions, nails shall be corrosion resistant, with a minimum 0.120 shank and minimum 0.313 head diameter. Nails shall be a minimum of 1 1/4'" long or as necessary to ~~and fully~~ penetrate sheathing or ~~penetrate the~~ substrate a minimum 3/4 inch. Where the nail fully penetrates the sheathing or nailable substrate, the ~~The~~ end of the fastener shall extend a minimum of ¼ inch beyond the opposite face of the sheathing or ~~nailable sheathing~~. Substrate. Staples are not permitted.

~~**703.13.2** Polypropylene siding shall comply with section 703.13.2.1~~

~~**703.13.2.1**~~ **R703.13.2** Polypropylene siding shall not be installed on walls with a fire separation distance of less than 5 feet (1524 mm) and walls ~~not~~ closer than 10 feet to a building on another lot.

Exception: Walls perpendicular to the line used to determine the *fire separation distance.*

Committee Reason: This change introduces a new product and a new standard into the code. The modification clarifies the text and adds a minimum length for the nails.

Assembly Action: **None**

Final Hearing Results

RB387-13	**AM**

Code Change No: RB389-13

Original Proposal

Section(s): R703.4, Table R703.4, R703.13 (NEW), R703.13.1 (NEW), Table R703.13.1 (NEW), R703.13.2 (NEW), Table R703.13.2 (NEW),

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee and American Chemistry Council (jcrandell@aresconsulting.biz)

Revise as follows:

R703.4 Attachments. Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other *approved* aluminum, stainless steel, zinc-coated or other *approved* corrosion-resistive fasteners. Where the basic wind speed in accordance with Figure R301.2(4)A is 110 miles per hour (49 m/s) or higher, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3). Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Section R703.13.

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[aa]	Direct to studs	Number or spacing of fasteners

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.
b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.
c. Staples shall have a minimum crown width of $^7/_{16}$-inch outside diameter and be manufactured of minimum 16-gage wire.
d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.
e. Aluminum nails shall be used to attach aluminum siding.
f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.
g. All attachments shall be coated with a corrosion-resistant coating.
h. Shall be of approved type.
i. Three-eighths-inch plywood shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. Plywood $^1/_2$-inch or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.
j. Wood board sidings applied vertically shall be nailed to horizontal nailing strips or blocking set 24 inches on center. Nails shall penetrate $1^1/_2$ inches into studs, studs and wood sheathing combined or blocking.
k. Hardboard siding shall comply with CPA/ANSI A135.6.
l. Vinyl siding shall comply with ASTM D 3679.
m. Minimum shank diameter of 0.092 inch, minimum head diameter of 0.225 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
n. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.
o. Minimum shank diameter of 0.099 inch, minimum head diameter of 0.240 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
p. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.

q. See Section R703.10.1.
r. Fasteners shall comply with the nominal dimensions in ASTM F 1667.
s. See Section R703.10.2.
t. Face nailing: one 6d common nail through the over lap ping planks at each stud. Concealed nailing: one 11 gage $1^1/_2$ inch long galv. roofing nail through the top edge of each plank at each stud.
u. See Section R703.2 exceptions.
v. Minimum nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
w. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and shall comply with the requirements in Sections 6.1 and 6.3 of TMS-402 ACI 530/ASCE 5.
x. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.
y. Minimum fastener length must accommodate sheathing and penetrate framing 0.75 inches or in accordance with the manufacturer's installation instructions.
z. Where approved by the manufacturer's instructions or test report siding shall be permitted to be installed with fasteners penetrating not less than 0.75 inches through wood or wood structural sheathing with or without penetration into the framing.
aa. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Section R703.13.

R703.13 Cladding attachment over foam sheathing to wood framing. Cladding shall be specified and installed in accordance with Section R703, the cladding manufacturer's approved installation instructions, including any limitations for use over foam plastic sheathing, or an approved design. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section R703.13.1, Section R703.13.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section R703.9.
3. For anchored masonry or stone veneer installed over foam sheathing; refer to Section R703.7.

R703.13.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table R703.13.1.

TABLE R703.13.1
CLADDING MINIMUM FASTENING REQUIREMENTS
FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING
TO SUPPORT CLADDING WEIGHT[a]

Cladding Fastener Through Foam Sheathing into:	Cladding Fastener Type and Minimum Size[b]	Cladding Fastener Vertical Spacing (inches)	Maximum Thickness of Foam Sheathing[c] (inches)					
			16" o.c. Fastener Horizontal Spacing			24" o.c. Fastener Horizontal Spacing		
			Cladding Weight:			Cladding Weight:		
			3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Wood Framing (minimum 1-1/4 inch penetration)	0.113" diameter nail	6	2	1	DR	2	0.75	DR
		8	2	1	DR	2	0.5	DR
		12	2	0.5	DR	2	DR	DR
	0.120" diameter nail	6	3	1.5	0.5	3	0.75	DR
		8	3	1	DR	3	0.5	DR
		12	3	0.5	DR	2	DR	DR
	0.131" diameter nail	6	4	2	0.75	4	1	DR
		8	4	1.5	0.5	4	0.75	DR
		12	4	0.75	DR	2	0.5	DR
	0.162" diameter nail	6	4	4	1.5	4	2	1
		8	4	3	1	4	1.5	0.75
		12	4	2	0.75	4	1	DR

For SI: 1 inch = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa
DR = design required
o.c. = on center

a. Wood framing shall be Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS.
b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
c. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C 578 or ASTM C 1289.

R703.13.2 Furred cladding attachment. Where wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table R703.13.2. Where placed horizontally, wood furring shall be preservative treated wood in accordance with Section R317.1 or naturally durable wood and fasteners shall be corrosion resistant in accordance Section R317.3.

TABLE R703.13.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a,b]

Furring Material	Framing Member	Fastener Type and Minimum Size	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing[d] (inches)						Allowable Design Wind Pressure for Furring (psf)	
					16"oc Furring[e]			24"oc Furring[e]				
					Siding Weight:			Siding Weight:				
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf	16"oc Furring	24"oc Furring
Minimum 1x Wood Furring[c]	Minimum 2x Wood Stud	0.131" diameter nail	1-1/4	8	4	2	1	4	1.5	DR	46.5	31.0
				12	4	1.5	DR	3	1	DR	31.0	20.7
				16	4	1	DR	3	0.5	DR	23.3	15.5
		0.162" diameter nail	1-1/4	8	4	4	1.5	4	2	0.75	57.5	38.3
				12	4	2	0.75	4	1.5	DR	38.3	25.6
				16	4	1.5	DR	4	1	DR	28.8	19.2
		#10 wood screw	1	12	4	2	0.75	4	1.5	DR	107.3	71.6
				16	4	1.5	DR	4	1	DR	79.0	52.7
				24	4	1	DR	3	DR	DR	35.1	23.4
		¼" lag screw	1-1/2	12	4	3	1	4	2	0.5	140.4	93.6
				16	4	1.5	DR	4	1.5	DR	79.0	52.7
				24	4	1.5	DR	4	0.75	DR	35.1	23.4

For SI: 1" = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa.
DR = design required
o.c. = on center
a. Wood framing and furring shall be Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS.
b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
c. Where the required cladding fastener penetration into wood material exceeds ¾ inch (19.1 mm) and is not more than 1-1/2 inches (38.1 mm), a minimum 2x wood furring shall be used or an approved design.
d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C 578 or ASTM C 1289.
e. Furring shall be spaced a maximum of 24 inches (610 mm) on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8 inch (203.2 mm) and 12 inch (304.8 mm) fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches (406.4 mm) and 24 inches (610 mm) on center, respectively.

Reason: The proposed cladding connection requirements were proposed for the IBC 2015 (FS 195-11/12) but were withdrawn at the final action hearing to address more recent research to improve connection performance. An earlier version of these siding connection requirements already exist in the New York State Energy Code which is based on the 2009 IECC. Similar requirements for the IECC 2012 were denied last year mainly because it was felt that they belonged in the building code, not the energy code. These requirements fill an information gap in the IRC provisions for exterior wall covering assemblies that include foam plastic insulation. Separate proposals address connection to other wall framing materials and were approved for the 2015 IBC.

The proposed requirements are based on a project sponsored by the New York State Energy Research and Development Agency (NYSERDA). The project report is available for download at www.nyserda.ny.gov/~/media/Files/Publications/Research/Other Technical Reports/fastening-systems-for-continuous-insulation.pdf . The report explains the technical basis for the proposed requirements which, for purposes of this proposal, have been modified to increase the reduction factor to control deflection from 1.5 to 3 (fastener strength halved) to better ensure long-term deflection control. For comparison, the reduction factor used in the NDS provisions for fastener shear resistance calculation is 2.2.

The purpose of the NYSERDA project was to develop prescriptive fastening requirements for cladding materials installed over foam sheathing to ensure adequate performance. The project included testing of cladding attachments through various thicknesses of foam sheathing using various fastener types on steel frame wall assemblies (see separate proposal for attachment to steel framing). Supplemental testing also was sponsored by the Foam Sheathing Coalition (lab report available at http://fsc.americanchemistry.com/Building-Code/Installation-of-Cladding) to address attachments to wood framing and the resulting data is included in the data set analyzed and presented in the NYSERDA project report. The proposed cladding attachment requirements and foam sheathing thickness limits are based on rational analysis verified by the extensive test data to control cladding connection movement to no more than 0.015" slip under cladding weight or dead load. This deflection controlled approach resulted in safety factors commonly in the range of 5 to 8 relative to average shear capacity. Similar tests by other independent parties, such Wiss, Janey, & Elsner (unpublished data) and also Building Science Corporation for DOE's Building America program (report pending) have shown similar results and have contributed to the verification of this proposal.

Finally, the proposal provides prescriptive requirements for attachment of furring to resist wind loading – something that is currently not addressed in the IRC. Furring is a common means of attaching cladding over foam sheathing and provides for improved siding durability. The allowable wind pressure limits are based on the lesser of fastener withdrawal and furring bending strength.

Three separate proposals for wood, steel, and concrete/masonry wall applications have been prepared to ensure that these different applications are considered independently. If one or more these proposals are approved, the proponent will work with ICC staff to resolve duplicative formatting/numbering of the proposed new code sections.

Cost Impact:

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

TABLE R703.13.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a,b]

Furring Material	Framing Member	Fastener Type and Minimum Size	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing[d] (inches)						~~Allowable Design Wind Pressure for Furring (psf)~~	
					16"oc Furring[e]			24"oc Furring[e]				
					Siding Weight:			Siding Weight:				
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf	~~16"oc Furring~~	~~24"oc Furring~~
Minimum 1x Wood Furring[c]	Minimum 2x Wood Stud	0.131" diameter nail	1-1/4	8	4	2	1	4	1.5	DR	~~46.5~~	~~31.0~~
				12	4	1.5	DR	3	1	DR	~~31.0~~	~~20.7~~
				16	4	1	DR	3	0.5	DR	~~23.3~~	~~15.5~~
		0.162" diameter nail	1-1/4	8	4	4	1.5	4	2	0.75	~~57.5~~	~~38.3~~
				12	4	2	0.75	4	1.5	DR	~~38.3~~	~~25.6~~
				16	4	1.5	DR	4	1	DR	~~28.8~~	~~19.2~~
		#10 wood screw	1	12	4	2	0.75	4	1.5	DR	~~107.3~~	~~71.6~~
				16	4	1.5	DR	4	1	DR	~~79.0~~	~~52.7~~
				24	4	1	DR	3	DR	DR	~~35.1~~	~~23.4~~
		¼" lag screw	1-1/2	12	4	3	1	4	2	0.5	~~140.4~~	~~93.6~~
				16	4	1.5	DR	4	1.5	DR	~~79.0~~	~~52.7~~
				24	4	1.5	DR	4	0.75	DR	~~35.1~~	~~23.4~~

(Portions of proposal not shown remain unchanged)

Committee Reason: Approval was based upon the proponent's published reason. The modification deletes the allowable design wind pressure columns that is better handled by other sections of the code.

Assembly Action: None

Final Hearing Results

RB389-13 AM

Code Change No: RB390-13

Original Proposal

Section(s): R703.4, Table R703.4, R703.13 (NEW), R703.13.1 (NEW), Table R703.13.1 (NEW), R703.13.2 (NEW), Table R703.13.2 (NEW)

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee and American Chemistry Council (jcrandell@aresconsulting.biz); Mark Nowak, M Nowak Consulting LLC, representing Steel Framing Alliance

Revise as follows:

R703.4 Attachments. Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other *approved* aluminum, stainless steel, zinc-coated or other *approved* corrosion-resistive fasteners. Where the basic wind speed in accordance with Figure R301.2(4)A is 110 miles per hour (49 m/s) or higher, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3). <u>Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Section R703.13.</u>

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud<u>[aa]</u>	Direct to studs	Number or spacing of fasteners

(Portions of Table not shown remain unchanged)

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.
b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.
c. Staples shall have a minimum crown width of $^{7}/_{16}$-inch outside diameter and be manufactured of minimum 16-gage wire.
d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.
e. Aluminum nails shall be used to attach aluminum siding.
f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 I nches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.
g. All attachments shall be coated with a corrosion-resistant coating.
h. Shall be of approved type.
i. Three-eighths-inch plywood shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. Plywood $^{1}/_{2}$-inch or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.
j. Wood board sidings applied vertically shall be nailed to horizontal nailing strips or blocking set 24 inches on center. Nails shall penetrate $1^{1}/_{2}$ inches into studs, studs and wood sheathing combined or blocking.
k. Hardboard siding shall comply with CPA/ANSI A135.6.
l. Vinyl siding shall comply with ASTM D 3679.
m. Minimum shank diameter of 0.092 inch, minimum head diameter of 0.225 inch, and nail length must accommodate sheathing and penetrate framing $1^{1}/_{2}$ inches.

n. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.
o. Minimum shank diameter of 0.099 inch, minimum head diameter of 0.240 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
p. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.
q. See Section R703.10.1.
r. Fasteners shall comply with the nominal dimensions in ASTM F 1667.
s. See Section R703.10.2.
t. Face nailing: one 6d common nail through the over lap ping planks at each stud. Concealed nailing: one 11 gage $1^1/_2$ inch long galv. roofing nail through the top edge of each plank at each stud.
u. See Section R703.2 exceptions.
v. Minimum nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
w. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and shall comply with the requirements in Sections 6.1 and 6.3 of TMS-402 ACI 530/ASCE 5.
x. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.
y. Minimum fastener length must accommodate sheathing and penetrate framing 0.75 inches or in accordance with the manufacturer's installation instructions.
z. Where approved by the manufacturer's instructions or test report siding shall be permitted to be installed with fasteners penetrating not less than 0.75 inches through wood or wood structural sheathing with or without penetration into the framing.
a.a. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Section R703.13.

R703.13 Cladding attachment over foam sheathing to cold-formed steel framing. Cladding shall be specified and installed in accordance with Section R703, the cladding manufacturer's approved installation instructions, including any limitations for use over foam plastic sheathing, or an approved design. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section R703.13.1, Section R703.13.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section R703.9.
3. For anchored masonry or stone veneer installed over foam sheathing; refer to Section R703.7.

R703.13.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table R703.13.1.

TABLE R703.13.1
CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1]

Cladding Fastener Through Foam Sheathing into:	Cladding Fastener Type and Minimum Size[2]	Cladding Fastener Vertical Spacing (inches)	Maximum Thickness of Foam Sheathing[3] (inches)					
			16"oc Fastener Horizontal Spacing			24"oc Fastener Horizontal Spacing		
			Cladding Weight:			Cladding Weight:		
			3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Steel Framing (minimum penetration of steel thickness + 3 threads)	#8 screw into 33 mil steel or thicker	6	3	3	1.5	3	2	DR
		8	3	2	0.5	3	1.5	DR
		12	3	1.5	DR	3	0.75	DR
	#10 screw into 33 mil steel	6	4	3	2	4	3	0.5
		8	4	3	1	4	2	DR
		12	4	2	DR	3	1	DR
	#10 screw	6	4	4	3	4	4	2

	into 43 mil	8	4	4	2	4	3	1.5
	steel or thicker	12	4	3	1.5	4	3	DR

For SI: 1 inch = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa
DR = design required
o.c. = on center

1. Steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
2. Screws shall comply with the requirements of ASTM C1513.
3. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C 578 or ASTM C 1289.

R703.13.2 Furred cladding attachment. Where steel or wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table R703.13.2. Where placed horizontally, wood furring shall be preservative treated wood in accordance with Section R317.1 or naturally durable wood and fasteners shall be corrosion resistant in accordance Section R317.3. Steel furring shall have a minimum G60 galvanized coating.

TABLE R703.13.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1]

Furring Material	Framing Member	Fastener Type and Minimum Size[2]	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing[4] (inches)						Allowable Design Wind Pressure for Furring (psf)	
					16"oc FURRING[5]			24"oc FURRING[5]			16"oc Furring	24"oc Furring
					Cladding Weight:			Cladding Weight:				
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf		
Minimum 33mil Steel Furring or Minimum 1x Wood Furring[3]	33 mil Steel Stud	#8 screw	Steel thickness + 3 threads	12	3	1.5	DR	3	0.5	DR	52.9	35.3
				16	3	1	DR	2	DR	DR	39.7	26.5
				24	2	DR	DR	2	DR	DR	26.5	17.6
		#10 screw	Steel thickness + 3 threads	12	4	2	DR	4	1	DR	62.9	41.9
				16	4	1.5	DR	3	DR	DR	47.1	31.4
				24	3	DR	DR	2	DR	DR	31.4	21.0
	43 mil or thicker Steel Stud	#8 Screw	Steel thickness + 3 threads	12	3	1.5	DR	3	0.5	DR	69.0	46.0
				16	3	1	DR	2	DR	DR	51.8	34.5
				24	2	DR	DR	2	DR	DR	34.5	23.0
		#10 screw	Steel thickness + 3 threads	12	4	3	1.5	4	3	DR	81.9	54.6
				16	4	3	0.5	4	2	DR	61.5	41.0
				24	4	2	DR	4	0.5	DR	35.1	23.4

For SI: 1" = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa.
DR = design required
o.c. = on center

1. Wood furring shall be Spruce-Pine-Fir or any softwood species with a specific gravity of 0.42 or greater. Steel furring shall be minimum 33 ksi steel. Steel studs shall be minimum 33 ksi steel for 33mil and 43 mil thickness and 50 ksi steel for 54 mil steel or thicker.
2. Screws shall comply with the requirements of ASTM C1513.
3. Where the required cladding fastener penetration into wood material exceeds ¾ inch (19.1 mm) and is not more than 1-1/2 inches (38.1 mm), a minimum 2 inch (51 mm) nominal wood furring shall be used or an approved design.
4. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C 578 or ASTM C 1289.
5. Furring shall be spaced a maximum of 24 inches (610 mm) on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8 inch (203.2 mm) and 12 inch (304.8 mm) fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches (406.4 mm) and 24 inches (610 mm) on center, respectively.

Reason: The proposed cladding connection requirements have been approved for the 2015 IBC (FS 194-11/12) and already exist in the New York State Energy Code which is based on the 2009 IECC. Similar requirements for the IECC 2012 were considered last code cycle, but it was clearly expressed that these provision are a better fit for the building code. These requirements fill an important need in the IRC provisions for exterior wall covering assemblies that include foam plastic insulation.

The proposed requirements are based on a project sponsored by the New York State Energy Research and

Development Agency (NYSERDA) and the Steel Framing Alliance. The project report is available for download at http://data.memberclicks.com/site/sfa/NYSERDA_TASK_3_REPORT%20-%20FINAL_(3-22-10).pdf . The report explains the technical basis for the proposed requirements.

The purpose of the NYSERDA project was to develop prescriptive fastening requirements for cladding materials installed over foam sheathing to ensure adequate performance. The project included testing of cladding attachments through various thicknesses of foam sheathing using various fastener types on steel frame wall assemblies. Supplemental testing also was sponsored by the Foam Sheathing Coalition (lab report available at www.foamsheathing.org) to address attachments to wood framing and the resulting data is included in the data set analyzed and presented in the NYSERDA project report. The proposed cladding attachment requirements and foam sheathing thickness limits are based on rational analysis verified by the extensive test data to control cladding connection movement to no more than 0.015" slip under cladding weight or dead load. This deflection controlled approach resulted in safety factors commonly in the range of 5 to 8 relative to average shear capacity.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE R703.13.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1]

Furring Material	Framing Member	Fastener Type and Minimum Size[2]	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing[4] (inches)						~~Allowable Design Wind Pressure for Furring (psf)~~	
					16"oc FURRING[5]			24"oc FURRING[5]			~~16"oc Furring~~	~~24"oc Furring~~
					Cladding Weight:			Cladding Weight:				
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf		
Minimum 33mil Steel Furring or Minimum 1x Wood Furring[3]	33 mil Steel Stud	#8 screw	Steel thickness + 3 threads	12	3	1.5	DR	3	0.5	DR	~~52.9~~	~~35.3~~
				16	3	1	DR	2	DR	DR	~~39.7~~	~~26.5~~
				24	2	DR	DR	2	DR	DR	~~26.5~~	~~17.6~~
		#10 screw	Steel thickness + 3 threads	12	4	2	DR	4	1	DR	~~62.9~~	~~41.9~~
				16	4	1.5	DR	3	DR	DR	~~47.1~~	~~31.4~~
				24	3	DR	DR	2	DR	DR	~~31.4~~	~~21.0~~
	43 mil or thicker Steel Stud	#8 Screw	Steel thickness + 3 threads	12	3	1.5	DR	3	0.5	DR	~~69.0~~	~~46.0~~
				16	3	1	DR	2	DR	DR	~~51.8~~	~~34.5~~
				24	2	DR	DR	2	DR	DR	~~34.5~~	~~23.0~~
		#10 screw	Steel thickness + 3 threads	12	4	3	1.5	4	3	DR	~~81.9~~	~~54.6~~
				16	4	3	0.5	4	2	DR	~~61.5~~	~~41.0~~
				24	4	2	DR	4	0.5	DR	~~35.1~~	~~23.4~~

Committee Reason: Approval was based upon the proponent's published reason. The modification deletes the allowable design wind pressure columns that is better handled by other sections of the code.

Assembly Action: **None**

Final Hearing Results

RB390-13 **AM**

Code Change No: RB391-13

Original Proposal

Section(s): R703.4, Table R703.4, R703.13 (NEW)

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee / American Chemistry Council (jcrandell@aresconsulting.biz)

Revise as follows:

R703.4 Attachments. Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other *approved* aluminum, stainless steel, zinc-coated or other *approved* corrosion-resistive fasteners. Where the basic wind speed in accordance with Figure R301.2(4)A is 110 miles per hour (49 m/s) or higher, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3). Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Section R703.13.

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[aa]	Direct to studs	Number or spacing of fasteners

(Portions of Table not shown remain unchanged)

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.
b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.
c. Staples shall have a minimum crown width of $^{7}/_{16}$-inch outside diameter and be manufactured of minimum 16-gage wire.
d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.
e. Aluminum nails shall be used to attach aluminum siding.
f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.
g. All attachments shall be coated with a corrosion-resistant coating.
h. Shall be of approved type.
i. Three-eighths-inch plywood shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. Plywood $^{1}/_{2}$-inch or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.
j. Wood board sidings applied vertically shall be nailed to horizontal nailing strips or blocking set 24 inches on center. Nails shall penetrate $1^{1}/_{2}$ inches into studs, studs and wood sheathing combined or blocking.
k. Hardboard siding shall comply with CPA/ANSI A135.6.
l. Vinyl siding shall comply with ASTM D 3679.
m. Minimum shank diameter of 0.092 inch, minimum head diameter of 0.225 inch, and nail length must accommodate sheathing a nd penetrate framing $1^{1}/_{2}$ inches.
n. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.

o. Minimum shank diameter of 0.099 inch, minimum head diameter of 0.240 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
p. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.
q. See Section R703.10.1.
r. Fasteners shall comply with the nominal dimensions in ASTM F 1667.
s. See Section R703.10.2.
t. Face nailing: one 6d common nail through the over lap ping planks at each stud. Concealed nailing: one 11 gage $1^1/_2$ inch long galv. roofing nail through the top edge of each plank at each stud.
u. See Section R703.2 exceptions.
v. Minimum nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.
w. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and shall comply with the requirements in Sections 6.1 and 6.3 of TMS-402 ACI 530/ASCE 5.
x. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.
y. Minimum fastener length must accommodate sheathing and penetrate framing 0.75 inches or in accordance with the manufacturer's installation instructions.
z. Where approved by the manufacturer's instructions or test report siding shall be permitted to be installed with fasteners penetrating not less than 0.75 inches through wood or wood structural sheathing with or without penetration into the framing.
aa. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Section R703.13.

R703.13 Cladding attachment over foam sheathing to masonry or concrete wall construction.
Cladding shall be specified and installed in accordance with Section 703.4 and the cladding manufacturer's installation instructions or an approved design. Foam sheathing shall be attached to masonry or concrete construction in accordance with the insulation manufacturer's installation instructions or an approved design. Furring and furring attachments through foam sheathing into concrete or masonry substrate shall be designed to resist design loads determined in accordance with Section R301, including support of cladding weight as applicable. Fasteners used to attach cladding or furring through foam sheathing to masonry or concrete substrates shall be approved for application into masonry or concrete material and shall be installed in accordance with the fastener manufacturer's installation instructions.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing and connection to a masonry or concrete substrate, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section R703.9.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section R703.7.

Reason: Two other proposals submitted on the topic of attachment of cladding through foam sheathing address wood and steel framing applications based on experimental data and rational analysis addressed in the reason statements for those proposals. Similar solutions and guidance for attachment of cladding to masonry/concrete walls through foam sheathing is needed. Research is not yet available to justify prescriptive "off-the-shelf" solutions with standardized types of concrete/masonry fasteners. Also, many fasteners best suited for this application are proprietary and approved data and design is the best approach. Therefore, this proposal requires engineered design of cladding connections through foam sheathing to masonry/concrete. The exceptions recognize cases where appropriate attachment solutions may already exist. An identical provision was approved for the 2015 IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The following is errata that was not posted to the ICC website. (Footnote d should not be underlined):

TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.

(Portions of proposal not shown remain unchanged)

Committee Action: **Approved as Submitted**

Committee Reason: This change adds the provision for attaching cladding over foam sheathing to concrete or masonry walls.

Assembly Action: **None**

Final Hearing Results

RB391-13	**AS**

Code Change No: RB392-13

Original Proposal

Section(s): R703.2, R703.3, Table R703.3 (New), R703.3.1, R703.3.2, R703.4, Table R703.4, R703.3.1, R703.3.2, R703.3.3 (New), R703.5.1 (New), R703.8, R703.12, R703.12.3 (New)

Proposed Change as Submitted

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R703.2 Water-resistive barrier. One layer of No. 15 asphalt felt, free from holes and breaks, complying with ASTM D 226 for Type 1 felt or other approved water-resistive barrier shall be applied over studs or sheathing of all exterior walls. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm). The felt or other approved material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1.

> **Exception:** Omission of the water-resistive barrier is permitted in the following situations:
>
> 1. In detached accessory buildings.
> 2. ~~Under exterior wall finish materials as permitted in Table R703.4.~~
> ~~3~~ 2. Under paperbacked stucco lath when the paper backing is an approved water-resistive barrier.

~~R703.4~~ R703.3 Nominal thickness and attachments. ~~Unless specified otherwise, all~~ The nominal thickness and attachment of exterior wall coverings shall be ~~securely fastened~~ in accordance with Table ~~R703.4~~ R703.3, the wall covering material requirements of this section, and the wall covering manufacturer's installation instructions ~~or with other *approved* aluminum, stainless steel, zinc-coated or other *approved* corrosion-resistive fasteners~~. Nominal material thicknesses in Table R703.3 are based on a maximum stud spacing of 16 inches on center. Where specified by the siding manufacturer's instructions and supported by a test report or other documentation, attachment to studs with greater spacing is permitted. Fasteners for exterior wall coverings shall be in accordance with Section R703.3.2

R703.3.1 Wind limitations. Where the basic wind speed in accordance with Figure R301.2(4)A is 110 miles per hour (49 m/s) or higher, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

R703.3.2 Fasteners. Exterior wall coverings shall be securely fastened with aluminum, galvanized, stainless steel or rust-preventative coated nails or staples in accordance with Table R703.3 or with other *approved* corrosion-resistant fasteners in accordance with the wall covering manufacturer's installation instructions. Nails and staples shall comply with ASTM F 1667. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples shall have a minimum crown width of 7/16-inch outside diameter and be manufactured of minimum 16 gage wire. Where fiberboard, gypsum, or foam plastic sheathing backing is used, nails or staples shall be driven into the studs. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.

R703.3.3 Minimum fastener length and penetration. Fasteners shall have the greater of the minimum length specified in Table R703.3 or as required to provide a minimum penetration into framing as follows:

1. Fasteners for horizontal aluminum siding, steel siding, particleboard panel siding, wood structural panel siding per ANSI/APA-PRP 210, fiber-cement panel siding, and fiber-cement lap siding installed over foam plastic sheathing shall penetrate a minimum of 1-1/2 inches into framing or shall be in accordance with the manufacturer's installation instructions.
2. Fasteners for hardboard panel and lap siding shall penetrate a minimum of 1-1/2 inches into framing.
3. Fasteners for vinyl siding installed over wood or wood structural panel sheathing shall penetrate a minimum of 1-1/4 inches into sheathing and framing combined. Where approved by the manufacturer's instructions or test report, vinyl siding shall be permitted to be installed with fasteners penetrating not less than .75 inches through wood or wood structural sheathing with or without penetration into the framing. Fasteners for vinyl siding installed over foam plastic sheathing shall be in accordance with Section R703.11.2. Fasteners for vinyl siding installed over fiberboard or gypsum sheathing or direct to studs shall penetrate a minimum of 1-1/4 inches into framing.
4. Fasteners for vertical or horizontal wood siding shall penetrate a minimum of 1-1/2 inches into studs, studs and wood sheathing combined, or blocking.
5. Fasteners for siding material installed over foam plastic sheathing shall have sufficient length to accommodate foam plastic sheathing thickness and to penetrate framing or sheathing and framing combined as specified above.

~~R703.8~~ R703.4 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:
   - 1.1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall also incorporate flashing or protection at the head and sides.
   - 1.2. In accordance with the flashing design or method of a registered design professional.
   - 1.3. In accordance with other approved methods.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

~~R703.3~~ R703.5 Wood, hardboard and wood structural panel siding. Wood, hardboard, and wood structural panel siding shall be installed in accordance with this section and Table R703.3. Hardboard siding shall comply with CPA/ANSI A135.6.

R703.5.1 Vertical wood siding. Wood siding applied vertically shall be nailed to horizontal nailing strips or blocking set no more than 24 inches on center.

~~R703.3.1~~ R703.5.2 Panel siding. 3/8" wood structural panel siding shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. 7/16" wood structural panel siding or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.

Joints in wood, hardboard or wood structural panel siding shall be made as follows unless otherwise approved. Vertical joints in panel siding shall occur over framing members, unless wood or wood structural panel sheathing is used, and shall be shiplapped or covered with a batten. Horizontal joints in panel siding shall be lapped a minimum of 1 inch (25 mm) or shall be shiplapped or shall be flashed with Z-flashing and occur over solid blocking, wood or wood structural panel sheathing.

~~R703.3.2~~ R703.5.3 Horizontal wood siding. Horizontal lap siding shall be installed in accordance with the manufacturer's recommendations. Where there are no recommendations the siding shall be lapped a minimum of 1 inch (25 mm), or 1/2 inch (13 mm) if rabbeted, and shall have the ends caulked, covered with a batten or sealed and installed over a strip of flashing.

R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall comply with the requirements of Section R703.6.3. Adhered masonry veneer shall be attached in accordance with Section R703.6.1 or the manufacturer's instructions. Adhered masonry veneer shall be installed in accordance with Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5 or the manufacturer's instructions.

R703.12.3 Water-resistive barrier. ~~The~~ A water-resistive barrier shall be installed~~,~~ as required by Section R703.2 and shall comply with the requirements of Section R703.6.3. The water-resistive barrier ~~Table R703.4, Footnote w,~~ shall lap over the exterior of the attachment flange of the screed or flashing provided in accordance with Section R703.12.2.

TABLE R703.3
SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL		NOMINAL THICKNESS(inches)	JOINT TREAT-MENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
Anchored veneer: brick, concrete, masonry or stone (See Section R703.7)		2	Per Section R703.7	Per Section R703.7					
Adhered veneer: concrete, stone or masonry (See Section R703.12)		—	Per Section R703.12	Per Section R703.12					
Fiber-cement siding	Panel siding (See Section R703.10.1)	5/16	(Per Section R703.10.1)	6d common (2" x 0.113")	6d common (2" x 0.113")	6d common (2" x 0.113")	6d common (2" x 0.113")	4d common (1½" x 0.099")	6" panel edges 12" inter. sup.

SIDING MATERIAL		NOMINAL THICKNESS(inches)	JOINT TREAT-MENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
	Lap siding (See Section R703.10.2)	5/16	(Per Section R703.10.2)	6d common (2” x 0.113”)	6d common (2” x 0.113”)	6d common (2” x 0.113”)	6d common (2” x 0.113”)	6d common (2” x 0.113”) or 11 gage roofing nail	Note f
Hardboard panel siding (See Section R703.3)		7/16	—	0.120” nail (shank) with 0.225” head	0.120” nail (shank) with 0.225” head	0.120” nail (shank) with 0.225” head	0.120” nail (shank) with 0.225” head	0.120” nail (shank) with 0.225” head	6” panel edges 12” inter. sup.[d]
Hardboard lap siding (See Section R703.3)		7/16	Note e	0.099” nail (shank) with 0.240” head	0.099” nail (shank) with 0.240” head	0.099” nail (shank) with 0.240” head	0.099” nail (shank) with 0.240” head	0.099” nail (shank) with 0.240” head	Same as stud spacing 2 per bearing
Horizontal aluminum[a]	Without insulation	0.019[b]	Lap	Siding nail 1½” x 0.120”	Siding nail 2” x 0.120”	Siding nail 2” x 0.120”	Siding nail 1½” x 0.120”	Not allowed	Same as stud spacing
		0.024	Lap	Siding nail 1½” x 0.120”	Siding nail 2” x 0.120”	Siding nail 2” x 0.120”	Siding nail 1½” x 0.120”	Not Allowed	
	With insulation	0.019	Lap	Siding nail 1½” x 0.120”	Siding nail 2½” x 0.120”	Siding nail 2½” x 0.120”	Siding nail 1½” x 0.120”	Siding nail 1½” x 0.120”	
Particleboard panels		3/8	—	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	Not allowed	6” panel edges 12” inter. sup.
		1/2	—	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	
		5/8	—	6d box nail (2” x 0.099”)	8d box nail (2½” x 0.113”)	8d box nail (2½” x 0.113”)	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	
Steel[c]		29 ga.	Lap	Siding nail (1¾” x 0.113”) Staple–1¾”	Siding nail (2¾” x 0.113”) Staple–2½”	Siding nail (2½” x 0.113”) Staple–2¼”	Siding nail (1¾” x 0.113”) Staple–1¾”	Not allowed	Same as stud spacing
Vinyl siding (See Section R703.11)		0.035	Lap	0.120” nail	0.120” nail (shank)	0.120” nail	0.120 nail (shank)	Not allowed	16 inches on center or

SIDING MATERIAL		NOMINAL THICKNESS(inches)	JOINT TREAT-MENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
				(shank) with a 0.313" head or 16 gauge staple with 3/8 to ½-inch crown	with a 0.313" head or 16 gauge staple with 3/8 to ½-inch crown	(shank) with a 0.313" head or 16 gauge staple with 3/8 to ½-inch crown	with a 0.313 head per Section R703.11.2		specified by the manufacturer instructions or test report
Wood siding (See Section R703.3)	Wood rustic, drop	3/8 Min	Lap	6d box or siding nail (2" x 0.099")	6d box or siding nail (2" x 0.099")	6d box or siding nail (2" x 0.099")	6d box or siding nail (2" x 0.099")	8d box or siding nail (2½" x 0.113") Staple–2"	Face nailing up to 6" widths, 1 nail per bearing; 8" widths and over, 2 nails per bearing
	Shiplap	19/32 Average	Lap						
	Bevel	7/16							
	Butt tip	3/16	Lap						
Wood structural panel ANSI/APA PRP-210 siding (exterior grade) (See Section R703.3)		3/8 – 1/2	Note e	2" x 0.099" siding nail	2½" x 0.113" siding nail	2½" x 0.113" siding nail	2½" x 0.113" siding nail	2" x 0.099" siding nail	6" panel edges 12" inter. sup.
Wood structural panel lapsiding (See Section R703.3)		3/8 – 1/2	Note e Note g	2" x 0.099" siding nail	2½" x 0.113" siding nail	2½" x 0.113" siding nail	2½" x 0.113" siding nail	2" x 0.099" siding nail	8" along bottom edge

For SI: 1 inch = 25.4 mm.

a. Aluminum nails shall be used to attach aluminum siding.

b. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.

c. Shall be of approved type.

d. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.

e. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.

f. Face nailing: one 6d common nail through the overlapping planks at each stud. Concealed nailing: one 11 gage 1½ inch long galv. roofing nail through the top edge of each plank at each stud in accordance with the manufacturer's installation instruction.

g. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.

~~TABLE R703.4~~
~~WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS~~

~~SIDING MATERIAL~~		~~NOMINAL THICKNESS[a] (inches)~~	~~JOINT TREATMENT~~	~~WATER-RESISTIVE BARRIER REQUIRED~~	~~TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]~~					
					~~Wood or wood structural panel sheathing into stud~~	~~Fiberboard sheathing into stud~~	~~Gypsum sheathing into stud~~	~~Foam plastic sheathing into stud~~	~~Direct to studs~~	~~Number or spacing of fasteners~~
~~Horizonal aluminum[e]~~	~~Without insulation~~	~~0.019[f]~~	~~Lap~~	~~Yes~~	~~0.120 nail 1½□ long~~	~~0.120 nail 2□~~	~~0.120 nail 2□~~	~~0.120 nail[y]~~	~~Not allowed~~	~~Same as stud spacing~~
		~~0.024~~	~~Lap~~	~~Yes~~	~~0.120 nail 1½□ long~~	~~0.120 nail 2□~~	~~0.120 nail 2□~~	~~0.120 nail[y]~~	~~Not allowed~~	

~~SIDING MATERIAL~~		~~NOMINAL THICKNESS[a] (inches)~~	~~JOINT TREATMENT~~	~~WATER-RESISTIVE BARRIER REQUIRED~~	~~TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]~~					
					~~Wood or wood structural panel sheathing into stud~~	~~Fiberboard sheathing into stud~~	~~Gypsum sheathing into stud~~	~~Foam plastic sheathing into stud~~	~~Direct to studs~~	~~Number or spacing of fasteners~~
	~~With insulation~~	~~0.019~~	~~Lap~~	~~Yes~~	~~0.120 nail 1 1/2□ long~~	~~0.120 nail 2 1/2□ long~~	~~0.120 nail 2 1/2□ long~~	~~0.120 nail[y]~~	~~0.120 nail 1 1/2□ long~~	
~~Anchored veneer: brick, concrete, masonry or stone~~		~~2~~	~~Section R703~~	~~Yes~~	~~See Section R703 and Figure R703.7[g]~~					
~~Adhered veneer: concrete, stone or masonry[w]~~		~~—~~	~~Section R703~~	~~Yes Note w~~	~~See Section R703.6.1[g] or in accordance with the manufacturer's instructions.~~					
~~Hardboard[k] Panel siding-vertical~~		~~7/16~~	~~—~~	~~Yes~~	~~Note m~~	~~Note m~~	~~Note m~~	~~Note m~~	~~Note m~~	~~6□ edges 12□ inter. sup.[n]~~
~~Hardboard[k] Lap-siding-horizontal~~		~~7/16~~	~~Note p~~	~~Yes~~	~~Note o~~	~~Note o~~	~~Note o~~	~~Note o~~	~~Note o~~	~~Same as stud spacing 2 per bearing~~
~~Steel[h]~~		~~29 ga.~~	~~Lap~~	~~Yes~~	~~0.113 nail 1 3/4□ Staple-1 3/4□~~	~~0.113 nail 2 3/4□ Staple-2 1/2□~~	~~0.113 nail 2 1/2□ Staple-2 1/4□~~	~~0.113 nail[y] Staple[y]~~	~~Not allowed~~	~~Same as stud spacing~~
~~Particleboard panels~~		~~3/8 – 1/2~~	~~—~~	~~Yes~~	~~6d box nail (2□ x 0.099□)~~	~~6d box nail (2□ x 0.099□)~~	~~6d box nail (2□ x 0.099□)~~	~~box nail[y]~~	~~6d box nail (2□ x 0.099□) 3/8 not allowed~~	~~6□ edge, 12" inter. sup.~~
		~~5/8~~	~~—~~	~~Yes~~	~~6d box nail (2□ x 0.099□)~~	~~8d box nail (2 1/2□ x 0.113□)~~	~~8d box nail (2 1/2□ x 0.113□)~~	~~box nail[y]~~	~~6d box nail (2□ x 0.099□)~~	
~~Wood structural panel[i] ANSI/APA-PRP 210 siding[i] (exterior grade)~~		~~3/8 – 1/2~~	~~Note p~~	~~Yes~~	~~0.099 nail-2□~~	~~0.113 nail-2 1/2□~~	~~0.113 nail-2 1/2□~~	~~0.113 nail[y]~~	~~0.099 nail-2□~~	~~6□ edges, 12□ inter. sup.~~
~~Wood structural panel lapsiding~~		~~3/8 – 1/2~~	~~Note p Note x~~	~~Yes~~	~~0.099 nail-2□~~	~~0.113 nail-2 1/2□~~	~~0.113 nail-2 1/2□~~	~~0.113 nail[x]~~	~~0.099 nail-2□~~	~~8□ bottom edge~~
~~Vinyl siding[l]~~		~~0.035~~	~~Lap~~	~~Yes~~	~~0.120 nail (shank) with a 0.313 head or 16-gage staple with 3/8 to 1/2-inch crown[y, z]~~	~~0.120 nail (shank) with a 0.313 head or 16-gage staple with 3/8 to 1/2-inch crown[y]~~	~~0.120 nail (shank) with a 0.313 head or 16-gage staple with 3/8 to 1/2-inch crown[y]~~	~~0.120 nail (shank) with a 0.313 head per Section R703.11.2~~	~~Not allowed~~	~~16 inches on center or specified by the manufacturer instructions or test report~~

~~SIDING MATERIAL~~	~~NOMINAL THICKNESS[a] (inches)~~	~~JOINT TREATMENT~~	~~WATER-RESISTIVE BARRIER REQUIRED~~	~~TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b, c, d]~~					
				~~Wood or wood structural panel sheathing into stud~~	~~Fiberboard sheathing into stud~~	~~Gypsum sheathing into stud~~	~~Foam plastic sheathing into stud~~	~~Direct to studs~~	~~Number or spacing of fasteners~~
~~Wood[j] rustic, drop~~	~~3/8 Min~~	~~Lap~~	~~Yes~~	~~Fastener penetration into stud 1~~□				~~0.113 nail 2 1/2~~□ ~~Staple 2~~□	~~Face nailing up to 6~~□ ~~widths, 1 nail per bearing; 8~~□ ~~and over, 2 nails per bearing~~
~~Shiplap~~	~~19/32 Average~~	~~Lap~~	~~Yes~~	~~Fastener penetration into stud 1~~□				~~0.113 nail 2 1/2~~□ ~~Staple 2~~□	~~Face nailing up to 6~~□ ~~widths, 1 nail per bearing; 8~~□ ~~and over, 2 nails per bearing~~
~~Bevel~~	~~7/16~~								
~~Butt tip~~	~~3/16~~	~~Lap~~	~~Yes~~						
~~Fiber cement panel siding[q]~~	~~5/16~~	~~Note q~~	~~Yes Note u~~	~~6d common corrosion-resistant nail[r]~~	~~6d common corrosion-resistant nail[r]~~	~~6d common corrosion-resistant nail[r]~~	~~6d common corrosion-resistant nail[r, v]~~	~~4d common corrosion-resistant nail[r]~~	~~6~~□ ~~edges, 12~~□ ~~o.c. on intermed. studs~~
~~Fiber cement lap siding[s]~~	~~5/16~~	~~Note s~~	~~Yes Note u~~	~~6d common corrosion-resistant nail[r]~~	~~6d common corrosion-resistant nail[r]~~	~~6d common corrosion-resistant nail[r]~~	~~6d common corrosion-resistant nail[r, v]~~	~~6d common corrosion-resistant nail or 11-gage roofing nail[r]~~	~~Note t~~

~~For SI: 1 inch = 25.4 mm.~~

~~a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.~~

~~b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.~~

~~c. Staples shall have a minimum crown width of 7/16-inch outside diameter and be manufactured of minimum 16-gage wire.~~

~~d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.~~

~~e. Aluminum nails shall be used to attach aluminum siding.~~

~~f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.~~

~~g. All attachments shall be coated with a corrosion-resistant coating.~~

~~h. Shall be of approved type.~~

~~i. Three-eighths-inch plywood shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. Plywood 1/2-inch or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.~~

~~j. Wood board sidings applied vertically shall be nailed to horizontal nailing strips or blocking set 24 inches on center. Nails shall penetrate 1 1/2 inches into studs, studs and wood sheathing combined or blocking.~~

~~k. Hardboard siding shall comply with CPA/ANSI A135.6.~~

~~l. Vinyl siding shall comply with ASTM D 3679.~~

~~m. Minimum shank diameter of 0.092 inch, minimum head diameter of 0.225 inch, and nail length must accommodate sheathing and penetrate framing 1 1/2 inches.~~

~~n. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.~~
~~o. Minimum shank diameter of 0.099 inch, minimum head diameter of 0.240 inch, and nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.~~
~~p. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.~~
~~q. See Section R703.10.1.~~
~~r. Fasteners shall comply with the nominal dimensions in ASTM F 1667.~~
~~s. See Section R703.10.2.~~
~~t. Face nailing: one 6d common nail through the over lap ping planks at each stud. Concealed nailing: one 11 gage $1^1/_2$ inch long galv. roofing nail through the top edge of each plank at each stud.~~
~~u. See Section R703.2 exceptions.~~
~~v. Minimum nail length must accommodate sheathing and penetrate framing $1^1/_2$ inches.~~
~~w. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and shall comply with the requirements in Sections 6.1 and 6.3 of TMS-402 ACI 530/ASCE 5.~~
~~x. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.~~
~~y. Minimum fastener length must accommodate sheathing and penetrate framing 0.75 inches or in accordance with the manufacturer's installation instructions.~~

Reason: The purpose of this code change is to replace the existing Table R703.4 with a revised and simplified version and improve the code text relating to siding attachment. While reviewing several code change proposals last cycle dealing with siding attachment, we identified a number of conflicts between the table and code text, as well as discovering several errata. Additionally, we found the 2009 IRC version of the table hard to work with because of the small font and the extensive footnotes. The 2012 version of the table was printed in a larger font in an effort to improve readability, but this has not fixed all of the issues and we have identified new errata. This code change replaces the table with a new version and introduces new charging language and additional code revisions to move material from footnotes to the main body of the code where they can be more easily located. The key changes are as follows:

(1) Existing Section R703.4 is clarified and revised. The nail requirement is relocated to a new subsection. Footnote (a) is moved to the section. The entire section is moved to become R703.3, placing it immediately following the WRB section ahead of the wood siding section.
(2) To the extent possible, nail specifications are formatted to match the standard used in Table R602.3(1) and elsewhere, where the nail type is specified, followed by the length x shank diameter.
(3) A new Section R703.3.2 on fasteners combines existing footnotes (b), (c), (d), (g) and (r). It is noted all nails and staples need to comply with ASTM F 1667, not just those for fiber-cement siding.
(4) Footnotes (i) and (j) are moved to the existing section on wood, hardboard and wood structural panel siding. Separate subsections are created for the requirements relevant to horizontal wood siding, vertical wood siding, and panel siding products. Minimum fastener size and minimum penetration requirements, along with other installation details, are coordinated with current installation guides such as those available from WRCLA or WWPA.
(5) The existing footnote (k) reference to the hardboard siding standard is moved to Section R703.5 (formerly Section R703.3).
(6) The existing footnote (l) reference to the vinyl siding standard is not needed as the standard is called out in Section R703.11. A pointer is added under the material listing.
(7) A new Section R703.3.3 is created dealing with fastener length and penetration. The penetration requirements from footnotes (m) and (o) for hardboard siding and footnotes (v), (y), and (z) are moved to items under this new section.
(8) The shank and head diameters in footnotes (m) and (o) for hardboard siding are moved into Table.R703.3.
(9) The fiber-cement section references from existing footnotes (q) and (s) are provided under the respective material listings. The shank diameter and length for the 6d common nail is provided. The "corrosion-resistant nail" language is removed since it is already required by the charging language for Table R703.3 (formerly Table R703.4).
(10) The "water-resistive barrier required" column is deleted. As of the 2012 IRC, all the products in Table R703.4 required a WRB unless covered by the exceptions under Section R703.2 for detached accessory buildings and for certain paper-backed stucco lath products. Since Section R703.2 always applies, existing footnote (u) is redundant.
(11) The existing footnote (w) reference to TMS 402 is relocated to the adhered veneer section.

Cost Impact: The code change proposal will not increase the cost of construction.

R703.2-RB-EHRLICH.doc

Committee Action Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

R703.3 Nominal thickness and attachments. The nominal thickness and attachment of exterior wall coverings shall be in accordance with Table R703.3, the wall covering material requirements of this section, and the wall covering manufacturer's installation instructions. Nominal material thicknesses in Table R703.3 are based on a maximum stud spacing of 16 inches on center. Where specified by the siding manufacturer's instructions and supported by a test report or other documentation, attachment to studs with greater spacing is permitted. Fasteners for exterior wall coverings <u>attached to wood framing</u> shall be in accordance with Section R703.3.2. <u>Exterior wall coverings shall be attached to cold-formed steel light framing in accordance with the cladding manufacturer's installation instructions or an approved design.</u>

R703.3.3 Minimum fastener length and penetration. Fasteners shall have the greater of the minimum length specified in Table R703.3 or as required to provide a minimum penetration into framing as follows:

1. Fasteners for horizontal aluminum siding, steel siding, particleboard panel siding, wood structural panel siding per ANSI/APA-PRP 210, fiber-cement panel siding, and fiber-cement lap siding installed over foam plastic sheathing shall penetrate a minimum of 1-1/2 inches into framing or shall be in accordance with the manufacturer's installation instructions.
2. Fasteners for hardboard panel and lap siding shall penetrate a minimum of 1-1/2 inches into framing.
3. Fasteners for vinyl siding installed over wood or wood structural panel sheathing shall penetrate a minimum of 1-1/4 inches into sheathing and framing combined. ~~Where approved by the manufacturer's instructions or test report,~~ vinyl siding shall be permitted to be installed with fasteners penetrating ~~not less than .75 inches~~ into or through wood or wood structural sheathing of minimum thickness as specified by the manufacturer's instructions or test report, with or without penetration into the framing. Where3 the fastener penetrates fully through the sheathing, the end of the fastener shall extend a minimum of ¼ inch beyond the opposite face of the sheathing. Fasteners for vinyl siding installed over foam plastic sheathing shall be in accordance with Section R703.11.2. Fasteners for vinyl siding installed over fiberboard or gypsum sheathing ~~or direct to studs~~ shall penetrate a minimum of 1-1/4 inches into framing.
4. Fasteners for vertical or horizontal wood siding shall penetrate a minimum of 1-1/2 inches into studs, studs and wood sheathing combined, or blocking.
5. Fasteners for siding material installed over foam plastic sheathing shall have sufficient length to accommodate foam plastic sheathing thickness and to penetrate framing or sheathing and framing combined as specified above.

(Portions of proposal not shown remain unchanged)

Committee Reason: Approval was based upon the proponent's published reason. The modification addresses fastening to cold-formed steel framing and clarifies the fastener penetration for wood structural panels.

Assembly Action: None

Individual Consideration Agenda

Public Comment 1:

Jay H. Crandell, d/b/a ARES Consulting, representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R703.3 Nominal thickness and attachments. The nominal thickness and attachment of exterior wall coverings shall be in accordance with Table R703.3, the wall covering material requirements of this section, and the wall covering manufacturer's installation instructions. Nominal material thicknesses in Table R703.3 are based on a maximum stud spacing of 16 inches on center. Where specified by the siding manufacturer's instructions and supported by a test report or other documentation, attachment to studs with greater spacing is permitted. Fasteners for exterior wall coverings attached to wood framing shall be in accordance with Section R703.3.2. Exterior wall coverings shall be attached to cold-formed steel light ~~framing~~ frame construction in accordance with the cladding manufacturer's installation instructions, the requirements of Table R703.3 using screw fasteners substituted for the nails specified in accordance with Table R703.4, or an approved design.

TABLE R703.3(1)
SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS
(portions of table not shown remain unchanged)

TABLE R703.3(2)
SCREW FASTENER SUBSTITUTION FOR SIDING ATTACHMENT TO COLD-FORMED STEEL LIGHT FRAME CONSTRUCTION[a,b,c,d,e]

Nail Diameter per Table R703.3	Minimum Screw Fastener Size
0.099”	#6
0.113”	#7
0.120”	#8

For SI: 1 inch = 25.4 mm

a. Screws shall comply with ASTM C1513 and shall penetrate a minimum of three threads through minimum 33 mil (20 gauge) cold-formed steel frame construction.
b. Screw head diameter shall not be less than the nail head diameter required by Table R703.3(1).
c. Number and spacing of screw fasteners shall comply with Table R703.3(1).
d. Pan head, hex washer head, modified truss head, or other screw head types with a flat attachment surface under the head shall be used for vinyl siding attachment.
e. Aluminum siding shall not be fastened directly to cold-formed steel light frame construction.

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: At the committee action hearing, the committee realized the need to address siding connections to cold-formed steel framing. The code currently includes prescriptive fastening solutions for wood framing, but nothing for steel framing. This public comment builds on the committee's action and adds a simple prescriptive solution that makes use of and is based on equivalence to the nail fastening requirements already in the code.

Public Comment 2:

Matthew Dobson, Vinyl Siding Institute, Inc., requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R703.3 Nominal thickness and attachments. The nominal thickness and attachment of exterior wall coverings shall be in accordance with Table R703.3, the wall covering material requirements of this section, and the wall covering manufacturer's installation instructions. Nominal material thicknesses in Table R703.3 are based on a maximum stud spacing of 16 inches on center. Where specified by the siding manufacturer's instructions and supported by a test report or other documentation, attachment to studs with greater spacing is permitted. Fasteners for exterior wall coverings attached to wood framing shall be in accordance with Section R703.3.2 and Table 703.3. Exterior wall coverings shall be attached to cold-formed steel light framing in accordance with the cladding manufacturer's installation instructions or an approved design.

R703.3.3 Minimum fastener length and penetration. Fasteners shall have the greater of the minimum length specified in Table R703.3 or as required to provide a minimum penetration into framing as follows:

3. Fasteners for vinyl siding and insulated vinyl siding installed over wood or wood structural panel sheathing shall penetrate a minimum of 1-1/4 inches into sheathing and framing combined. Vinyl siding and insulated vinyl siding shall be permitted to be installed with fasteners penetrating not less than .75 inches into or through wood or wood structural sheathing of minimum thickness as specified by the manufacturer's instructions or test report, with or without penetration into the framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend a minimum of ¼ inch beyond the opposite face of the sheathing. Fasteners for vinyl siding and insulated vinyl siding installed over foam plastic sheathing shall be in accordance with Section R703.11.2. Fasteners for vinyl siding and insulated vinyl siding installed over fiberboard or gypsum sheathing shall penetrate a minimum of 1-1/4 inches into framing.

(Portions of code change proposal not shown remain unchanged)

TABLE R703.3
SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS (inches)	Joint Treatment	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
			Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
Editorial Note: Insert after Hardboard lap siding in new table. Insulated Vinyl Siding (See Section R703.X)	0.035 (vinyl siding layer only)	Lap	0.120 nail (shank) with a 0.313 head or 16 gauge crown	0.120 nail (shank) with a 0.313 head or 16 gauge crown	0.120 nail (shank) with a 0.313 head or 16 gauge crown	0.120 nail (shank) with a 0.313 head per Section R703.11.2	Not Allowed	16 inches on center or specified by manufacturer instructions, test report or other sections of this code.
Editorial Note: Insert after Particleboard panels in new table. Polypropylene Siding (See Section R703.X)	Not Applicable.	Lap	See section 703.13.1	See section 703.13.1	See section 703.13.1	See section 703.13.1	Not Allowed	As specified by the manufacturer instructions, test report or other sections of this code.

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: This change brings approved changes on installation from RB385 and RB387 into the new accepted formatting of RB392. The installation specifications were accepted but because of the changes in RB392 it is necessary to bring them along with this change.

Public Comment 3:

David Johnston, Vinyl Siding Institute, Inc., requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R703.3.1 Wind limitations. Where ~~the basic wind speed in accordance with Figure R301.2(4)A is 110 miles per hour (49 m/s) or higher,~~ the design wind pressure exceeds 30 psf, or where the limits of Table R703.3.1 are exceeded, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3). For the determination of wall covering attachment, component and cladding loads shall be determined using an effective wind area of 10 ft^2.

TABLE R703.3.1
LIMITS FOR ATTACHMENT PER TABLE R703.3

Maximum Mean Roof Height

Ultimate Wind Speed (mph-3-second gust)	Exposure		
	B	C	D
115	NL	50'	20'
120	NL	30'	DR
130	60'	15'	DR
140	35'	DR	DR

NL = not limited by Table R703.3.1, DR = Design Required
For SI: 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: This public comment will merge the results of committee action on RB366 and RB367 into the committee action on RB392, and satisfy the intent of all proponents. The committee action on RB366 was to update the wind speed in the first sentence of the paragraph from the old 110 mph ASD basis to the new 140 mph Ultimate basis. This sentence states the maximum wind speed for which the attachment methods in Table 703.4 are applicable.
Committee action on RB367 was to delete this sentence but substitute similar criteria for the use of current Table R703.4 based on wind pressure rather than wind speed. The 30 psf threshold pressure matches the threshold for required design in ICC 600 and is slightly higher than the pressure that would result from either the previous 110 mph nominal (ASD) wind or a 140 mph (ultimate) wind in Exposure Category B with a mean roof height of 30 feet. RB367 also provides a table with maximum roof heights in different combinations of wind speed and exposure category that would produce 30 psf, so that use of the attachments table would also be limited to those roof heights.
Meanwhile, RB392 relocated section R703.4 and Table R703.4 to R703.3, and broke out a separate section R703.3.1 to state the wind limitation on the use of the table attachments. It makes sense to incorporate the changes made in RB366 and RB367 into this comprehensive proposal. This public comment thus would delete the sentence in R703.3.1 related to the wind *speed* limitation and substitute the wind *pressure* limitations, consistent with committee action on RB367. The roof height limitation table from RB367 would also be carried over and be designated Table R703.3.1.

The effect of all these changes would be to make the limitations of the attachment methods in Table R703.3 clearer and more complete, and consistent with ICC 600 and the other upgrades to the wind speed provisions being made to the IRC during this cycle.

Public Comment 4:

Edward L. Keith, representing APA – The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R703.3.2 Fasteners. Exterior wall coverings shall be securely fastened with aluminum, galvanized, stainless steel or rust-preventative coated nails or staples in accordance with Table R703.3 or with other *approved* corrosion-resistant fasteners in accordance with the wall covering manufacturer's installation instructions. Nails and staples shall comply with ASTM F 1667. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples shall have a minimum crown width of 7/16-inch outside diameter and be manufactured of minimum 16 gage wire. Where fiberboard, gypsum, or foam plastic sheathing backing is used, nails or staples shall be driven into the studs. Where wood or wood structural panel sheathing is used, fasteners shall be driven into the studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions or in accordance with the Table R703.3.2.

Table R703.3.2
Optional Siding Attachment Schedule For Fasteners Where No Stud Penetration Necessary

APPLICATION	NUMBER AND TYPE OF FASTENER	SPACING OF FASTENERS[b]
Exterior wall covering (weighing less than 11 psf) attachment to wood structural panel sheathing, either direct or over foam sheathing a maximum of 2 inches thick.[a] Note: Does not apply to vertical siding.	Ring shank roofing nail (0.120" min. dia.)	12" o.c.
	Ring shank nail (0.148" min. dia.)	15" o.c.
	#6 screw (0.138" min. dia.)	12" o.c.
	#8 screw (0.164" min. dia.)	16" o.c.

a. Fastener length shall be sufficient to penetrate back side of the wood structural panel sheathing by at least 1/4". The wood structural panel sheathing shall be 7/16" or thicker in thickness.

b. Spacing of fasteners is per 12" of siding width. For other siding widths, multiply SPACING OF FASTENERS above by a factor of 12/s, where s is the siding width in inches. For example, if 8" lap siding, multiply SPACING OF FASTENERS above by 12/8 or 1.5. Fastener spacing shall never be greater than the manufacturer's minimum recommendations.

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: APA attempted to work with other industries while developing this code change proposal. There was, however, not sufficient time to fully resolve some of the outstanding issues with the Vinyl Siding Institute (VSI) in December 2012. This PC reflects the resolution between APA and the VSI. We also took this opportunity to make some adjustments to the original proposal that we were unable to make through the Floor Modification procedure.

The most compelling of the arguments received from the other industries was that this information would fit better in Chapter 7 and that the changes proposed and accepted as modified during the Committee Action Hearing to proposal RB392 provided the ideal location in Chapter 7. As such APA has submitted this Public Comment to RB392 and has submitted a similar Public Comment to RB277 where this proposal originally appeared. We will ask for RB277 to be heard after RB392 so that if we are successful with this public comment we will request denial for RB277.

Additional proposal adjustments – The below discusses the various modifications made to the table originally proposed for RB277.

1. The format of the able was changed slightly to account for the fact that the original proposal, RB277, was part of an existing table. In this Public Comment to RB392 the proposed is a free-standing table.
2. Recent research conducted by the foam industry suggests that limiting the thickness of the foam sheathing to 2 inches or less will minimize the potential for long term sagging of the siding material. With thicker foam sheathing the fasteners used to attach the foam are essentially cantilevered through the foam away from the main member of the connection. For smaller diameter fasteners the cantilevered fasteners can bend over time causing the water-resistant barrier to sag downward. Even though the use of the wall sheathing alone to anchor the siding requires a closer fastener spacing than that tested by the foam industry and should result in greater resistance to long term sagging of the siding, we have chosen to be conservative in our proposal to ensure good performance of the siding and its attachment to the wood structural panel sheathing.
3. We also changed the term "foam insulation" to "foam sheathing" to be consistent with the code definition.
4. Footnote "a" was rewritten separating the requirements of the footnote into two separate sentences to ensure correct interpretation of the provisions. The requirements are:
   a. Full penetration of the wood structural panel sheathing by at least ¼ inch to ensure that the pyramidal tip of the fastener is not considered in the "depth of penetration" of the fastener, as the tip contributes nothing to the withdrawal capacity of the fastener. We want the nail to penetrate the wood structural panel sheathing, *regardless of thickness* to provide a visual indication of the nails' presence, adequate length and penetration of the wood structural panel sheathing.
   b. The second separate requirement is the minimum thickness of the wood structural panel sheathing. The tables are based on the use of 7/16" minimum thickness sheathing.
5. The ring-shank roofing nail was added to the table as they have been used in part of the country.

Final Hearing Results

RB392-13 **AMPC1, 2, 3, 4**

Code Change No: RB393-13

Original Proposal

Section(s): R802.1, R802.1.1, R802.1.2, R802.1.3, R802.1.3.1, R802.1.3.2, R802.1.3.3, R802.1.3.4, R802.1.3.5, R802.1.3.5.1, R802.1.3.5.2, R802.1.3.6, R802.1.3.7, R802.1.3.8, R802.1.4, R802.1.5, R802.1.6

Proponent: Dennis Pitts, American Wood Council (dpitts@awc.org)

Revise as follows:

R802.1 General. Wood and wood-based products used for load-supporting purposes shall conform to the applicable provisions of this section.

R802.1.1 ~~Identification~~ Sawn Lumber. ~~Load-bearing dimension lumber for rafters, trusses and ceiling joists~~ Sawn lumber shall be identified by a grade mark of an accredited lumber grading or inspection agency and have design values certified by ~~that has been approved by~~ an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.

~~**R802.1Blocking.** Blocking shall be a minimum of utility grade lumber.~~

~~**R802.1.2**~~ **R802.1.1.1 End-jointed lumber.** *Approved* end-jointed lumber identified by a grade mark conforming to Section R802.1.1 may be used interchangeably with solid-sawn members of the same species and grade. End-jointed lumber used in an assembly required elsewhere in this code to have a fire-resistance rating shall have the designation “Heat-Resistant Adhesive” or “HRA” included in its grade mark.

~~**R802.1.4**~~ **R802.1.2 Structural glued laminated timbers.** Glued laminated timbers shall be manufactured and identified as required in ANSI/AITC A190.1 and ASTM D 3737.

~~**R802.1.5**~~ **R802.1.3 Structural log members.** Stress grading of structural log members of nonrectangular shape, as typically used in log buildings, shall be in accordance with ASTM D 3957. Such structural log members shall be identified by the grade mark of an *approved* lumber grading or inspection agency. In lieu of a grade mark on the material, a certificate of inspection as to species and grade issued by a lumber-grading or inspection agency meeting the requirements of this section shall be permitted to be accepted**.**

~~**R802.1.6**~~ **R802.1.4 Structural composite lumber.** Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D 5456.

~~**R802.1.3**~~ **R802.1.5 Fire-retardant-treated wood.** Fire-retardant treated wood (FRTW) is any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E 84 or UL 723, a listed flame spread index of 25 or less and shows no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. In addition, the flame front shall not progress more than 10.5 feet (3200 mm) beyond the center line of the burners at any time during the test.

~~**R802.1.3.1**~~ **R802.1.5.1 Pressure process.** For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (344.7 kPa).

~~R802.1.3.2~~ R802.1.5.2 Other means during manufacture. For wood products produced by other means during manufacture the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product.

~~R802.1.3.3~~ R802.1.5.3 Testing. For wood products produced by other means during manufacture, other than a pressure process, all sides of the wood product shall be tested in accordance with and produce the results required in Section R802.1.3. Testing of only the front and back faces of wood structural panels shall be permitted.

~~R802.1.3.4~~ R802.1.5.4 Labeling. Fire-retardant-treated lumber and wood structural panels shall be *labeled.* The *label* shall contain:

1. The identification *mark* of an *approved agency* in accordance with Section 1703.5 of the *International Building Code.*
2. Identification of the treating manufacturer.
3. The name of the fire-retardant treatment.
4. The species of wood treated.
5. Flame spread index and smoke-developed index.
6. Method of drying after treatment.
7. Conformance to applicable standards in accordance with Sections ~~R802.1.3.5~~ R802.1.5.5 through ~~R802.1.3.8~~ R802.1.5.10.
8. For FRTW exposed to weather, or a damp or wet location, the words "No increase in the listed classification when subjected to the Standard Rain Test" (ASTM D 2898).

~~R802.1.3.5~~ R802.1.5.5 Strength adjustments. Design values for untreated lumber and wood structural panels as specified in Section R802.1 shall be adjusted for fire-retardant- treated wood. Adjustments to design values shall be based upon an *approved* method of investigation which takes into consideration the effects of the anticipated temperature and humidity to which the fire-retardant- treated wood will be subjected, the type of treatment and redrying procedures.

~~R802.1.3.5.1~~ R802.1.5.6 Wood structural panels. The effect of treatment and the method of redrying after treatment, and exposure to high temperatures and high humidities on the flexure properties of fire-retardant- treated softwood plywood shall be determined in accordance with ASTM D 5516. The test data developed by ASTM D 5516 shall be used to develop adjustment factors, maximum loads and spans, or both for untreated plywood design values in accordance with ASTM D 6305. Each manufacturer shall publish the allowable maximum loads and spans for service as floor and roof sheathing for their treatment.

~~R802.1.3.5.2~~ R802.1.5.7 Lumber. For each species of wood treated, the effect of the treatment and the method of redrying after treatment and exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated lumber shall be determined in accordance with ASTM D 5664. The test data developed by ASTM D 5664 shall be used to develop modification factors for use at or near room temperature and at elevated temperatures and humidity in accordance with ASTM D 6841. Each manufacturer shall publish the modification factors for service at temperatures of not less than 80°F (27°C) and for roof framing. The roof framing modification factors shall take into consideration the climatological location.

~~R802.1.3.6~~ R802.1.5.8 Exposure to weather. Where fire-retardant- treated wood is exposed to weather or damp or wet locations, it shall be identified as "Exterior" to indicate there is no increase in the listed flame spread index as defined in Section ~~R802.1.3~~ R802.1.5 when subjected to ASTM D 2898.

~~R802.1.3.7~~ R802.1.5.9 Interior applications. Interior fire-retardant- treated wood shall have a moisture content of not over 28 percent when tested in accordance with ASTM D 3201 procedures at 92 percent relative humidity. Interior fire-retardant-treated wood shall be tested in accordance with Section ~~R802.1.3.5.1~~ R802.1.3.5.6 or ~~R802.1.3.5.2~~ R802.1.3.5.7. Interior fire-retardant-treated wood designated as Type A shall be tested in accordance with the provisions of this section.

~~**R802.1.3.8**~~ **R802.1.5.10 Moisture content.** Fire-retardant-treated wood shall be dried to a moisture content of 19 percent or less for lumber and 15 percent or less for wood structural panels before use. For wood kiln dried after treatment (KDAT) the kiln temperatures shall not exceed those used in kiln drying the lumber and plywood submitted for the tests described in Section ~~R802.1.3.5.1~~ R802.1.5.6 for plywood and ~~R802.1.3.5.2~~ R802.1.5.7 for lumber.

~~**R802.1**~~ **R802.3.3 Blocking.** Blocking shall be a minimum of utility grade lumber.

Reason: The change is intended to clarify the process by which lumber design values are certified and recognized in the code. The current process, which has been used since 1970, relies on the internationally recognized U.S.Department of Commerce Voluntary Product Standard PS20. Because the current format of the section can be incorrectly interpreted to place a number of wood products under the identification requirements of PS20, a new format is proposed that clearly states this standard is only for sawn lumber. The format proposed is nearly identical to what is used in Section 2302 of the International Building Code. Wood products other than sawn lumber have unique manufacturing standards, design value development, and quality control criteria. This new format clarifies that these other wood products must comply with specific product standards.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB393-13 **AS**

Code Change No: RB394-13

Original Proposal

Section(s): R802.3

Proponent: Tim Swanson, City of Greeley, representing Colorado Chapter of the International Code Council (tim.swanson@greeleygov.com)

Revise as follows:

R802.3 Framing details. Rafters shall be framed directly opposite each other to ridge board or directly opposite ~~or to~~ each other with a gusset plate as a tie. Ridge board shall be at least 1-inch (25 mm) nominal thickness and not less in depth than the cut end of the rafter. At all valleys and hips there shall be a valley or hip rafter not less than 2-inch (51 mm) nominal thickness and not less in depth than the cut end of the rafter. Hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point. Where the roof pitch is less than three units vertical in 12 units horizontal (25-percent slope), structural members that support rafters and ceiling joists, such as ridge beams, hips and valleys, shall be designed as beams.

Reason: The language in the current IRC would allow rafters to be staggered at the ridge board, does that maintain structural integrity? It also does not give any guidance as to how the rafters are configured when joined with a gusset plate. Are they stacked? Side by side? We can assume that the code intends for them to be opposed with the gusset plate, but that requirement is not given. This code change reflects the intent and language currently in the IBC with minimal changes to the text of the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R802.3 Framing details. Rafters shall be framed no more than 1.5-inch (38 mm) offset from ~~directly opposite~~ each other to ridge board or directly opposite from each other with a gusset plate as a tie. Ridge board shall be at least 1-inch (25 mm) nominal thickness and not less in depth than the cut end of the rafter. At all valleys and hips there shall be a valley or hip rafter not less than 2-inch (51 mm) nominal thickness and not less in depth than the cut end of the rafter. Hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point. Where the roof pitch is less than three units vertical in 12 units horizontal (25-percent slope), structural members that support rafters and ceiling joists, such as ridge beams, hips and valleys, shall be designed as beams.

Committee Reason: Approval was based upon the proponent's published reason. The modification clarifies the term "directly opposite" by adding a tolerance for an offset.

Assembly Action: **None**

Final Hearing Results

RB394-13 **AM**

Code Change No: RB396-13

Original Proposal

Section(s): R802.10.2.1, R802.11.1, Table R802.11

Proposed Change as Submitted

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R802.10.2.1 Applicability limits. The provisions of this section shall control the design of truss roof framing when snow controls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist, rafter or truss span, not greater than 36 feet (10 973 mm) in width parallel to the joist, rafter or truss span, not more than three stories above grade plane in height, and roof slopes not smaller than 3:12 (25 percent slope) or greater than 12:12 (100 percent slope). Truss roof framing constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 140 ~~110~~ miles per hour (63~~49~~ m/s), Exposure A, B or C, and a maximum ground snow load of 70 psf (3352 Pa). For consistent loading of all truss types, roof snow load is to be computed as: 0.7 p_g.

R802.11.1 Uplift resistance. Roof assemblies shall have uplift resistance in accordance with Sections R802.11.1.2 and R802.11.1.3.

Where the uplift force does not exceed 200 pounds, rafters and trusses spaced not more than 24 inches (610 mm) on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Where the basic wind speed does not exceed 115 mph ~~90 mph~~, the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, rafters and trusses spaced not more than 24 inches (610 mm) on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

~~TABLE R802.11~~
~~RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)~~~~[a, b, c, d, e, f, g, h]~~

~~RAFTER OR TRUSS SPACING~~	~~ROOF SPAN (feet)~~	~~EXPOSURE B~~							
		~~Basic Wind Speed (mph)~~							
		~~85~~		~~90~~		~~100~~		~~110~~	
		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~	
		~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~
~~12~~	~~12~~	~~47~~	~~41~~	~~62~~	~~54~~	~~93~~	~~81~~	~~127~~	~~110~~
	~~18~~	~~59~~	~~51~~	~~78~~	~~68~~	~~119~~	~~104~~	~~165~~	~~144~~
	~~24~~	~~70~~	~~61~~	~~93~~	~~81~~	~~145~~	~~126~~	~~202~~	~~176~~
	~~28~~	~~77~~	~~67~~	~~104~~	~~90~~	~~163~~	~~142~~	~~227~~	~~197~~
	~~32~~	~~85~~	~~74~~	~~115~~	~~100~~	~~180~~	~~157~~	~~252~~	~~219~~

~~RAFTER OR TRUSS SPACING~~	~~ROOF SPAN (feet)~~	~~EXPOSURE B~~							
		~~Basic Wind Speed (mph)~~							
		~~85~~		~~90~~		~~100~~		~~110~~	
		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~	
		~~< 5:12~~	~~□5:12~~	~~< 5:12~~	~~□5:12~~	~~< 5:12~~	~~□5:12~~	~~< 5:12~~	~~□5:12~~
	~~36~~	~~93~~	~~81~~	~~126~~	~~110~~	~~198~~	~~172~~	~~277~~	~~241~~
	~~42~~	~~105~~	~~91~~	~~143~~	~~124~~	~~225~~	~~196~~	~~315~~	~~274~~
	~~48~~	~~116~~	~~101~~	~~159~~	~~138~~	~~251~~	~~218~~	~~353~~	~~307~~
~~16~~ □	~~12~~	~~63~~	~~55~~	~~83~~	~~72~~	~~124~~	~~108~~	~~169~~	~~147~~
	~~18~~	~~78~~	~~68~~	~~103~~	~~90~~	~~159~~	~~138~~	~~219~~	~~191~~
	~~24~~	~~93~~	~~81~~	~~124~~	~~108~~	~~193~~	~~168~~	~~269~~	~~234~~
	~~28~~	~~102~~	~~89~~	~~138~~	~~120~~	~~217~~	~~189~~	~~302~~	~~263~~
	~~32~~	~~113~~	~~98~~	~~153~~	~~133~~	~~239~~	~~208~~	~~335~~	~~291~~
	~~36~~	~~124~~	~~108~~	~~168~~	~~146~~	~~264~~	~~230~~	~~369~~	~~321~~
	~~42~~	~~139~~	~~121~~	~~190~~	~~165~~	~~299~~	~~260~~	~~420~~	~~365~~
	~~48~~	~~155~~	~~135~~	~~212~~	~~184~~	~~335~~	~~291~~	~~471~~	~~410~~
~~24~~ □	~~12~~	~~94~~	~~82~~	~~124~~	~~108~~	~~186~~	~~162~~	~~254~~	~~221~~
	~~18~~	~~117~~	~~102~~	~~155~~	~~135~~	~~238~~	~~207~~	~~329~~	~~286~~
	~~24~~	~~140~~	~~122~~	~~186~~	~~162~~	~~290~~	~~252~~	~~404~~	~~351~~
	~~28~~	~~154~~	~~134~~	~~208~~	~~181~~	~~326~~	~~284~~	~~454~~	~~395~~
	~~32~~	~~170~~	~~148~~	~~230~~	~~200~~	~~360~~	~~313~~	~~504~~	~~438~~
	~~36~~	~~186~~	~~162~~	~~252~~	~~219~~	~~396~~	~~345~~	~~554~~	~~482~~
	~~42~~	~~209~~	~~182~~	~~285~~	~~248~~	~~449~~	~~391~~	~~630~~	~~548~~
	~~48~~	~~232~~	~~202~~	~~318~~	~~277~~	~~502~~	~~437~~	~~706~~	~~614~~
~~RAFTER OR TRUSS SPACING~~	~~ROOF SPAN (feet)~~	~~EXPOSURE C~~							
		~~Basic Wind Speed (mph)~~							
		~~85~~		~~90~~		~~100~~		~~110~~	
		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~	
		~~< 5:12~~	~~□5:12~~	~~< 5:12~~	~~□5:12~~	~~< 5:12~~	~~□5:12~~	~~< 5:12~~	~~□5:12~~
~~12~~ □	~~12~~	~~94~~	~~82~~	~~114~~	~~99~~	~~157~~	~~137~~	~~206~~	~~179~~
	~~18~~	~~120~~	~~104~~	~~146~~	~~127~~	~~204~~	~~177~~	~~268~~	~~233~~
	~~24~~	~~146~~	~~127~~	~~179~~	~~156~~	~~251~~	~~218~~	~~330~~	~~287~~
	~~28~~	~~164~~	~~143~~	~~201~~	~~175~~	~~283~~	~~246~~	~~372~~	~~324~~
	~~32~~	~~182~~	~~158~~	~~224~~	~~195~~	~~314~~	~~273~~	~~414~~	~~360~~
	~~36~~	~~200~~	~~174~~	~~246~~	~~214~~	~~346~~	~~301~~	~~456~~	~~397~~

~~RAFTER OR TRUSS SPACING~~	~~ROOF SPAN (feet)~~	~~EXPOSURE B~~							
		~~Basic Wind Speed (mph)~~							
		~~85~~		~~90~~		~~100~~		~~110~~	
		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~	
		~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~
	~~42~~	~~227~~	~~197~~	~~279~~	~~243~~	~~394~~	~~343~~	~~520~~	~~452~~
	~~48~~	~~254~~	~~221~~	~~313~~	~~272~~	~~441~~	~~384~~	~~583~~	~~507~~

~~RAFTER OR TRUSS SPACING~~	~~ROOF SPAN (feet)~~	~~EXPOSURE C~~							
		~~Basic Wind Speed (mph)~~							
		~~85~~		~~90~~		~~100~~		~~110~~	
		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~	
		~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~	~~< 5:12~~	~~≥ 5:12~~
~~16~~	~~12~~	~~125~~	~~109~~	~~152~~	~~132~~	~~209~~	~~182~~	~~274~~	~~238~~
	~~18~~	~~160~~	~~139~~	~~194~~	~~169~~	~~271~~	~~236~~	~~356~~	~~310~~
	~~24~~	~~194~~	~~169~~	~~238~~	~~207~~	~~334~~	~~291~~	~~439~~	~~382~~
	~~28~~	~~218~~	~~190~~	~~267~~	~~232~~	~~376~~	~~327~~	~~495~~	~~431~~
	~~32~~	~~242~~	~~211~~	~~298~~	~~259~~	~~418~~	~~364~~	~~551~~	~~479~~
	~~36~~	~~266~~	~~231~~	~~327~~	~~284~~	~~460~~	~~400~~	~~606~~	~~527~~
	~~42~~	~~302~~	~~263~~	~~372~~	~~324~~	~~524~~	~~456~~	~~691~~	~~601~~
	~~48~~	~~338~~	~~294~~	~~416~~	~~362~~	~~587~~	~~511~~	~~775~~	~~674~~
~~24~~	~~12~~	~~188~~	~~164~~	~~228~~	~~198~~	~~314~~	~~273~~	~~412~~	~~358~~
	~~18~~	~~240~~	~~209~~	~~292~~	~~254~~	~~408~~	~~355~~	~~536~~	~~466~~
	~~24~~	~~292~~	~~254~~	~~358~~	~~311~~	~~502~~	~~437~~	~~660~~	~~574~~
	~~28~~	~~328~~	~~285~~	~~402~~	~~350~~	~~566~~	~~492~~	~~744~~	~~647~~
	~~32~~	~~364~~	~~317~~	~~448~~	~~390~~	~~628~~	~~546~~	~~828~~	~~720~~
	~~36~~	~~400~~	~~348~~	~~492~~	~~428~~	~~692~~	~~602~~	~~912~~	~~793~~
	~~42~~	~~454~~	~~395~~	~~558~~	~~485~~	~~786~~	~~684~~	~~1040~~	~~905~~
	~~48~~	~~508~~	~~442~~	~~626~~	~~545~~	~~882~~	~~767~~	~~1166~~	~~1014~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound = 0.454 kg, 1 pound per linear foot = 14.5 N/m.~~

~~a. The uplift connection forces are based on a maximum 33-foot mean roof height and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated basic wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights.~~

~~b. The uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.~~

~~c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.~~

~~d. The tabulated uplift connection forces shall be permitted to be multiplied by 0.75 for connections not located within 8 feet of building corners.~~

~~e. For buildings with hip roofs with 5:12 and greater pitch, the tabulated uplift connection forces shall be permitted to be multiplied by 0.70. This reduction shall not be combined with any other reduction in tabulated forces.~~

~~f. For wall-to-wall and wall-to-foundation connections, the uplift connection force shall be permitted to be reduced by 60 plf for each full wall above.~~

~~g. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.~~

~~h. The tabulated forces for a 12-inch on-center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.~~

TABLE R802.11
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (ASD)(POUNDS PER CONNECTION) [a, b, c, d, e, f, g, h]

RAFTER OR TRUSS SPACING	ROOF SPAN (feet)	EXPOSURE B									
		Ultimate Design Wind Speed, V_{ULT} (mph)									
		110		115		120		130		140	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12
12" o.c.	12	48	32	59	42	70	52	95	73	122	97
	18	59	42	74	55	89	69	122	98	157	129
	24	71	52	89	69	108	86	149	123	192	162
	28	79	59	99	78	121	97	167	139	216	184
	32	86	66	109	87	134	109	185	156	240	206
	36	94	72	120	96	146	120	203	172	264	229
	42	106	83	135	109	166	138	230	197	300	262
	48	118	93	151	123	185	155	258	222	336	295
16" o.c.	12	64	43	78	56	93	69	126	97	162	129
	18	78	56	98	73	118	92	162	130	209	172
	24	94	69	118	92	144	114	198	164	255	215
	28	105	78	132	104	161	129	222	185	287	245
	32	114	88	145	116	178	145	246	207	319	274
	36	125	96	160	128	194	160	270	229	351	305
	42	141	110	180	145	221	184	306	262	399	348
	48	157	124	201	164	246	206	343	295	447	392
24" o.c.	12	96	64	118	84	140	104	190	146	244	194
	18	118	84	148	110	178	138	244	196	314	258
	24	142	104	178	138	216	172	298	246	384	324
	28	158	118	198	156	242	194	334	278	432	368
	32	172	132	218	174	268	218	370	312	480	412
	36	188	144	240	192	292	240	406	344	528	458
	42	212	166	270	218	332	276	460	394	600	524
	48	236	186	302	246	370	310	516	444	672	590
RAFTER OR TRUSS SPACING	ROOF SPAN (feet)	EXPOSURE C									
		Ultimate Design Wind Speed, V_{ULT} (mph)									
		110		115		120		130		140	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		<5:12	≥5:12	<5:12	<5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12
12" o.c.	12	95	73	110	86	126	100	161	130	198	163
	18	121	97	141	115	163	135	208	175	257	219
	24	148	122	173	145	200	169	256	220	317	275
	28	166	138	195	164	225	192	289	250	358	313
	32	184	155	216	184	249	215	321	280	398	351
	36	202	171	237	204	274	238	353	310	438	389
	42	229	196	269	233	312	273	402	356	499	446

	48	256	221	302	263	349	307	450	401	560	503
16" o.c.	12	126	97	146	114	168	133	214	173	263	217
	18	161	129	188	153	217	180	277	233	342	291
	24	197	162	230	193	266	225	340	293	422	366
	28	221	184	259	218	299	255	384	333	476	416
	32	245	206	287	245	331	286	427	372	529	467
	36	269	227	315	271	364	317	469	412	583	517
	42	305	261	358	310	415	363	535	473	664	593
	48	340	294	402	350	464	408	599	533	745	669
24" o.c.	12	190	146	220	172	252	200	322	260	396	326
	18	242	194	282	230	326	270	416	350	514	438
	24	296	244	346	290	400	338	512	440	634	550
	28	332	276	390	328	450	384	578	500	716	626
	32	368	310	432	368	498	430	642	560	796	702
	36	404	342	474	408	548	476	706	620	876	778
	42	458	392	538	466	624	546	804	712	998	892
	48	512	442	604	526	698	614	900	802	1120	1006

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.

a. The uplift connection forces are based on a maximum 33 foot mean roof height and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated ultimate design wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights.

b. The uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.

c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.

d. The tabulated uplift connection forces shall be permitted to be multiplied by 0.75 for connections not located within 8 feet of building corners.

e. For buildings with hip roofs with 5:12 and greater pitch, the tabulated uplift connection forces shall be permitted to be multiplied by 0.70. This reduction shall not be combined with any other reduction in tabulated forces.

f. For wall-to-wall and wall-to-foundation connections, the uplift connection force shall be permitted to be reduced by 60 plf for each full wall above.

g. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.

h. The tabulated forces for a 12” on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

Reason: The purpose of this code change is to bring the wind provisions of the IRC in line with the 2012 IBC and ASCE 7-10. As a result of the schedule changes implemented during the 2009-2010 ICC code development cycle, there was not sufficient time to revise the IRC to fully implement the new ultimate wind speed basis of ASCE 7-10 and the 2012 IBC, due to the extent of prescriptive IRC provisions and tables which are directly related to basic wind speed.. New maps based on the ASCE 7-10 ultimate wind speed data but converted back down to nominal (ASD) basis were provided in the IRC. This has led to a fair amount of confusion among those stakeholders who work with both codes.

A working group of stakeholders including NAHB, the major material associations, ASCE, and the Insurance Institute for Business and Home Safety developed a series of IRC proposals to implement the new ultimate wind speed basis. This proposal updates Chapter 8, including wood truss applicability limits and roof uplift connection provisions. It is noted that the changes necessary to update the appropriate Section R804 cold-formed steel provisions are contained in a separate AISI proposal which comprehensively revises the cold-formed steel provisions.

Cost Impact: The code change proposal will not increase the cost of construction.

R703.2-RB-EHRLICH.doc

Committee Action Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE R802.11
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)[a, b, c, d, e, f, g, h]

RAFTER OR TRUSS SPACING	ROOF SPAN (feet)	EXPOSURE B							
		Nominal Design Windspeed V_{ASD} (mph)							
		85		90		100		110	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		< 5:12	≥5:12	< 5:12	≥5:12	< 5:12	≥5:12	≥5:12	≥5:12
12" o.c.	12	47	41	62	54	93	81	127	110
	18	59	51	78	68	119	104	165	144
	24	70	61	93	81	145	126	202	176
	28	77	67	104	90	163	142	227	197
	32	85	74	115	100	180	157	252	219
	36	93	81	126	110	198	172	277	241
	42	105	91	143	124	225	196	315	274
	48	116	101	159	138	251	218	353	307
16" o.c.	12	63	55	83	72	124	108	169	147
	18	78	68	103	90	159	138	219	191
	24	93	81	124	108	193	168	269	234
	28	102	89	138	120	217	189	302	263
	32	113	98	153	133	239	208	335	291
	36	124	108	168	146	264	230	369	321
	42	139	121	190	165	299	260	420	365
	48	155	135	212	184	335	291	471	410
24" o.c.	12	94	82	124	108	186	162	254	221
	18	117	102	155	135	238	207	329	286
	24	140	122	186	162	290	252	404	351
	28	154	134	208	181	326	284	454	395
	32	170	148	230	200	360	313	504	438
	36	186	162	252	219	396	345	554	482
	42	209	182	285	248	449	391	630	548
	48	232	202	318	277	502	437	706	614

RAFTER OR TRUSS SPACING	ROOF SPAN (feet)	EXPOSURE C							
		Nominal Design Windspeed V_{ASD} (mph)							
		85		90		100		110	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		< 5:12	≥5:12	< 5:12	≥5:12	< 5:12	≥5:12	< 5:12	≥5:12
12" o.c.	12	94	82	114	99	157	137	206	179
	18	120	104	146	127	204	177	268	233
	24	146	127	179	156	251	218	330	287
	28	164	143	201	175	283	246	372	324
	32	182	158	224	195	314	273	414	360
	36	200	174	246	214	346	301	456	397
	42	227	197	279	243	394	343	520	452
	48	254	221	313	272	441	384	583	507

RAFTER OR TRUSS SPACING	ROOF SPAN (feet)	EXPOSURE C							
		Nominal Design Windspeed V_{ASD} (mph)							
		85		90		100		110	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		< 5:12	≥5:12	< 5:12	≥5:12	< 5:12	≥5:12	< 5:12	≥5:12
16" o.c.	12	125	109	152	132	209	182	274	238
	18	160	139	194	169	271	236	356	310
	24	194	169	238	207	334	291	439	382
	28	218	190	267	232	376	327	495	431
	32	242	211	298	259	418	364	551	479
	36	266	231	327	284	460	400	606	527
	42	302	263	372	324	524	456	691	601
	48	338	294	416	362	587	511	775	674
24" o.c.	12	188	164	228	198	314	273	412	358
	18	240	209	292	254	408	355	536	466
	24	292	254	358	311	502	437	660	574
	28	328	285	402	350	566	492	744	647
	32	364	317	448	390	628	546	828	720
	36	400	348	492	428	692	602	912	793
	42	454	395	558	485	786	684	1040	905

	48	508	442	626	545	882	767	1166	1014

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound = 0.454 kg, 1 pound per linear foot = 14.5 N/m.

a. The uplift connection forces are based on a maximum 33-foot mean roof height and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated basic wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights.

b. The uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.

c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.

d. The tabulated uplift connection forces shall be permitted to be multiplied by 0.75 for connections not located within 8 feet of building corners.

e. For buildings with hip roofs with 5:12 and greater pitch, the tabulated uplift connection forces shall be permitted to be multiplied by 0.70. This reduction shall not be combined with any other reduction in tabulated forces.

f. For wall-to-wall and wall-to-foundation connections, the uplift connection force shall be permitted to be reduced by 60 plf for each full wall above.

g. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.

h. The tabulated forces for a 12-inch on-center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

~~TABLE R802.11~~

~~RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (ASD)(POUNDS PER CONNECTION)~~ ~~[a, b, c, d, e, f, g, h]~~

~~RAFTER OR TRUSS SPACING~~	~~ROOF SPAN (feet)~~	~~EXPOSURE B~~									
		~~Ultimate Design Wind Speed, V_{ULT} (mph)~~									
		~~110~~		~~115~~		~~120~~		~~130~~		~~140~~	
		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~	
		~~<5:12~~	~~≥5:12~~	~~<5:12~~	~~≥5:12~~	~~<5:12~~	~~≥5:12~~	~~<5:12~~	~~≥5:12~~	~~<5:12~~	~~≥5:12~~
~~12" o.c.~~	~~12~~	~~48~~	~~32~~	~~59~~	~~42~~	~~70~~	~~52~~	~~95~~	~~73~~	~~122~~	~~97~~
	~~18~~	~~59~~	~~42~~	~~74~~	~~55~~	~~89~~	~~69~~	~~122~~	~~98~~	~~157~~	~~129~~
	~~24~~	~~71~~	~~52~~	~~89~~	~~69~~	~~108~~	~~86~~	~~149~~	~~123~~	~~192~~	~~162~~
	~~28~~	~~79~~	~~59~~	~~99~~	~~78~~	~~121~~	~~97~~	~~167~~	~~139~~	~~216~~	~~184~~
	~~32~~	~~86~~	~~66~~	~~109~~	~~87~~	~~134~~	~~109~~	~~185~~	~~156~~	~~240~~	~~206~~
	~~36~~	~~94~~	~~72~~	~~120~~	~~96~~	~~146~~	~~120~~	~~203~~	~~172~~	~~264~~	~~229~~
	~~42~~	~~106~~	~~83~~	~~135~~	~~109~~	~~166~~	~~138~~	~~230~~	~~197~~	~~300~~	~~262~~
	~~48~~	~~118~~	~~93~~	~~151~~	~~123~~	~~185~~	~~155~~	~~258~~	~~222~~	~~336~~	~~295~~
~~16" o.c.~~	~~12~~	~~64~~	~~43~~	~~78~~	~~56~~	~~93~~	~~69~~	~~126~~	~~97~~	~~162~~	~~129~~
	~~18~~	~~78~~	~~56~~	~~98~~	~~73~~	~~118~~	~~92~~	~~162~~	~~130~~	~~209~~	~~172~~
	~~24~~	~~94~~	~~69~~	~~118~~	~~92~~	~~144~~	~~114~~	~~198~~	~~164~~	~~255~~	~~215~~
	~~28~~	~~105~~	~~78~~	~~132~~	~~104~~	~~161~~	~~129~~	~~222~~	~~185~~	~~287~~	~~245~~
	~~32~~	~~114~~	~~88~~	~~145~~	~~116~~	~~178~~	~~145~~	~~246~~	~~207~~	~~319~~	~~274~~
	~~36~~	~~125~~	~~96~~	~~160~~	~~128~~	~~194~~	~~160~~	~~270~~	~~229~~	~~351~~	~~305~~
	~~42~~	~~141~~	~~110~~	~~180~~	~~145~~	~~221~~	~~184~~	~~306~~	~~262~~	~~399~~	~~348~~
	~~48~~	~~157~~	~~124~~	~~201~~	~~164~~	~~246~~	~~206~~	~~343~~	~~295~~	~~447~~	~~392~~
~~24" o.c.~~	~~12~~	~~96~~	~~64~~	~~118~~	~~84~~	~~140~~	~~104~~	~~190~~	~~146~~	~~244~~	~~194~~
	~~18~~	~~118~~	~~84~~	~~148~~	~~110~~	~~178~~	~~138~~	~~244~~	~~196~~	~~314~~	~~258~~
	~~24~~	~~142~~	~~104~~	~~178~~	~~138~~	~~216~~	~~172~~	~~298~~	~~246~~	~~384~~	~~324~~
	~~28~~	~~158~~	~~118~~	~~198~~	~~156~~	~~242~~	~~194~~	~~334~~	~~278~~	~~432~~	~~368~~
	~~32~~	~~172~~	~~132~~	~~218~~	~~174~~	~~268~~	~~218~~	~~370~~	~~312~~	~~480~~	~~412~~
	~~36~~	~~188~~	~~144~~	~~240~~	~~192~~	~~292~~	~~240~~	~~406~~	~~344~~	~~528~~	~~458~~
	~~42~~	~~212~~	~~166~~	~~270~~	~~218~~	~~332~~	~~276~~	~~460~~	~~394~~	~~600~~	~~524~~
	~~48~~	~~236~~	~~186~~	~~302~~	~~246~~	~~370~~	~~310~~	~~516~~	~~444~~	~~672~~	~~590~~
~~RAFTER OR TRUSS SPACING~~	~~ROOF SPAN (feet)~~	~~EXPOSURE C~~									
		~~Ultimate Design Wind Speed, V_{ULT} (mph)~~									
		~~110~~		~~115~~		~~120~~		~~130~~		~~140~~	
		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~		~~Roof Pitch~~	

		~~<5:12~~	~~≥5:12~~	~~<5:12~~	~~<5:12~~	~~<5:12~~	~~≥5:12~~	~~<5:12~~	~~≥5:12~~	~~<5:12~~	~~≥5:12~~
~~12" o.c.~~	~~12~~	~~95~~	~~73~~	~~110~~	~~86~~	~~126~~	~~100~~	~~161~~	~~130~~	~~198~~	~~163~~
	~~18~~	~~121~~	~~97~~	~~141~~	~~115~~	~~163~~	~~135~~	~~208~~	~~175~~	~~257~~	~~219~~
	~~24~~	~~148~~	~~122~~	~~173~~	~~145~~	~~200~~	~~169~~	~~256~~	~~220~~	~~317~~	~~275~~
	~~28~~	~~166~~	~~138~~	~~195~~	~~164~~	~~225~~	~~192~~	~~289~~	~~250~~	~~358~~	~~313~~
	~~32~~	~~184~~	~~155~~	~~216~~	~~184~~	~~249~~	~~215~~	~~321~~	~~280~~	~~398~~	~~351~~
	~~36~~	~~202~~	~~171~~	~~237~~	~~204~~	~~274~~	~~238~~	~~353~~	~~310~~	~~438~~	~~389~~
	~~42~~	~~229~~	~~196~~	~~269~~	~~233~~	~~312~~	~~273~~	~~402~~	~~356~~	~~499~~	~~446~~
	~~48~~	~~256~~	~~221~~	~~302~~	~~263~~	~~349~~	~~307~~	~~450~~	~~401~~	~~560~~	~~503~~
~~16" o.c.~~	~~12~~	~~126~~	~~97~~	~~146~~	~~114~~	~~168~~	~~133~~	~~214~~	~~173~~	~~263~~	~~217~~
	~~18~~	~~161~~	~~129~~	~~188~~	~~153~~	~~217~~	~~180~~	~~277~~	~~233~~	~~342~~	~~291~~
	~~24~~	~~197~~	~~162~~	~~230~~	~~193~~	~~266~~	~~225~~	~~340~~	~~293~~	~~422~~	~~366~~
	~~28~~	~~221~~	~~184~~	~~259~~	~~218~~	~~299~~	~~255~~	~~384~~	~~333~~	~~476~~	~~416~~
	~~32~~	~~245~~	~~206~~	~~287~~	~~245~~	~~331~~	~~286~~	~~427~~	~~372~~	~~529~~	~~467~~
	~~36~~	~~269~~	~~227~~	~~315~~	~~271~~	~~364~~	~~317~~	~~469~~	~~412~~	~~583~~	~~517~~
	~~42~~	~~305~~	~~261~~	~~358~~	~~310~~	~~415~~	~~363~~	~~535~~	~~473~~	~~664~~	~~593~~
	~~48~~	~~340~~	~~294~~	~~402~~	~~350~~	~~464~~	~~408~~	~~599~~	~~533~~	~~745~~	~~669~~
~~24" o.c.~~	~~12~~	~~190~~	~~146~~	~~220~~	~~172~~	~~252~~	~~200~~	~~322~~	~~260~~	~~396~~	~~326~~
	~~18~~	~~242~~	~~194~~	~~282~~	~~230~~	~~326~~	~~270~~	~~416~~	~~350~~	~~514~~	~~438~~
	~~24~~	~~296~~	~~244~~	~~346~~	~~290~~	~~400~~	~~338~~	~~512~~	~~440~~	~~634~~	~~550~~
	~~28~~	~~332~~	~~276~~	~~390~~	~~328~~	~~450~~	~~384~~	~~578~~	~~500~~	~~716~~	~~626~~
	~~32~~	~~368~~	~~310~~	~~432~~	~~368~~	~~498~~	~~430~~	~~642~~	~~560~~	~~796~~	~~702~~
	~~36~~	~~404~~	~~342~~	~~474~~	~~408~~	~~548~~	~~476~~	~~706~~	~~620~~	~~876~~	~~778~~
	~~42~~	~~458~~	~~392~~	~~538~~	~~466~~	~~624~~	~~546~~	~~804~~	~~712~~	~~998~~	~~892~~
	~~48~~	~~512~~	~~442~~	~~604~~	~~526~~	~~698~~	~~614~~	~~900~~	~~802~~	~~1120~~	~~1006~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.~~

~~a. The uplift connection forces are based on a maximum 33 foot mean roof height and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated ultimate design wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights.~~

~~b. The uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.~~

~~c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.~~

~~d. The tabulated uplift connection forces shall be permitted to be multiplied by 0.75 for connections not located within 8 feet of building corners.~~

~~e. For buildings with hip roofs with 5:12 and greater pitch, the tabulated uplift connection forces shall be permitted to be multiplied by 0.70. This reduction shall not be combined with any other reduction in tabulated forces.~~

~~f. For wall-to-wall and wall-to-foundation connections, the uplift connection force shall be permitted to be reduced by 60 plf for each full wall above.~~

~~g. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.~~

~~h. The tabulated forces for a 12” on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.~~

Committee Reason: This change provides the basis for calculating the appropriate wind load in accordance with ASCE 7-10. The modification deletes the proposed revised table and restores the original table in order to allow to bring back as a corrected table.

Assembly Action: None

Public Comment:

Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

~~TABLE R802.11~~
~~RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)~~ ~~[a, b, c, d, e, f, g, h]~~

TABLE R802.11
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (ASD)(POUNDS PER CONNECTION) [a, b, c, d, e, f, g, h]

RAFTER OR TRUSS SPACING	ROOF SPAN (feet)	EXPOSURE B									
		Ultimate Design Wind Speed, V_{ULT} (mph)									
		110		115		120		130		140	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12
12" o.c.	12	48	43	59	53	70	64	95	88	122	113
	18	59	52	74	66	89	81	122	112	157	146
	24	71	62	89	79	108	98	149	137	192	178
	28	79	69	99	88	121	109	167	153	216	200
	32	86	75	109	97	134	120	185	170	240	222
	36	94	82	120	106	146	132	203	186	264	244
	42	106	92	135	120	166	149	230	211	300	278
	48	118	102	151	134	185	166	258	236	336	311
16" o.c.	12	64	57	78	70	93	85	126	117	162	150
	18	78	69	98	88	118	108	162	149	209	194
	24	94	82	118	105	144	130	198	182	255	237
	28	105	92	132	117	161	145	222	203	287	266
	32	114	100	145	129	178	160	246	226	319	295
	36	125	109	160	141	194	176	270	247	351	325
	42	141	122	180	160	221	198	306	281	399	370
	48	157	136	201	178	246	221	343	314	447	414
24" o.c.	12	96	86	118	106	140	128	190	176	244	226
	18	118	104	148	132	178	162	244	224	314	292
	24	142	124	178	158	216	196	298	274	384	356
	28	158	138	198	176	242	218	334	306	432	400
	32	172	150	218	194	268	240	370	340	480	444
	36	188	164	240	212	292	264	406	372	528	488
	42	212	184	270	240	332	298	460	422	600	556
	48	236	204	302	268	370	332	516	472	672	622
RAFTER OR TRUSS SPACING	ROOF SPAN (feet)	EXPOSURE C									
		Ultimate Design Wind Speed, V_{ULT} (mph)									
		110		115		120		130		140	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12
12" o.c.	12	95	88	110	102	126	118	161	151	198	186
	18	121	111	141	131	163	151	208	195	257	242
	24	148	136	173	160	200	185	256	239	317	298

	28	166	152	195	179	225	208	289	269	358	335
	32	184	168	216	199	249	231	321	299	398	373
	36	202	185	237	219	274	254	353	329	438	411
	42	229	210	269	248	312	289	402	375	499	468
	48	256	234	302	278	349	323	450	420	560	524
16" o.c.	12	126	117	146	136	168	157	214	201	263	247
	18	161	148	188	174	217	201	277	259	342	322
	24	197	181	230	213	266	246	340	318	422	396
	28	221	202	259	238	299	277	384	358	476	446
	32	245	223	287	265	331	307	427	398	529	496
	36	269	246	315	291	364	338	469	438	583	547
	42	305	279	358	330	415	384	535	499	664	622
	48	340	311	402	370	464	430	599	559	745	697
24" o.c.	12	190	176	220	204	252	236	322	302	396	372
	18	242	222	282	262	326	302	416	390	514	484
	24	296	272	346	320	400	370	512	478	634	596
	28	332	304	390	358	450	416	578	538	716	670
	32	368	336	432	398	498	462	642	598	796	746
	36	404	370	474	438	548	508	706	658	876	822
	42	458	420	538	496	624	578	804	750	998	936
	48	512	468	604	556	698	646	900	840	1120	1048

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.

a. The uplift connection forces are based on a maximum 33 foot mean roof height and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated ultimate design wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights.

b. The uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.

c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.

d. The tabulated uplift connection forces shall be permitted to be multiplied by 0.75 for connections not located within 8 feet of building corners.

e. For buildings with hip roofs with 5:12 and greater pitch, the tabulated uplift connection forces shall be permitted to be multiplied by 0.70. This reduction shall not be combined with any other reduction in tabulated forces.

f. For wall-to-wall and wall-to-foundation connections, the uplift connection force shall be permitted to be reduced by 60 plf for each full wall above.

g. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.

h. The tabulated forces for a 12” on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

(Portions of code change proposal not shown remain unchanged)

Commenter’s Reason: The purpose of this public comment is to complete the updating of the IRC Chapter 8 provisions to correlate with the ultimate wind speed basis of the 2012 IBC and ASCE 7-10. A review of the new roof uplift load table by AWC shortly before the Committee Action Hearings uncovered an error in the calculations for 5:12 roof slopes and greater. (The values for roof slopes less than 5:12 were correct.) Since there was not time to track down the error and prepare an amended table in time for the hearings, and we did not want to ask for disapproval given the remaining portions of the wind update heard up to that point had passed, we opted to maintain the original table but identify the wind speeds as “nominal design wind speeds” using the V_{ASD} term introduced in the 2012 IBC.

The error in the calculations has now been identified and corrected and a new version of Table R802.11 generated using ultimate design wind speeds. This public comment supplies the new table and values to replace the existing V_{ASD} table and complete the updating of the IRC wind provisions. It is noted the values proposed here have been checked against AWC’s calculations and confirmed.

Final Hearing Results

RB396-13 **AMPC**

Code Change No: RB397-13

Original Proposal

Section(s): R802.11.1.2

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R802.11.1.2 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings for the basic wind speed as determined by Figure R301.2(4)A and listed in Table R301.2(1). Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice.

Reason: The purpose of this code change is to clarify the requirements for determining uplift loads for trusses. The proposal adds a pointer to the Climatic and Geographic Design Criteria table and the Basic Wind Speed figure. This emphasizes the need for the Truss Designer to correctly select the proper wind speed and other criteria for the site and building in the truss design software and not just pick the highest wind speed applicable in a state or the highest mean roof height permitted. It is critical the Truss Design Drawings reflect the correct uplift reactions for the site and building in question and not a more conservative reaction. Otherwise, the builder (and homeowner) would be required to install extra (or larger) uplift connectors than would normally be necessary for the loads anticipated at the site.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Public Comments

Public Comment 1:

Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R802.11.1.2 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings for the ~~basic~~ ultimate design wind speed as determined by Figure R301.2(4) and listed in Table R301.2(1). Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice.

Commenter's Reason: The purpose of this public comment is to correlate the original proposal with the update of the IRC wind provisions to the ultimate wind speed basis of the 2012 IBC and ASCE 7-10. The term "basic wind speed" is amended to "ultimate design wind speed" in keeping with the set of approved code changes which comprehensively implement the new wind provisions.

Public Comment 2:

Larry Wainright, Qualtim, representing Structural Building Components Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R802.11.1.2 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings for the basic wind speed as determined by Figure R301.2(4)A and listed in Table R301.2(1) <u>or as shown on the construction documents</u>. Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice.

Commenter's Reason: While SBCA agrees in concept that that trusses should be designed at a minimum to the wind speeds determined by Figure R301.2(4) and listed in Table R301.2(1), truss designers are not building designers. In accordance with ANSI/TPI 1, chapter 2 (the truss design standard referenced by the IRC) truss designers must design the trusses in accordance with the construction documents provided. It is the prerogative of the building designer to specify design parameters above the minimum code requirements. As written, the code would not allow the truss designer to do truss design in accordance with the building designer's specification if it is greater than the minimum requirements.

Final Hearing Results

RB397-13	**AMPC1, 2**

Code Change No: RB400-13

Original Proposal

Section(s): R804

RB400 – 13
R804

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org)

Revise as follows:

SECTION R804 COLD-FORMED STEEL ROOF FRAMING

R804.1 General. Elements shall be straight and free of any defects that would significantly affect their structural performance. Cold-formed steel roof framing members shall be in accordance ~~comply~~ with the requirements of this section.

R804.1.1 Applicability limits. The provisions of this section shall control the construction of cold-formed steel roof framing for buildings not greater than 60 feet (18 288 mm) perpendicular to the joist, rafter or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist span or truss, less than or equal to three stories above *grade* plane and with roof slopes not less than 3:12 (25-percent slope) or greater than 12:12 (100-percent slope). Cold-formed steel roof framing constructed in accordance with the provisions of this section shall be limited to sites ~~subjected to a maximum~~ where the ultimate design wind speed ~~of 110~~ is less than 139 miles per hour (62~~49~~ m/s), Exposure Category B or C, and ~~a maximum~~ the ground snow load is less than or equal to~~of~~ 70 pounds per square foot (3350 Pa).

R804.2 Structural framing. Load-bearing, cold-formed steel roof framing members shall be in accordance ~~comply~~ with this section. ~~Figure R804.2(1) and with the dimensional and minimum thickness requirements specified in Tables R804.2(1) and R804.2(2). Tracks shall comply with Figure R804.2(2) and shall have a minimum flange width of 1$^1/_4$ inches (32 mm).~~

R804.2.1 Material. Load-bearing, cold-formed steel framing members shall be cold-formed to shape from structural quality sheet steel complying with the requirements of ~~one of the following:~~

~~1. ASTM A 653: Grades 33 and 50 (Class 1 and 3).~~
~~2. ASTM A 792: Grades 33 and 50A.~~
~~3.~~ ASTM A 1003,~~:~~ Structural Grades 33 Type H and 50 Type H.

R804.2.2 Corrosion protection. Load-bearing, cold-formed steel framing shall have a metallic coating complying with ASTM A 1003 and one of the following:

1. A minimum of G 60 in accordance with ASTM A 653.
2. A minimum of AZ 50 in accordance with ASTM A 792.

R804.2.3 Dimension, thickness and material grade. Load-bearing, cold-formed steel roof framing members shall comply with Figure R804.2.3(1) and with the dimensional and thickness requirements specified in Table R804.2.3. Additionally, all c-shaped sections shall have a minimum flange width of 1.625 inches (41 mm) and a maximum flange width of 2 inches (51 mm). The minimum lip size for c-shaped sections shall be 0.5 inches (13 mm). Tracks shall comply with Figure R804.2.3(2) and shall have a minimum flange width of $1^1/_4$ inches (32 mm). Minimum Grade 33 ksi steel shall be used wherever 33 mil and 43 mil thicknesses are specified. Minimum Grade 50 ksi steel shall be used wherever 54 and 68 mil thicknesses are specified.

R804.2.4 Identification. Load-bearing, cold-formed steel framing members shall have a legible *label,* stencil, stamp or embossment with the following information as a minimum:

1. Manufacturer's identification.
2. Minimum base steel thickness in inches (mm).
3. Minimum coating designation.
4. Minimum yield strength, in kips per square inch (ksi) (MPa).

~~**R804.2.3 Corrosion protection.** Load-bearing, cold-formed steel framing shall have a metallic coating complying with ASTM A 1003 and one of the following:~~

1. ~~A minimum of G 60 in accordance with ASTM A 653.~~
2. ~~A minimum of AZ 50 in accordance with ASTM A 792.~~

FIGURE R804.2.3(1) C-SHAPED SECTION

(No change to Figure)

FIGURE R804.2.3(2) TRACK SECTION

(No change to Figure)

~~**TABLE R804.2(1)**~~
~~**LOAD-BEARING COLD-FORMED STEEL MEMBER SIZES**~~

~~NOMINAL MEMBER SIZE MEMBER DESIGNATION[a]~~	~~WEB DEPTH (inches)~~	~~MINIMUM FLANGE WIDTH (inches)~~	~~MAXIMUM FLANGE WIDTH (inches)~~	~~MINIMUM LIP SIZE (inches)~~
~~350S162-t~~	~~3.5~~	~~1.625~~	~~2~~	~~0.5~~
~~550S162-t~~	~~5.5~~	~~1.625~~	~~2~~	~~0.5~~
~~800S162-t~~	~~8~~	~~1.625~~	~~2~~	~~0.5~~
~~1000S162-t~~	~~10~~	~~1.625~~	~~2~~	~~0.5~~
~~1200S162-t~~	~~12~~	~~1.625~~	~~2~~	~~0.5~~

~~For SI: 1 inch = 25.4 mm~~

~~a. The member designation is defined by the first number representing the member depth in hundredths of an inch, the letter "s" representing a stud or joist member, the second number representing the flange width in hundredths of an inch, and the letter "t" shall be a number representing the minimum base metal thickness in mils [see Tble R804.2(2)].~~

~~**TABLE R804.2(2)**~~
~~**MINIMUM THICKNESS OF COLD-FORMED STEEL MEMBERS**~~

~~DESIGNATION THICKNESS (mils)~~	~~MINIMUM BASE STEEL THICKNESS (inch)~~
~~33~~	~~0.0329~~
~~43~~	~~0.0428~~
~~54~~	~~0.0538~~
~~68~~	~~0.0677~~

~~97~~	~~0.0966~~

~~For SI:1 inch = 25.4 mm, 1 mil = 0.0254 mm.~~

TABLE R804.2.3 LOAD-BEARING COLD-FORMED STEEL ROOF FRAMING MEMBER SIZES AND THICKNESSES

MEMBER DESIGNATION[a]	WEB DEPTH (inches)	MINIMUM BASE STEEL THICKNESS mil (inches)
350S162-t	3.5	33 (0.0329), 43 (0.0428), 54 (0.0538)
550S162-t	5.5	33 (0.0329), 43 (0.0428), 54 (0.0538), 68 (0.0677)
800S162-t	8	33 (0.0329), 43 (0.0428), 54 (0.0538), 68 (0.0677)
1000S162-t	10	43 (0.0428), 54 (0.0538), 68 (0.0677)
1200S162-t	12	43 (0.0428), 54 (0.0538), 68 (0.0677)

For SI: 1 inch = 25.4 mm

a. The member designation is defined by the first number representing the member depth in hundredths of an inch, the letter “s” representing a stud or joist member, the second number representing the flange width in hundredths of an inch, and the letter “t” shall be a number representing the minimum base metal thickness in mils.

~~R804.2.4~~ R804.2.5 Fastening ~~requirements.~~ Screws for steel-to-steel connections shall be installed with a minimum edge distance and center-to-center spacing of $^1/_2$ inch (13 mm), shall be self-drilling tapping, and shall conform to ASTM C 1513. Structural sheathing shall be attached to cold-formed steel roof rafters with minimum No. 8 self-drilling tapping screws that conform to ASTM C 1513. Screws for attaching structural sheathing to cold-formed steel roof framing shall have a minimum head diameter of 0.292 inch (7.4 mm) with countersunk heads and shall be installed with a minimum edge distance of $^3/_8$ inch (10 mm). Gypsum board ceilings shall be attached to cold-formed steel joists with minimum No. 6 screws conforming to ASTM C 954 or ASTM C 1513 with a bugle-head style and shall be installed in accordance with Section R805. For all connections, screws shall extend through the steel a minimum of three exposed threads. All fasteners shall have rust-inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion.
~~Where No. 8 screws are specified in a steel-to-steel connection, reduction of the required number of screws in the connection is permitted in accordance with the reduction factors in Table R804.2.4 when larger screws are used or when one of the sheets of steel being connected is thicker than 33 mils (0.84 mm). When applying the reduction factor, the resulting number of screws shall be rounded up.~~

~~TABLE R804.2.4~~
~~SCREW SUBSTITUTION FACTOR~~

~~SCREW SIZE~~	~~THINNEST CONNECTED STEEL SHEET (mils)~~	
	~~33~~	~~43~~
~~#8~~	~~1.0~~	~~0.67~~
~~#10~~	~~0.93~~	~~0.62~~
~~#12~~	~~0.86~~	~~0.56~~

~~For SI:1 mil = 0.0254 mm.~~

~~R804.2.5~~ R804.2.6 Web holes, web hole reinforcing and web hole patching. Web holes, web hole reinforcing, and web hole patching shall be in accordance with this section.

~~R804.2.5.1~~ R804.2.6.1 Web holes. Web holes in roof framing members shall comply with all of the following conditions:

1. Holes shall conform to Figure ~~R804.2.5.1~~ R804.2.6.1;
2. Holes shall be permitted only along the centerline of the web of the framing member;
3. Center-to-center spacing of holes shall not be less than 24 inches (610 mm);
4. The web hole width shall not be greater than one-half the member depth, or $2^1/_2$ inches (64.5 mm);
5. Holes shall have a web hole length not exceeding $4^1/_2$ inches (114 mm); and
6. The minimum distance between the edge of the bearing surface and the edge of the web hole shall not be less than 10 inches (254 mm).

Framing members with web holes not conforming to the above requirements shall be reinforced in accordance with Section ~~R804.2.5.2~~ R804.2.6.2, patched in accordance with Section ~~R804.2.5.3~~ R804.2.6.3 or designed in accordance with accepted engineering practices.

FIGURE ~~R804.2.5.1~~ R804.2.6.1 ROOF FRAMING MEMBER WEB HOLES

(No change to Figure)

~~R804.2.5.2~~ R804.2.6.2 Web hole reinforcing. Reinforcement of web holes in ceiling joists not conforming to the requirements of Section ~~R804.2.5.1~~ R804.2.6.1 shall be permitted if the hole is located fully within the center 40 percent of the span and the depth and length of the hole does not exceed 65 percent of the flat width of the web. The reinforcing shall be a steel plate or C-shape section with a hole that does not exceed the web hole size limitations of Section ~~R804.2.5.1~~ R804.2.6.1 for the member being reinforced. The steel reinforcing shall be the same thickness as the receiving member and shall extend at least 1 inch (25.4 mm) beyond all edges of the hole. The steel reinforcing shall be fastened to the web of the receiving member with No. 8 screws spaced no greater than 1 inch (25.4 mm) center-to-center along the edges of the patch with minimum edge distance of $^1/_2$ inch (13 mm).

~~R804.2.5.3~~ R804.2.6.3 Hole patching. Patching of web holes in roof framing members not conforming to the requirements in Section ~~R804.2.5.1~~ R804.2.6.1 shall be permitted in accordance with either of the following methods:

1. Framing members shall be replaced or designed in accordance with accepted engineering practices where web holes exceed the following size limits:
    1.1. The depth of the hole, measured across the web, exceeds 70 percent of the flat width of the web; or
    1.2. The length of the hole measured along the web, exceeds 10 inches (254 mm) or the depth of the web, whichever is greater.
2. Web holes not exceeding the dimensional requirements in Section ~~R804.2.5.3~~ R804.2.6.3, Item 1, shall be patched with a solid steel plate, stud section or track section in accordance with Figure ~~R804.2.5.3~~ R804.2.6.3. The steel patch shall, as a minimum, be of the same thickness as the receiving member and shall extend at least 1 inch (25 mm) beyond all edges of the hole. The steel patch shall be fastened to the web of the receiving member with No.8 screws spaced no greater than 1 inch (25 mm) center-to-center along the edges of the patch with minimum edge distance of $^1/_2$ inch (13 mm).

FIGURE ~~R804.2.5.3~~ R804.2.6.3 ROOF FRAMING MEMBER WEB HOLE PATCH

(No change to Figure)

R804.3 Roof construction. Cold-formed steel roof systems constructed in accordance with the provisions of this section shall consist of both ceiling joists and rafters in accordance with Figure R804.3 and fastened in accordance with Table R804.3~~, and hip framing in accordance with Section R804.3.3~~.

R804.3.1 Ceiling joists. Cold-formed steel ceiling joists shall be in accordance with this section.

R804.3.1.1 Minimum ceiling joist size. Ceiling joist size and thickness shall be determined in accordance with the limits set forth in Tables R804.3.1.1(1) ~~through~~ and ~~R804.3.1.1(8).~~ R804.3.1.1(2).

When determining the size of ceiling joists, the lateral support of the top flange shall be classified as unbraced, braced at mid-span or braced at third points in accordance with Section R804.3.1.4. Where sheathing material is attached to the top flange of ceiling joists or where the bracing is spaced closer than third point of the joists, the "third point" values from Tables R804.3.1.1(1) ~~through~~ and ~~R804.3.1.1(8)~~ R804.3.1.1(2) shall be used.

Ceiling joists shall have a bearing support length of not less than 1$^1/_2$ inches (38 mm) and shall be connected to roof rafters (heel joint) with No. 10 screws in accordance with Figure~~s~~ R804.3.1.1~~(1) and R804.3.1.1(2)~~ and Table ~~804.3.1.1(9).~~ 804.3.1.1(3).

When continuous joists are framed across interior bearing supports, the interior bearing supports shall be located within 24 inches (610 mm) of midspan of the ceiling joist, and the individual spans shall not exceed the applicable spans in Tables ~~R804.3.1.1(2), R804.3.1.1(4), R804.3.1.1(6) and R804.3.1.1(8).~~ R804.3.1.1(1) and R804.3.1.1(2)

When the *attic* is to be used as an *occupied space,* the ceiling joists shall be designed in accordance with Section R505.

FIGURE R804.3 COLD-FORMED STEEL ROOF CONSTRUCTION

(No change to Figure)

TABLE R804.3
ROOF FRAMING FASTENING SCHEDULE~~[a,b]~~

<table>
<tr><th colspan="3">DESCRIPTION OF BUILDING ELEMENTS</th><th colspan="4">NUMBER AND SIZE OF FASTENERS[a]</th><th>SPACING OF FASTENERS</th></tr>
<tr><td colspan="3">~~Ceiling joist to top track of load-bearing wall~~</td><td colspan="4">~~2 No. 10 screws~~</td><td>~~Each joist~~</td></tr>
<tr><td colspan="3">Roof sheathing (oriented strand board or plywood) to rafter</td><td colspan="4">No. 8 screws</td><td>6" o.c. on edges and 12" o.c. at interior supports. 6" o.c. at gable end truss</td></tr>
<tr><td colspan="3">~~Truss to bearing wall[a]~~</td><td colspan="4">~~2 No. 10 screws~~</td><td>~~Each truss~~</td></tr>
<tr><td colspan="3">Gable end truss to end wall top track</td><td colspan="4">No. 10 screws</td><td>12" o.c.</td></tr>
<tr><td colspan="3">Rafter to ceiling joist</td><td colspan="4">Minimum No. 10 screws, per Table R804.3.1.1(3~~9~~)</td><td>Evenly spaced, not less than $^1/_2$" from all edges.</td></tr>
<tr><td rowspan="12">Ceiling joist or roof truss to top track of bearing wall[b]</td><td rowspan="2">Ceiling Joist Spacing (in.)</td><td rowspan="2">Roof Span (ft)</td><td colspan="4">Ultimate Design Wind Speed (mph) and Exposure Category</td><td rowspan="12">Each ceiling joist or roof truss</td></tr>
<tr><td>126 B
110 C</td><td><139 B
115 C</td><td>126 C</td><td><139 C</td></tr>
<tr><td rowspan="5">16</td><td>24</td><td>2</td><td>2</td><td>2</td><td>3</td></tr>
<tr><td>28</td><td>2</td><td>2</td><td>3</td><td>3</td></tr>
<tr><td>32</td><td>2</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>36</td><td>2</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>40</td><td>2</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td rowspan="5">24</td><td>24</td><td>2</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>28</td><td>2</td><td>2</td><td>4</td><td>5</td></tr>
<tr><td>32</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>36</td><td>2</td><td>3</td><td>4</td><td>6</td></tr>
<tr><td>40</td><td>2</td><td>3</td><td>5</td><td>6</td></tr>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 mil = 0.0254 mm.

a. Screws are a minimum No. 10 unless noted otherwise.

b. Indicated number of s~~S~~crews shall be applied through the flanges of the truss or ceiling joist or through each leg of a 54 mil clip angle~~ shall be used with two No. 10 screws in each leg~~. See Section R804.3.8~~9~~ for additional requirements to resist uplift forces.

~~b. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and at all roof plane perimeters. Blocking of roof sheathing panel edges perpendicular to the framing members shall not be required except at the intersection of adjacent roof planes. Roof perimeter shall be supported by framing members or cold-formed blocking of the same depth and gage as the floor members.~~

~~**TABLE R804.3.1.1(1)**~~
~~**CEILING JOIST SPANS**~~
~~**SINGLE SPANS WITH BEARING STIFFENERS**~~
~~**10 lb per sq ft LIVE LOAD (NO ATTIC STORAGE)[a, b, c] 33 ksi STEEL**~~

~~MEMBER DESIGNATION~~	~~ALLOWABLE SPAN (feet-inches)~~					
	~~Lateral Support of Top (Compression) Flange~~					
	~~Unbraced~~		~~Mid-Span Bracing~~		~~Third-Point Bracing~~	
	~~Ceiling Joist Spacing (inches)~~					
	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~
~~350S162-33~~	~~9'-5"~~	~~8'-6"~~	~~12'-2"~~	~~10'-4"~~	~~12'-2"~~	~~10'-7"~~
~~350S162-43~~	~~10'-3"~~	~~9'-2"~~	~~12'-10"~~	~~11'-2"~~	~~12'-10"~~	~~11'-2"~~
~~350S162-54~~	~~11'-1"~~	~~9'-11"~~	~~13'-9"~~	~~12'-0"~~	~~13'-9"~~	~~12'-0"~~
~~350S162-68~~	~~12'-1"~~	~~10'-9"~~	~~14'-8"~~	~~12'-10"~~	~~14'-8"~~	~~12'-10"~~
~~350S162-97~~	~~14'-4"~~	~~12'-7"~~	~~16'-4"~~	~~14'-3"~~	~~16'-4"~~	~~14'-3"~~
~~550S162-33~~	~~10'-7"~~	~~9'-6"~~	~~14'-10"~~	~~12'-10"~~	~~15'-11"~~	~~13'-4"~~
~~550S162-43~~	~~11'-8"~~	~~10'-6"~~	~~16'-4"~~	~~14'-3"~~	~~17'-10"~~	~~15'-3"~~
~~550S162-54~~	~~12'-6"~~	~~11'-2"~~	~~17'-7"~~	~~15'-7"~~	~~19'-5"~~	~~16'-10"~~
~~550S162-68~~	~~13'-6"~~	~~12'-1"~~	~~19'-2"~~	~~17'-1"~~	~~21'-0"~~	~~18'-4"~~
~~550S162-97~~	~~15'-9"~~	~~13'-11"~~	~~21'-8"~~	~~19'-3"~~	~~23'-5"~~	~~20'-5"~~
~~800S162-33~~	~~12'-2"~~	~~10'-11"~~	~~17'-8"~~	~~15'-10"~~	~~19'-10"~~	~~17'-1"~~
~~800S162-43~~	~~13'-0"~~	~~11'-9"~~	~~18'-10"~~	~~17'-0"~~	~~21'-6"~~	~~19'-1"~~
~~800S162-54~~	~~13'-10"~~	~~12'-5"~~	~~20'-0"~~	~~18'-0"~~	~~22'-9"~~	~~20'-4"~~
~~800S162-68~~	~~14'-11"~~	~~13'-4"~~	~~21'-3"~~	~~19'-1"~~	~~24'-1"~~	~~21'-8"~~
~~800S162-97~~	~~17'-1"~~	~~15'-2"~~	~~23'-10"~~	~~21'-3"~~	~~26'-7"~~	~~23'-10"~~
~~1000S162-43~~	~~13'-11"~~	~~12'-6"~~	~~20'-2"~~	~~18'-3"~~	~~23'-1"~~	~~20'-9"~~
~~1000S162-54~~	~~14'-9"~~	~~13'-3"~~	~~21'-4"~~	~~19'-3"~~	~~24'-4"~~	~~22'-0"~~
~~1000S162-68~~	~~15'-10"~~	~~14'-2"~~	~~22'-8"~~	~~20'-5"~~	~~25'-9"~~	~~23'-2"~~
~~1000S162-97~~	~~18'-0"~~	~~16'-0"~~	~~25'-3"~~	~~22'-7"~~	~~28'-3"~~	~~25'-4"~~
~~1200S162-43~~	~~14'-8"~~	~~13'-3"~~	~~21'-4"~~	~~19'-3"~~	~~24'-5"~~	~~21'-8"~~
~~1200S162-54~~	~~15'-7"~~	~~14'-0"~~	~~22'-6"~~	~~20'-4"~~	~~25'-9"~~	~~23'-2"~~
~~1200S162-68~~	~~16'-8"~~	~~14'-11"~~	~~23'-11"~~	~~21'-6"~~	~~27'-2"~~	~~24'-6"~~
~~1000S162-97~~	~~18'-9"~~	~~16'-9"~~	~~26'-6"~~	~~23'-8"~~	~~29'-9"~~	~~26'-9"~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Deflection criterion: *L*/240 for total loads.~~
~~b. Ceiling deal load = 5 psf.~~
~~c. Bearing stiffners are required at all bearing points and concentrated load locations.~~

~~TABLE R804.3.1.1(2)~~
~~CEILING JOIST SPANS~~
~~TWO EQUAL SPANS WITH BEARING STIFFENERS~~
~~10 lb per sq ft LIVE LOAD (NO ATTIC STORAGE)[a, b, c] 33 ksi STEEL~~

~~MEMBER DESIGNATION~~	~~ALLOWABLE SPAN (feet-inches)~~					
	~~Lateral Support of Top (Compression) Flange~~					
	~~Unbraced~~		~~Mid-Span Bracing~~		~~Third-Point Bracing~~	
	~~Ceiling Joist Spacing (inches)~~					
	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~
~~350S162-33~~	~~12'-11"~~	~~10'-11"~~	~~13'-5"~~	~~10'-11"~~	~~13'-5"~~	~~10'-11"~~
~~350S162-43~~	~~14'-2"~~	~~12'-8"~~	~~15'-10"~~	~~12'-11"~~	~~15'-10"~~	~~12'-11"~~
~~350S162-54~~	~~15'-6"~~	~~13'-10"~~	~~17'-1"~~	~~14'-6"~~	~~17'-9"~~	~~14'-6"~~
~~350S162-68~~	~~17'-3"~~	~~15'-3"~~	~~18'-6"~~	~~16'-1"~~	~~19'-8"~~	~~16'-1"~~
~~350S162-97~~	~~20'-10"~~	~~18'-4"~~	~~21'-5"~~	~~18'-10"~~	~~21'-11"~~	~~18'-10"~~
~~550S162-33~~	~~14'-4"~~	~~12'-11"~~	~~16'-7"~~	~~14'-1"~~	~~17'-3"~~	~~14'-1"~~
~~550S162-43~~	~~16'-0"~~	~~14'-1"~~	~~17'-11"~~	~~16'-1"~~	~~20'-7"~~	~~16'-10"~~
~~550S162-54~~	~~17'-4"~~	~~15'-6"~~	~~19'-5"~~	~~17'-6"~~	~~23'-2"~~	~~19'-0"~~
~~550S162-68~~	~~19'-1"~~	~~16'-11"~~	~~20'-10"~~	~~18'-8"~~	~~25'-2"~~	~~21'-5"~~
~~550S162-97~~	~~22'-8"~~	~~19'-9"~~	~~23'-6"~~	~~20'-11"~~	~~27'-11"~~	~~25'-1"~~
~~800S162-33~~	~~16'-5"~~	~~14'-10"~~	~~19'-2"~~	~~17'-3"~~	~~23'-1"~~	~~18'-3"~~
~~800S162-43~~	~~17'-9"~~	~~15'-11"~~	~~20'-6"~~	~~18'-5"~~	~~25'-0"~~	~~22'-6"~~
~~800S162-54~~	~~19'-1"~~	~~17'-1"~~	~~21'-8"~~	~~19'-6"~~	~~26'-4"~~	~~23'-9"~~
~~800S162-68~~	~~20'-9"~~	~~18'-6"~~	~~23'-1"~~	~~20'-9"~~	~~28'-0"~~	~~25'-2"~~
~~800S162-97~~	~~24'-5"~~	~~21'-6"~~	~~26'-0"~~	~~23'-2"~~	~~31'-1"~~	~~27'-9"~~
~~1000S162-43~~	~~18'-11"~~	~~17'-0"~~	~~21'-11"~~	~~19'-9"~~	~~26'-8"~~	~~24'-1"~~
~~1000S162-54~~	~~20'-3"~~	~~18'-2"~~	~~23'-2"~~	~~20'-10"~~	~~28'-2"~~	~~25'-5"~~
~~1000S162-68~~	~~21'-11"~~	~~19'-7"~~	~~24'-7"~~	~~22'-2"~~	~~29'-10"~~	~~26'-11"~~
~~1000S162-97~~	~~25'-7"~~	~~22'-7"~~	~~27'-6"~~	~~24'-6"~~	~~33'-0"~~	~~29'-7"~~
~~1200S162-43~~	~~19'-11"~~	~~17'-11"~~	~~23'-1"~~	~~20'-10"~~	~~28'-3"~~	~~25'-6"~~
~~1200S162-54~~	~~21'-3"~~	~~19'-1"~~	~~24'-5"~~	~~22'-0"~~	~~29'-9"~~	~~26'-10"~~
~~1200S162-68~~	~~23'-0"~~	~~20'-7"~~	~~25'-11"~~	~~23'-4"~~	~~31'-6"~~	~~28'-4"~~
~~1000S162-97~~	~~26'-7"~~	~~23'-6"~~	~~28'-9"~~	~~25'-10"~~	~~34'-8"~~	~~31'-1"~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Deflection criterion: *L*/240 for total loads.~~
~~b. Ceiling deal load = 5 psf.~~
~~c. Bearing stiffners are required at all bearing points and concentrated load locations.~~

~~TABLE R804.3.1.1(3)~~
~~CEILING JOIST SPANS~~
~~SINGLE SPANS WITH BEARING STIFFENERS~~
~~20 lb per sq ft LIVE LOAD (LIMITED ATTIC STORAGE)[a, b, c] 33 ksi STEEL~~

~~MEMBER DESIGNATION~~	~~ALLOWABLE SPAN (feet-inches)~~					
	~~Lateral Support of Top (Compression) Flange~~					
	~~Unbraced~~		~~Mid-Span Bracing~~		~~Third-Point Bracing~~	
	~~Ceiling Joist Spacing (inches)~~					
	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~
~~350S162-33~~	~~8'-2"~~	~~7'-2"~~	~~9'-9"~~	~~8'-1"~~	~~9'-11"~~	~~8'-1"~~
~~350S162-43~~	~~8'-10"~~	~~7'-10"~~	~~11'-0"~~	~~9'-5"~~	~~11'-0"~~	~~9'-7"~~
~~350S162-54~~	~~9'-6"~~	~~8'-6"~~	~~11'-9"~~	~~10'-3"~~	~~11'-9"~~	~~10'-3"~~
~~350S162-68~~	~~10'-4"~~	~~9'-2"~~	~~12'-7"~~	~~11'-0"~~	~~12'-7"~~	~~11'-0"~~
~~350S162-97~~	~~12'-1"~~	~~10'-8"~~	~~14'-0"~~	~~12'-0"~~	~~14'-0"~~	~~12'-0"~~
~~550S162-33~~	~~9'-2"~~	~~8'-3"~~	~~12'-2"~~	~~10'-2"~~	~~12'-6"~~	~~10'-5"~~
~~550S162-43~~	~~10'-1"~~	~~9'-1"~~	~~13'-7"~~	~~11'-7"~~	~~14'-5"~~	~~12'-2"~~
~~550S162-54~~	~~10'-9"~~	~~9'-8"~~	~~14'-10"~~	~~12'-10"~~	~~15'-11"~~	~~13'-6"~~
~~550S162-68~~	~~11'-7"~~	~~10'-4"~~	~~16'-4"~~	~~14'-0"~~	~~17'-5"~~	~~14'-11"~~
~~550S162-97~~	~~13'-4"~~	~~11'-10"~~	~~18'-5"~~	~~16'-2"~~	~~20'-1"~~	~~17'-1"~~
~~800S162-33~~	~~10'-7"~~	~~9'-6"~~	~~15'-1"~~	~~13'-0"~~	~~16'-2"~~	~~13'-7"~~
~~800S162-43~~	~~11'-4"~~	~~10'-2"~~	~~16'-5"~~	~~14'-6"~~	~~18'-2"~~	~~15'-9"~~
~~800S162-54~~	~~12'-0"~~	~~10'-9"~~	~~17'-4"~~	~~15'-6"~~	~~19'-6"~~	~~17'-0"~~
~~800S162-68~~	~~12'-10"~~	~~11'-6"~~	~~18'-5"~~	~~16'-6"~~	~~20'-10"~~	~~18'-3"~~
~~800S162-97~~	~~14'-7"~~	~~12'-11"~~	~~20'-5"~~	~~18'-3"~~	~~22'-11"~~	~~20'-5"~~
~~1000S162-43~~	~~12'-1"~~	~~10'-11"~~	~~17'-7"~~	~~15'-10"~~	~~19'-11"~~	~~17'-3"~~
~~1000S162-54~~	~~12'-10"~~	~~11'-6"~~	~~18'-7"~~	~~16'-9"~~	~~21'-2"~~	~~18'-10"~~
~~1000S162-68~~	~~13'-8"~~	~~12'-3"~~	~~19'-8"~~	~~17'-8"~~	~~22'-4"~~	~~20'-1"~~
~~1000S162-97~~	~~15'-4"~~	~~13'-8"~~	~~21'-8"~~	~~19'-5"~~	~~24'-5"~~	~~21'-11"~~
~~1200S162-43~~	~~12'-9"~~	~~11'-6"~~	~~18'-7"~~	~~16'-6"~~	~~20'-9"~~	~~18'-2"~~
~~1200S162-54~~	~~13'-6"~~	~~12'-2"~~	~~19'-7"~~	~~17'-8"~~	~~22'-5"~~	~~20'-2"~~
~~1200S162-68~~	~~14'-4"~~	~~12'-11"~~	~~20'-9"~~	~~18'-8"~~	~~23'-7"~~	~~21'-3"~~
~~1000S162-97~~	~~16'-1"~~	~~14'-4"~~	~~22'-10"~~	~~20'-6"~~	~~25'-9"~~	~~23'-2"~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Deflection criterion: *L*/240 for total loads.~~
~~b. Ceiling deal load = 5 psf.~~
~~c. Bearing stiffners are required at all bearing points and concentrated load locations.~~

~~TABLE R804.3.1.1(4)~~
~~CEILING JOIST SPANS~~
~~TWO EQUAL SPANS WITH BEARING STIFFENERS~~
~~20 lb per sq ft LIVE LOAD (LIMITED ATTIC STORAGE)[a, b, c] 33 ksi STEEL~~

~~MEMBER DESIGNATION~~	~~ALLOWABLE SPAN (feet-inches)~~					
	~~Lateral Support of Top (Compression) Flange~~					
	~~Unbraced~~		~~Mid-Span Bracing~~		~~Third-Point Bracing~~	
	~~Ceiling Joist Spacing (inches)~~					
	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~
~~350S162-33~~	~~10'-2"~~	~~8'-4"~~	~~10'-2"~~	~~8'-4"~~	~~10'-2"~~	~~8'-4"~~
~~350S162-43~~	~~12'-1"~~	~~9'-10"~~	~~12'-1"~~	~~9'-10"~~	~~12'-1"~~	~~9'-10"~~
~~350S162-54~~	~~13'-3"~~	~~11'-0"~~	~~13'-6"~~	~~11'-0"~~	~~13'-6"~~	~~11'-0"~~
~~350S162-68~~	~~14'-7"~~	~~12'-3"~~	~~15'-0"~~	~~12'-3"~~	~~15'-0"~~	~~12'-3"~~
~~350S162-97~~	~~17'-6"~~	~~14'-3"~~	~~17'-6"~~	~~14'-3"~~	~~17'-6"~~	~~14'-3"~~
~~550S162-33~~	~~12'-5"~~	~~10'-9"~~	~~13'-2"~~	~~10'-9"~~	~~13'-2"~~	~~10'-9"~~
~~550S162-43~~	~~13'-7"~~	~~12'-1"~~	~~15'-6"~~	~~12'-9"~~	~~15'-8"~~	~~12'-9"~~
~~550S162-54~~	~~14'-11"~~	~~13'-4"~~	~~16'-10"~~	~~14'-5"~~	~~17'-9"~~	~~14'-5"~~
~~550S162-68~~	~~16'-3"~~	~~14'-5"~~	~~18'-0"~~	~~16'-1"~~	~~20'-0"~~	~~16'-4"~~
~~550S162-97~~	~~19'-1"~~	~~16'-10"~~	~~20'-3"~~	~~18'-0"~~	~~23'-10"~~	~~19'-5"~~
~~800S162-33~~	~~14'-3"~~	~~12'-4"~~	~~16'-7"~~	~~12'-4"~~	~~16'-7"~~	~~12'-4"~~
~~800S162-43~~	~~15'-4"~~	~~13'-10"~~	~~17'-9"~~	~~16'-0"~~	~~21'-8"~~	~~17'-9"~~
~~800S162-54~~	~~16'-5"~~	~~14'-9"~~	~~18'-10"~~	~~16'-11"~~	~~22'-11"~~	~~20'-6"~~
~~800S162-68~~	~~17'-9"~~	~~15'-11"~~	~~20'-0"~~	~~18'-0"~~	~~24'-3"~~	~~21'-10"~~
~~800S162-97~~	~~20'-8"~~	~~18'-3"~~	~~22'-3"~~	~~19'-11"~~	~~26'-9"~~	~~24'-0"~~
~~1000S162-43~~	~~16'-5"~~	~~14'-9"~~	~~19'-0"~~	~~17'-2"~~	~~23'-3"~~	~~18'-11"~~
~~1000S162-54~~	~~17'-6"~~	~~15'-8"~~	~~20'-1"~~	~~18'-1"~~	~~24'-6"~~	~~22'-1"~~
~~1000S162-68~~	~~18'-10"~~	~~16'-10"~~	~~21'-4"~~	~~19'-2"~~	~~25'-11"~~	~~23'-4"~~
~~1000S162-97~~	~~21'-8"~~	~~19'-3"~~	~~23'-7"~~	~~21'-2"~~	~~28'-5"~~	~~25'-6"~~
~~1200S162-43~~	~~17'-3"~~	~~15'-7"~~	~~20'-1"~~	~~18'-2"~~	~~24'-6"~~	~~18'-3"~~
~~1200S162-54~~	~~18'-5"~~	~~16'-6"~~	~~21'-3"~~	~~19'-2"~~	~~25'-11"~~	~~23'-5"~~
~~1200S162-68~~	~~19'-9"~~	~~17'-8"~~	~~22'-6"~~	~~20'-3"~~	~~27'-4"~~	~~24'-8"~~
~~1000S162-97~~	~~22'-7"~~	~~20'-1"~~	~~24'-10"~~	~~22'-3"~~	~~29'-11"~~	~~26'-11"~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Deflection criterion: *L*/240 for total loads.~~
~~b. Ceiling deal load = 5 psf.~~
~~c. Bearing stiffners are required at all bearing points and concentrated load locations.~~

TABLE ~~R804.3.1.1(5)~~ R804.3.1.1(1)
CEILING JOIST SPANS
~~SINGLE SPANS WITHOUT BEARING STIFFENERS~~
10 lb per sq ft LIVE LOAD (NO ATTIC STORAGE)[a, b, c]
~~33 ksi STEEL~~

MEMBER DESIGNATION	ALLOWABLE SPAN (feet-inches)					
	Lateral Support of Top (Compression) Flange					
	Unbraced		Mid-Span Bracing		Third-Point Bracing	
	Ceiling Joist Spacing (inches)					
	16	24	16	24	16	24
350S162-33	9'-5"	8'-6"	12'-2"	10'-4"	12'-2"	10'-7"
350S162-43	10'-3"	9'-12"	13'-2"	11'-6"	13'-2"	11'-6"
350S162-54	11'-1"	9'-11"	13'-9"	12'-0"	13'-9"	12'-0"
350S162-68	12'-1"	10'-9"	14'-8"	12'-10"	14'-8"	12'-10"
~~350S162-97~~	~~14'-4"~~	~~12'-7"~~	~~16'-10"~~	~~14'-3"~~	~~16'-4"~~	~~14'-3"~~
550S162-33	10'-7"	9'-6"	14'-10"	12'-10"	15'-11"	13'-4"
550S162-43	11'-8"	10'-6"	16'-4"	14'-3"	17'-10"	15'-3"
550S162-54	12'-6"	11'-2"	17'-7"	15'-7"	19'-5"	16'-10"
550S162-68	13'-6"	12'-1"	19'-2"	17'-0"	21'-0"	18'-4"
~~550S162-97~~	~~15'-9"~~	~~13'-11"~~	~~21'-8"~~	~~19'-3"~~	~~23'-5"~~	~~20'-5"~~
800S162-33	—	—	—	—	—	—
800S162-43	13'-0"	11'-9"	18'-10"	17'-0"	21'-6"	19'-0"
800S162-54	13'-10"	12'-5"	20'-0"	18'-0"	22'-9"	20'-4"
800S162-68	14'-11"	13'-4"	21'-3"	19'-1"	24'-1"	21'-8"
~~800S162-97~~	~~17'-1"~~	~~15'-2"~~	~~23'-10"~~	~~21'-3"~~	~~26'-7"~~	~~23'-10"~~
1000S162-43	—	—	—	—	—	—
1000S162-54	14'-9"	13'-3"	21'-4"	19'-3"	24'-4"	22'-0"
1000S162-68	15'-10"	14'-2"	22'-8"	20'-5"	25'-9"	23'-2"
~~1000S162-97~~	~~18'-0"~~	~~16'-0"~~	~~25'-3"~~	~~22'-7"~~	~~28'-3"~~	~~25'-4"~~
1200S162-43	—	—	—	—	—	—
1200S162-54	—	—	—	—	—	—
1200S162-68	16'-8"	14'-11"	23'-11"	21'-6"	27'-2"	24'-6"
~~1000S162-97~~	~~18'-9"~~	~~16'-9"~~	~~26'-6"~~	~~23'-8"~~	~~29'-9"~~	~~26'-9"~~

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Deflection criterion: *L*/240 for total loads.
b. Ceiling deal load = 5 psf.
c. Minimum Grade 33 ksi steel shall be used for 33 mil and 43 mil thicknesses. Minimum Grade 50 ksi steel shall be used for 54 and 68 mil thicknesses.

~~TABLE R804.3.1.1(6)~~
~~CEILING JOIST SPANS~~
~~TWO EQUAL SPANS WITHOUT BEARING STIFFENERS~~
~~10 lb per sq ft LIVE LOAD (NO ATTIC STORAGE)[a,b] 33 ksi STEEL~~

~~MEMBER DESIGNATION~~	~~ALLOWABLE SPAN (feet-inches)~~					
	~~Lateral Support of Top (Compression) Flange~~					
	~~Unbraced~~		~~Mid-Span Bracing~~		~~Third-Point Bracing~~	
	~~Ceiling Joist Spacing (inches)~~					
	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~
~~350S162-33~~	~~11'-9"~~	~~8'-11"~~	~~11'-9"~~	~~8'-11"~~	~~11'-9"~~	~~8'-11"~~
~~350S162-43~~	~~14'-2"~~	~~11'-7"~~	~~14'-11"~~	~~11'-7"~~	~~14'-11"~~	~~11'-7"~~
~~350S162-54~~	~~15'-6"~~	~~13'-10"~~	~~17'-1"~~	~~13'-10"~~	~~17'-7"~~	~~13'-10"~~
~~350S162-68~~	~~17'-3"~~	~~15'-3"~~	~~18'-6"~~	~~16'-1"~~	~~19'-8"~~	~~16'-1"~~
~~350S162-97~~	~~20'-10"~~	~~18'-4"~~	~~21'-5"~~	~~18'-9"~~	~~21'-11"~~	~~18'-9"~~
~~550S162-33~~	~~13'-4"~~	~~9'-11"~~	~~13'-4"~~	~~9'-11"~~	~~13'-4"~~	~~9'-11"~~
~~550S162-43~~	~~16'-0"~~	~~13'-6"~~	~~17'-9"~~	~~13'-6"~~	~~17'-9"~~	~~13'-6"~~
~~550S162-54~~	~~17'-4"~~	~~15'-6"~~	~~19'-5"~~	~~16'-10"~~	~~21'-9"~~	~~16'-10"~~
~~550S162-68~~	~~19'-1"~~	~~16'-11"~~	~~20'-10"~~	~~18'-8"~~	~~24'-11"~~	~~20'-6"~~
~~550S162-97~~	~~22'-8"~~	~~20'-0"~~	~~23'-9"~~	~~21'-1"~~	~~28'-2"~~	~~25'-1"~~
~~800S162-33~~	—	—	—	—	—	—
~~800S162-43~~	~~17'-9"~~	~~15'-7"~~	~~20'-6"~~	~~15'-7"~~	~~21'-0"~~	~~15'-7"~~
~~800S162-54~~	~~19'-1"~~	~~17'-1"~~	~~21'-8"~~	~~19'-6"~~	~~26'-4"~~	~~23'-10"~~
~~800S162-68~~	~~20'-9"~~	~~18'-6"~~	~~23'-1"~~	~~20'-9"~~	~~28'-0"~~	~~25'-2"~~
~~800S162-97~~	~~24'-5"~~	~~21'-6"~~	~~26'-0"~~	~~23'-2"~~	~~31'-1"~~	~~27'-9"~~
~~1000S162-43~~	—	—	—	—	—	—
~~1000S162-54~~	~~20'-3"~~	~~18'-2"~~	~~23'-2"~~	~~20'-10"~~	~~28'-2"~~	~~21'-2"~~
~~1000S162-68~~	~~21'-11"~~	~~19'-7"~~	~~24'-7"~~	~~22'-2"~~	~~29'-10"~~	~~26'-11"~~
~~1000S162-97~~	~~25'-7"~~	~~22'-7"~~	~~27'-6"~~	~~24'-6"~~	~~33'-0"~~	~~29'-7"~~
~~1200S162-43~~	—	—	—	—	—	—
~~1200S162-54~~	—	—	—	—	—	—
~~1200S162-68~~	~~23'-0"~~	~~20'-7"~~	~~25'-11"~~	~~23'-4"~~	~~31'-6"~~	~~28'-4"~~
~~1000S162-97~~	~~26'-7"~~	~~23'-6"~~	~~28'-9"~~	~~25'-10"~~	~~34'-8"~~	~~31'-1"~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Deflection criterion: *L*/240 for total loads.~~
~~b. Ceiling deal load = 5 psf.~~

TABLE ~~R804.3.1.1(7)~~ R804.3.1.1(2)
CEILING JOIST SPANS
~~SINGLE SPANS WITHOUT BEARING STIFFENERS~~
20 lb per sq ft LIVE LOAD (LIMITED ATTIC STORAGE)[a, b, c]
~~33 ksi STEEL~~

MEMBER DESIGNATION	ALLOWABLE SPAN (feet-inches)					
	Lateral Support of Top (Compression) Flange					
	Unbraced		Mid-Span Bracing		Third-Point Bracing	
	Ceiling Joist Spacing (inches)					
	16	24	16	24	16	24
350S162-33	8'-2"	6'-10"	9'-9"	6'-10"	9'-11"	6'-10"
350S162-43	8'-10"	7'-10"	11'-0"	9'-5"	11'-0"	9'-7"
350S162-54	9'-6"	8'-6"	11'-9"	10'-3"	11'-9"	10'-3"
350S162-68	10'-4"	9'-2"	12'-7"	11'-0"	12'-7"	11'-0"
~~350S162-97~~	~~12'-10"~~	~~10'-8"~~	~~13'-9"~~	~~12'-0"~~	~~13'-9"~~	~~12'-0"~~
550S162-33	9'-2"	8'-3"	12'-2"	8'-5"	12'-6"	8'-5"
550S162-43	10'-1"	9'-1"	13'-7"	11'-8"	14'-5"	12'-2"
550S162-54	10'-9"	9'-8"	14'-10"	12'-10"	15'-11"	13'-6"
550S162-68	11'-7"	10'-4"	16'-4"	14'-0"	17'-5"	14'-11"
~~550S162-97~~	~~13'-4"~~	~~11'-10"~~	~~18'-5"~~	~~16'-2"~~	~~20'-1"~~	~~17'-4"~~
800S162-33	—	—	—	—	—	—
800S162-43	11'-4"	10'-1"	16'-5"	13'-6"	18'-1"	13'-6"
800S162-54	20'-0"	10'-9"	17'-4"	15'-6"	19'-6"	27'-0"
800S162-68	12'-10"	11'-6"	18'-5"	16'-6"	20'-10"	18'-3"
~~800S162-97~~	~~14'-7"~~	~~12'-11"~~	~~20'-5"~~	~~18'-3"~~	~~22'-11"~~	~~20'-5"~~
1000S162-43	—	—	—	—	—	—
1000S162-54	12'-10"	11'-6"	18'-7"	16'-9"	21'-2"	15'-5"
1000S162-68	13'-8"	12'-3"	19'-8"	17'-8"	22'-4"	20'-1"
~~1000S162-97~~	~~15'-4"~~	~~13'-8"~~	~~21'-8"~~	~~19'-5"~~	~~24'-5"~~	~~21'-11"~~
1200S162-43	—	—	—	—	—	—
1200S162-54	—	—	—	—	—	—
1200S162-68	14'-4"	12'-11"	20'-9"	18'-8"	23'-7"	21'-3"
~~1000S162-97~~	~~16'-1"~~	~~14'-4"~~	~~22'-10"~~	~~20'-6"~~	~~25'-9"~~	~~23'-2"~~

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Deflection criterion: *L*/240 for total loads.
b. Ceiling deal load = 5 psf.
c. Minimum Grade 33 ksi steel shall be used for 33 mil and 43 mil thicknesses. Minimum Grade 50 ksi steel shall be used for 54 and 68 mil thicknesses.

~~TABLE R804.3.1.1(8)~~
~~CEILING JOIST SPANS~~
~~TWO EQUAL SPANS WITHOUT BEARING STIFFENERS~~
~~20 lb per sq ft LIVE LOAD (LIMITED ATTIC STORAGE)[a, b] 33 ksi STEEL~~

~~MEMBER DESIGNATION~~	~~ALLOWABLE SPAN (feet-inches)~~					
	~~Lateral Support of Top (Compression) Flange~~					
	~~Unbraced~~		~~Mid-Span Bracing~~		~~Third-Point Bracing~~	
	~~Ceiling Joist Spacing (inches)~~					
	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~
~~350S162-33~~	~~8'-1"~~	~~6'-1"~~	~~8'-1"~~	~~6'-1"~~	~~8'-1"~~	~~6'-1"~~
~~350S162-43~~	~~10'-7"~~	~~8'-1"~~	~~10'-7"~~	~~8'-1"~~	~~10'-7"~~	~~8'-1"~~
~~350S162-54~~	~~12'-8"~~	~~9'-10"~~	~~12'-8"~~	~~9'-10"~~	~~12'-8"~~	~~9'-10"~~
~~350S162-68~~	~~14'-7"~~	~~11'-10"~~	~~14'-11"~~	~~11'-10"~~	~~14'-11"~~	~~11'-10"~~
~~350S162-97~~	~~17'-6"~~	~~14'-3"~~	~~17'-6"~~	~~14'-3"~~	~~17'-6"~~	~~14'-3"~~
~~550S162-33~~	~~8'-11"~~	~~6'-8"~~	~~8'-11"~~	~~6'-8"~~	~~8'-11"~~	~~6'-8"~~
~~550S162-43~~	~~12'-3"~~	~~9'-2"~~	~~12'-3"~~	~~9'-2"~~	~~12'-3"~~	~~9'-2"~~
~~550S162-54~~	~~14'-11"~~	~~11'-8"~~	~~15'-4"~~	~~11'-8"~~	~~15'-4"~~	~~11'-8"~~
~~550S162-68~~	~~16'-3"~~	~~14'-5"~~	~~18'-0"~~	~~15'-8"~~	~~18'-10"~~	~~14'-7"~~
~~550S162-97~~	~~19'-1"~~	~~16'-10"~~	~~20'-3"~~	~~18'-0"~~	~~23'-9"~~	~~19'-5"~~
~~800S162-33~~	—	—	—	—	—	—
~~800S162-43~~	~~13'-11"~~	~~9'-10"~~	~~13'-11"~~	~~9'-10"~~	~~13'-11"~~	~~9'-10"~~
~~800S162-54~~	~~16'-5"~~	~~13'-9"~~	~~18'-8"~~	~~13'-9"~~	~~18'-8"~~	~~13'-9"~~
~~800S162-68~~	~~17'-9"~~	~~15'-11"~~	~~20'-0"~~	~~18'-0"~~	~~24'-1"~~	~~18'-3"~~
~~800S162-97~~	~~20'-8"~~	~~18'-3"~~	~~22'-3"~~	~~19'-11"~~	~~26'-9"~~	~~24'-0"~~
~~1000S162-43~~	—	—	—	—	—	—
~~1000S162-54~~	~~17'-6"~~	~~13'-11"~~	~~19'-1"~~	~~13'-11"~~	~~19'-1"~~	~~13'-11"~~
~~1000S162-68~~	~~18'-10"~~	~~16'-10"~~	~~21'-4"~~	~~19'-2"~~	~~25'-11"~~	~~19'-7"~~
~~1000S162-97~~	~~21'-8"~~	~~19'-3"~~	~~23'-7"~~	~~21'-2"~~	~~28'-5"~~	~~25'-6"~~
~~1200S162-43~~	—	—	—	—	—	—
~~1200S162-54~~	—	—	—	—	—	—
~~1200S162-68~~	~~19'-9"~~	~~17'-8"~~	~~22'-6"~~	~~19'-8"~~	~~26'-8"~~	~~19'-8"~~
~~1000S162-97~~	~~22'-7"~~	~~20'-1"~~	~~24'-10"~~	~~22'-3"~~	~~29'-11"~~	~~26'-11"~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Deflection criterion: *L*/240 for total loads.~~
~~b. Ceiling deal load = 5 psf.~~

TABLE ~~R804.3.1.1(9)~~ R804.3.1.1(3)
NUMBER OF SCREWS REQUIRED FOR CEILING JOIST TO ROOF RAFTER CONNECTION[a]

ROOF SLOPE	NUMBER OF SCREWS																			
	Building width (feet)																			
	24				28				32				36				40			
	Ground snow load (psf)																			
	20	30	50	70	20	30	50	70	20	30	50	70	20	30	50	70	20	30	50	70
3/12	5	6	9	11	5	7	10	13	6	8	11	15	7	8	13	17	8	9	14	19
4/12	4	5	7	9	4	5	8	10	5	6	9	12	5	7	10	13	6	7	11	14
5/12	3	4	6	7	4	4	6	8	4	5	7	10	5	5	8	11	5	6	9	12
6/12	3	3	5	6	3	4	6	7	4	4	6	8	4	5	7	9	4	5	8	10
7/12	3	3	4	6	3	3	5	7	3	4	6	7	4	4	6	8	4	5	7	9
8/12	2	3	4	5	3	3	5	6	3	4	5	7	3	4	6	8	4	4	6	8
9/12	2	3	4	5	3	3	4	6	3	3	5	6	3	4	5	7	3	4	6	8
10/12	2	2	4	5	2	3	4	5	3	3	5	6	3	3	5	7	3	4	6	7
11/12	2	2	3	4	2	3	4	5	3	3	4	6	3	3	5	6	3	4	5	7
12/12	2	2	3	4	2	3	4	5	2	3	4	5	3	3	5	6	3	4	5	7

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479kPa.
a. Screws shall be No. 10.

FIGURE R804.3.1.1~~(1)~~ JOIST TO RAFTER CONNECTION

(No change to Figure)

~~**R804.3.1.2 Ceiling joist bearing stiffeners.** Where required in Tables R804.3.1.1(1) through R804.3.1.1(8), bearing stiffeners shall be installed at each bearing support in accordance with Figure R804.3.1.1(2). Bearing stiffeners shall be fabricated from a C-shaped or track member in accordance with the one of following:~~

1. ~~C-shaped bearing stiffeners shall be a minimum 33 mils (0.84 mm) thick.~~
2. ~~Track bearing stiffener shall be a minimum 43 mils (1.09 mm) thick.~~

~~The minimum length of a bearing stiffener shall be the depth of member being stiffened minus $^3/_8$ inch (9.5 mm). Each stiffener shall be fastened to the web of the ceiling joist with a minimum of four No. 8 screws equally spaced as shown in Figure R804.3.1.1(2). Installation of stiffeners shall be permitted on either side of the web.~~

~~**FIGURE R804.3.1.1(2) BEARING STIFFENER**~~

~~R804.3.1.3~~ R804.3.1.2 Ceiling joist bottom flange bracing. The bottom flanges of ceiling joists shall be laterally braced by the application of gypsum board or continuous steel straps installed perpendicular to the joist run in accordance with one of the following:

1. Gypsum board shall be fastened with No. 6 screws in accordance with Section R702.
2. Steel straps with a minimum size of $1^1/_2$ inches by 33 mils (38 mm by 0.84 mm) shall be installed at a maximum spacing of 4 feet (1219 mm). Straps shall be fastened to the bottom flange at each joist with one No. 8 screw and shall be fastened to blocking with two No. 8 screws. Blocking shall be installed between joists at a maximum spacing of 12 feet (3658 mm)

measured along a line of continuous strapping (perpendicular to the joist run). Blocking shall also be located at the termination of all straps.

~~R804.3.1.4~~ R804.3.1.3 Ceiling joist top flange bracing. The top flanges of ceiling joists shall be laterally braced as required by Tables R804.3.1.1(1) ~~through~~ and ~~R804.3.1.1(8),~~ R804.3.1.1(2) in accordance with one of the following:

1. Minimum 33-mil (0.84 mm) C-shaped member in accordance with Figure ~~R804.3.1.4(1).~~ R804.3.1.3(1).
2. Minimum 33-mil (0.84 mm) track section in accordance with Figure ~~R804.3.1.4(1).~~ R804.3.1.3(1),
3. Minimum 33-mil (0.84 mm) hat section in accordance with Figure ~~R804.3.1.4(1).~~ R804.3.1.3(1).
4. Minimum 54-mil (1.37 mm) $1^1/_2$-inch cold-rolled channel section in accordance with Figure ~~R804.3.1.4(1).~~ R804.3.1.3(1).
5. Minimum $1^1/_2$-inch by 33-mil (38 mm by 0.84 mm) continuous steel strap in accordance with ~~Figure R804.3.1.4(2).~~ R804.3.1.3(2).

Lateral bracing shall be installed perpendicular to the ceiling joists and shall be fastened to the top flange of each joist with one No. 8 screw. Blocking shall be installed between joists in line with bracing at a maximum spacing of 12 feet (3658 mm) measured perpendicular to the joists. Ends of lateral bracing shall be attached to blocking or anchored to a stable building component with two No. 8 screws.

~~R804.3.1.5~~ R804.3.1.4 Ceiling joist splicing. Splices in ceiling joists shall be permitted, if ceiling joist splices are supported at interior bearing points and are constructed in accordance with Figure ~~R804.3.1.5~~ R804.3.1.4. The number of screws on each side of the splice shall be the same as required for the heel joint connection in Table ~~R804.3.1.1(9).~~ R804.3.1.1(3).

FIGURE ~~R804.3.1.4(1)~~ R804.3.1.3(1) CEILING JOIST TOP FLANGE BRACING WITH C-SHAPE, TRACK OR COLD-ROLLED CHANNEL

(No change to Figure)

FIGURE ~~R804.3.1.4(2)~~ R804.3.1.3(2) CEILING JOIST TOP FLANGE BRACING WITH CONTINUOUS STEEL STRAP AND BLOCKING

(No change to Figure)

FIGURE ~~R804.3.1.5~~ R804.3.1.4 SPLICED CEILING JOISTS

(No change to Figure)

R804.3.2 Roof rafters. Cold-formed steel roof rafters shall be in accordance with this section.

R804.3.2.1 Minimum roof rafter sizes. Roof rafter size and thickness shall be determined in accordance with the limits set forth in Table~~s~~ R804.3.2.1(1) ~~and R804.3.2.1(2)~~ based on the horizontal projection of the roof rafter span. For determination of roof rafter sizes, reduction of roof spans shall be permitted when a roof rafter support brace is installed in accordance with Section R804.3.2.2. The reduced roof rafter span shall be taken as the larger of the distance from the roof rafter support brace to the ridge or to the heel measured horizontally.

For the purpose of determining roof rafter sizes in Table~~s~~ R804.3.2.1(1) ~~and R804.3.2.1(2)~~, ultimate design wind speeds shall be converted to equivalent ground snow loads in accordance with Table ~~R804.3.2.1(3).~~ R804.3.2.1(2). Roof rafter sizes shall be based on the higher of the ground snow load or the equivalent snow load converted from the ultimate design wind speed.

R804.3.2.1.1 Eave overhang. Eave overhangs shall not exceed 24 inches (610 mm) measured horizontally.

R804.3.2.1.2 Rake overhangs. Rake overhangs shall not exceed 12 inches (305 mm) measured horizontally. Outlookers at gable endwalls shall be installed in accordance with Figure R804.3.2.1.2.

R804.3.2.2 Roof rafter support brace. When used to reduce roof rafter spans in determining roof rafter sizes, a roof rafter support brace shall meet all of the following conditions:

1. Minimum 350S162-33 C-shaped brace member with maximum length of 8 feet (2438 mm).
2. Minimum brace member slope of 45 degrees (0.785 rad) to the horizontal.
3. Minimum connection of brace to a roof rafter and ceiling joist with four No.10 screws at each end.
4. Maximum 6 inches (152 mm) between brace/ceiling joist connection and load-bearing wall below.
5. Each roof rafter support brace greater than 4 feet (1219 mm) in length, shall be braced with a supplemental brace having a minimum size of 350S162-33 or 350T162-33 such that the maximum unsupported length of the roof rafter support brace is 4 feet (1219 mm). The supplemental brace shall be continuous and shall be connected to each roof rafter support brace using two No.8 screws.

TABLE R804.3.2.1(1)
ROOF RAFTER SPANS[a, b, c]
~~33 ksi STEEL~~

~~MEMBER DESIGNATION~~	~~ALLOWABLE SPAN MEASURED HORIZONTALLY (feet-inches)~~							
	~~Ground snow load (psf)~~							
	~~20~~		~~30~~		~~50~~		~~70~~	
	~~Rafter spacing (inches)~~							
	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~
~~550S162-33~~	~~14'-0"~~	~~11'-6"~~	~~11'-11"~~	~~9'-7"~~	~~9'-6"~~	~~7'-9"~~	~~8'-2"~~	~~6'-8"~~
~~550S162-43~~	~~16'-8"~~	~~13'-11"~~	~~14'-5"~~	~~11'-9"~~	~~11'-6"~~	~~9'-5"~~	~~9'-10"~~	~~8'-0"~~
~~550S162-54~~	~~17'-11"~~	~~15'-7"~~	~~15'-7"~~	~~13'-3"~~	~~12'-11"~~	~~10'-7"~~	~~11'-1"~~	~~9'-1"~~
~~550S162-68~~	~~19'-2"~~	~~16'-9"~~	~~16'-9"~~	~~14'-7"~~	~~14'-1"~~	~~11'-10"~~	~~12'-6"~~	~~10'-2"~~
~~550S162-97~~	~~21'-3"~~	~~18'-6"~~	~~18'-6"~~	~~16'-2"~~	~~15'-8"~~	~~13'-8"~~	~~14'-0"~~	~~12'-2"~~
~~800S162-33~~	~~16'-5"~~	~~13'-5"~~	~~13'-11"~~	~~11'-4"~~	~~11'-1"~~	~~8'-2"~~	~~9'-0"~~	~~6'-0"~~
~~800S162-43~~	~~19'-9"~~	~~16'-1"~~	~~16'-8"~~	~~13'-7"~~	~~13'-4"~~	~~10'-10"~~	~~11'-5"~~	~~9'-4"~~
~~800S162-54~~	~~22'-8"~~	~~18'-6"~~	~~19'-2"~~	~~15'-8"~~	~~15'-4"~~	~~12'-6"~~	~~13'-1"~~	~~10'-8"~~
~~800S162-68~~	~~25'-10"~~	~~21'-2"~~	~~21'-11"~~	~~17'-10"~~	~~17'-6"~~	~~14'-4"~~	~~15'-0"~~	~~12'-3"~~
~~800S162-97~~	~~21'-3"~~	~~18'-6"~~	~~18'-6"~~	~~16'-2"~~	~~15'-8"~~	~~13'-8"~~	~~14'-0"~~	~~12'-2"~~
~~1000S162-43~~	~~22'-3"~~	~~18'-2"~~	~~18'-9"~~	~~15'-8"~~	~~15'-0"~~	~~12'-3"~~	~~12'-10"~~	~~10'-6"~~
~~1000S162-54~~	~~25'-8"~~	~~20'-11"~~	~~21'-8"~~	~~17'-9"~~	~~17'-4"~~	~~14'-2"~~	~~14'-10"~~	~~12'-1"~~
~~1000S162-68~~	~~29'-7"~~	~~24'-2"~~	~~25'-0"~~	~~20'-5"~~	~~20'-0"~~	~~16'-4"~~	~~17'-2"~~	~~14'-0"~~
~~1000S162-97~~	~~34'-8"~~	~~30'-4"~~	~~30'-4"~~	~~25'-10"~~	~~25'-3"~~	~~20'-8"~~	~~21'-8"~~	~~17'-8"~~
~~1200S162-54~~	~~28'-3"~~	~~23'-1"~~	~~23'-11"~~	~~19'-7"~~	~~19'-2"~~	~~15'-7"~~	~~16'-5"~~	~~13'-5"~~
~~1200S162-68~~	~~32'-10"~~	~~26'-10"~~	~~27'-9"~~	~~22'-8"~~	~~22'-2"~~	~~18'-1"~~	~~19'-0"~~	~~15'-6"~~
~~1200S162-97~~	~~40'-6"~~	~~33'-5"~~	~~34'-6"~~	~~28'-3"~~	~~27'-7"~~	~~22'-7"~~	~~23'-8"~~	~~19'-4"~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Table provides maximum horizontal rafter spans in feet and inches for slopes between 3:12 and 12:12.~~

~~b. Deflection criterion: *L*/240 for live loads and *L*/180 for total loads.~~

~~c. Roof dead load = 12 psf.~~

TABLE R804.3.2.1(1)
ROOF RAFTER SPANS[a, b, c, d]

MEMBER DESIGNATION	ALLOWABLE SPAN MEASURED HORIZONTALLY (feet-inches)							
	Equivalent ground snow load (psf)							
	20		30		50		70	
	Rafter spacing (inches)							
	16	24	16	24	16	24	16	24
550S162-33	14'-0"	11'-6"	11'-11"	9'-7"	9'-6"	7'-9"	8'-2"	6'-8"
550S162-43	16'-8"	13'-11"	14'-5"	11'-9"	11'-6"	9'-5"	9'-10"	8'-0"
550S162-54	17'-11"	15'-7"	15'-7"	13'-8"	13'-2"	11'-6"	11'-9"	10'-3"
550S162-68	19'-2"	16'-9"	16'-9"	14'-7"	14'-1"	12'-4"	12'-7"	11'-0"
800S162-33	16'-5"	13'-5"	13'-11"	11'-4"	11'-1"	8'-2"	9'-0"	6'-0"
800S162-43	19'-9"	16'-1"	16'-8"	13'-7"	13'-4"	10'-10"	11'-5"	9'-4"
800S162-54	24'-2"	21'-2"	21'-1"	18'-5"	17'-10"	14'-8"	15'-5"	12'-7"
800S162-68	25'-11"	22'-8"	22'-8"	19'-9"	19'-1"	16'-8"	17'-1"	14'-9"
1000S162-43	22'-3"	18'-2"	18'-9"	15'-8"	15'-0"	12'-3"	12'-10"	10'-6"
1000S162-54	29'-0"	24'-6"	25'-4"	20'-9"	20'-3"	16'-7"	17'-5"	14'-2"
1000S162-68	31'-2"	27'-3"	27'-3"	23'-9"	20'-0"	19'-6"	20'-6"	16'-8"
1200S162-54	33'-2"	27'-1"	28'-1"	22'-11"	22'-5"	18'-4"	19'-3"	15'-8"
1200S162-68	36'-4"	31'-9"	31'-9"	27'-0"	26'-5"	21'-6"	22'-6"	18'-6"

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Table provides maximum horizontal rafter spans in feet and inches for slopes between 3:12 and 12:12.

b. Deflection criterion: *L*/240 for live loads and *L*/180 for total loads.

c. Roof dead load = 12 psf.

d. Grade 33 ksi steel is permitted to be used for 33 mil and 43 mil thicknesses. Grade 50 ksi steel shall be used for 54 and 68 mil thicknesses.

~~**TABLE R804.3.2.1(2)**~~
~~**ROOF RAFTER SPANS[a, b, c]**~~
~~**50 ksi STEEL**~~

~~MEMBER DESIGNATION~~	~~ALLOWABLE SPAN MEASURED HORIZONTALLY (feet-inches)~~							
	~~Equivalent ground snow load (psf)~~							
	~~20~~		~~30~~		~~50~~		~~70~~	
	~~Rafter spacing (inches)~~							
	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~	~~16~~	~~24~~
~~550S162-33~~	~~15'-4"~~	~~12'-11"~~	~~13'-4"~~	~~10"-11"~~	~~10'-9"~~	~~8'-9"~~	~~9'-2"~~	~~7'-6"~~
~~550S162-43~~	~~16'-8"~~	~~14'-7"~~	~~14'-7"~~	~~12'-9"~~	~~12'-3"~~	~~10'-6"~~	~~11'-0"~~	~~9'-0"~~
~~550S162-54~~	~~17'-11"~~	~~15'-7"~~	~~15'-7"~~	~~13'-8"~~	~~13'-2"~~	~~11'-6"~~	~~11'-9"~~	~~10'-3"~~
~~550S162-68~~	~~19'-2"~~	~~16'-9"~~	~~16'-9"~~	~~14'-7"~~	~~14'-1"~~	~~12'-4"~~	~~12'-7"~~	~~11'-0"~~
~~550S162-97~~	~~21'-3"~~	~~18'-6"~~	~~18'-6"~~	~~16'-2"~~	~~15'-8"~~	~~13'-8"~~	~~14'-0"~~	~~12'-3"~~

~~800S162-33~~	~~18'-10"~~	~~15'-5"~~	~~15'-11"~~	~~12'-9"~~	~~12'-3"~~	~~8'-2"~~	~~9'-0"~~	~~6'-0"~~
~~800S162-43~~	~~22'-3"~~	~~18'-2"~~	~~18'-10"~~	~~15'-5"~~	~~15'-1"~~	~~12'-3"~~	~~12'-11"~~	~~10'-6"~~
~~800S162-54~~	~~24'-2"~~	~~21'-2"~~	~~21'-1"~~	~~18'-5"~~	~~17'-10"~~	~~14'-8"~~	~~15'-5"~~	~~12'-7"~~
~~800S162-68~~	~~25'-11"~~	~~22'-8"~~	~~22'-8"~~	~~19'-9"~~	~~19'-1"~~	~~16'-8"~~	~~17'-1"~~	~~14'-9"~~
~~800S162-97~~	~~28'-10"~~	~~25'-2"~~	~~25'-2"~~	~~22'-0"~~	~~21'-2"~~	~~18'-6"~~	~~19'-0"~~	~~16'-7"~~
~~1000S162-43~~	~~25'-2"~~	~~20'-7"~~	~~21'-4"~~	~~17'-5"~~	~~17'-0"~~	~~13'-11"~~	~~14'-7"~~	~~10'-7"~~
~~1000S162-54~~	~~29'-0"~~	~~24'-6"~~	~~25'-4"~~	~~20'-9"~~	~~20'-3"~~	~~16'-7"~~	~~17'-5"~~	~~14'-2"~~
~~1000S162-68~~	~~31'-2"~~	~~27'-3"~~	~~27'-3"~~	~~23'-9"~~	~~20'-0"~~	~~19'-6"~~	~~20'-6"~~	~~16'-8"~~
~~1000S162-97~~	~~34'-8"~~	~~30'-4"~~	~~30'-4"~~	~~26'-5"~~	~~25'-7"~~	~~22'-4"~~	~~22'-10"~~	~~20'-0"~~
~~1200S162-54~~	~~33'-2"~~	~~27'-1"~~	~~28'-1"~~	~~22'-11"~~	~~22'-5"~~	~~18'-4"~~	~~19'-3"~~	~~15'-8"~~
~~1200S162-68~~	~~36'-4"~~	~~31'-9"~~	~~31'-9"~~	~~27'-0"~~	~~26'-5"~~	~~21'-6"~~	~~22'-6"~~	~~18'-6"~~
~~1200S162-97~~	~~40'-6"~~	~~35'-4"~~	~~35'-4"~~	~~30'-11"~~	~~29'-10"~~	~~26'-1"~~	~~26'-8"~~	~~23'-1"~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Table provides maximum horizontal rafter spans in feet and inches for slopes between 3:12 and 12:12.~~
~~b. Deflection criterion: *L*/240 for live loads and *L*/180 for total loads.~~
~~c. Roof dead load = 12 psf.~~

TABLE ~~R804.3.2.1(3)~~ R804.3.2.1(2)
~~BASIC~~ ULTIMATE DESIGN WIND SPEED TO EQUIVALENT SNOW LOAD CONVERSION

~~BASIC~~ ULTIMATE DESIGN WIND SPEED (mph) AND EXPOSURE CATEGORY		EQUIVALENT GROUND SNOW LOAD (psf)									
		Roof slope									
~~Exp.~~ B	~~Exp.~~ C	3:12	4:12	5:12	6:12	7:12	8:12	9:12	10:12	11:12	12:12
~~85 mph~~	—	~~20~~	~~20~~	~~20~~	~~20~~	~~20~~	~~20~~	~~30~~	~~30~~	~~30~~	~~30~~
~~100~~126 ~~mph~~	~~85~~110~~mph~~	20	20	20	20	30	30	30	30	50	50
~~110~~<139 ~~mph~~	~~100~~126~~ mph~~	20	20	20	20	30	50	50	50	50	50
—	~~110~~<139~~mph~~	30	30	30	50	50	50	70	70	70	—

For SI: 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

R804.3.2.3 Roof rafter splice. Roof rafters shall not be spliced.

R804.3.2.4 Roof rafter to ceiling joist and ridge member connection. Roof rafters shall be connected to a parallel ceiling joist to form a continuous tie between exterior walls in accordance with Figure R804.3.1.1~~(1) or R804.3.1.1(2)~~ and Table ~~R804.3.1.1(9).~~ R804.3.1.1(3). Ceiling joists shall be connected to the top track of the load-bearing wall in accordance with Table R804.3, either with ~~two~~ the required number of No. 10 screws applied through the flange of the ceiling joist or by using a 54-mil (1.37 mm) clip angle with ~~two~~ the required number of No.10 screws in each leg. Roof rafters shall be connected to a ridge member with a minimum 2-inch by 2-inch (51 mm by 51 mm) clip angle fastened with No. 10 screws to the ridge member in accordance with Figure R804.3.2.4 and Table R804.3.2.4. The clip angle shall have a steel thickness equivalent to or greater than the roof rafter thickness and shall extend the depth of the roof rafter member to the extent possible. The ridge member shall be fabricated from a C-shaped member and a track section, which shall have a minimum size and steel thickness equivalent to or greater than that of adjacent roof rafters and shall be installed in accordance with Figure R804.3.2.4. The ridge member shall extend the full depth of the sloped roof rafter cut.

R804.3.2.5 Roof rafter bottom flange bracing. The bottom flanges of roof rafters shall be continuously braced, at a maximum spacing of 8 feet (2440 mm) as measured parallel to the roof rafters, with one of the following members:

1. Minimum 33-mil (0.84 mm) C-shaped member.
2. Minimum 33-mil (0.84 mm) track section.
3. Minimum $1^1/_2$-inch by 33-mil (38 mm by 0.84 mm) steel strap.

The bracing element shall be fastened to the bottom flange of each roof rafter with one No. 8 screw and shall be fastened to blocking with two No. 8 screws. Blocking shall be installed between roof rafters in-line with the continuous bracing at a maximum spacing of 12 feet (3658 mm) measured perpendicular to the roof rafters. The ends of continuous bracing shall be fastened to blocking or anchored to a stable building component with two No. 8 screws.

FIGURE R804.3.2.4 ~~HIP MEMBER OR~~ RIDGE MEMBER CONNECTION

(No change to Figure)

TABLE R804.3.2.4
SCREWS REQUIRED AT EACH LEG OF CLIP ANGLE FOR ~~HIP RAFTER TO HIP MEMBER OR~~ ROOF RAFTER TO RIDGE MEMBER CONNECTION[a]

BUILDING WIDTH (feet)	NUMBER OF SCREWS			
	Ground snow load (psf)			
	0 to 20	21 to 30	31 to 50	51 to 70
24	2	2	3	4
28	2	3	4	5
32	2	3	4	5
36	3	3	5	6
40	3	4	5	7

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.
a. Screws shall be No. 10 minimum.

~~**R804.3.3 Hip framing.** Hip framing shall consist of jack-rafters, hip members, hip support columns and connections in accordance with this section, or shall be in accordance with an *approved* design. The provisions of this section for hip members and hip support columns shall apply only where the jack rafter slope is greater than or equal to the roof slope. For the purposes of determining member sizes in this section, wind speeds shall be converted to equivalent ground snow load in accordance with Table R804.3.2.1(3).~~

~~**R804.3.3.1 Jack rafters.** Jack rafters shall meet the requirements for roof rafters in accordance with Section R804.3.2, except that the requirements in Section R804.3.2.4 shall not apply.~~

~~**R804.3.3.2 Hip members.** Hip members shall be fabricated from C-shape members and track section, which shall have minimum sizes determined in accordance with Table R804.3.3.2. The C-shape member and track section shall be connected at a maximum spacing of 24 inches (610 mm) using No. 10 screws through top and bottom flanges in accordance with Figure R804.3.2.4. The depth of the hip member shall match that of the roof rafters and jack rafters, or shall be based on an *approved* design for a beam pocket at the corner of the supporting wall.~~

~~TABLE R804.3.3.2 HIP MEMBER SIZES, 33 ksi STEEL~~

~~BUILDING WIDTH (feet)~~	~~HIP MEMBER DESIGNATION~~[a]			
	~~Equivalent ground snow load (psf)~~			
	~~0 to 20~~	~~21 to 30~~	~~31 to 50~~	~~51 to 70~~

~~24~~	~~800S162-68~~ ~~800T150-68~~	~~800S162-68~~ ~~800T150-68~~	~~800S162-97~~ ~~800T150-97~~	~~1000S162-97~~ ~~1000T150-97~~
~~28~~	~~1000S162-68~~ ~~1000T150-68~~	~~1000S162-68~~ ~~1000T150-68~~	~~1000S162-97~~ ~~1000T150-97~~	~~1200S162-97~~ ~~1200T150-97~~
~~32~~	~~1000S162-97~~ ~~1000T150-97~~	~~1000S162-97~~ ~~1000T150-97~~	~~1200S162-97~~ ~~1200T150-97~~	—
~~36~~	~~1200S162-97~~ ~~1200T150-97~~	—	—	—
~~40~~	—	—	—	—

~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. The web depth of the roof rafters and jack rafters is to match at the hip or they shall be installed in accordance with an approved design.~~

~~**R804.3.3.3 Hip support columns.** Hip support columns shall be used to support hip members at the ridge. A hip support column shall consist of a pair of C-shape members, with a minimum size determined in accordance with Table R804.3.3.3. The C-shape members shall be connected at a maximum spacing of 24 inches (610 mm) on center to form a box using minimum 3-inch by 33-mil (76 mm by 0.84 mm) strap connected to each of the flanges of the C-shape members with three-No. 10 screws. Hip support columns shall have a continuous load path to the foundation and shall be supported at the ceiling line by an interior wall or by an *approved* design for a supporting element.~~

~~TABLE R804.3.3.3 HIP SUPPORT COLUMN SIZES~~

~~BUILDING WIDTH (feet)~~	~~HIP SUPPORT COLUMN DESIGNATION~~[a, b]			
	~~Equivalent ground snow load (psf)~~			
	~~0 to 20~~	~~21 to 30~~	~~31 to 50~~	~~51 to 70~~
~~24~~	~~2-350S162-33~~	~~2-350S162-33~~	~~2-350S162-43~~	~~2-350S162-54~~
~~28~~	~~2-350S162-54~~	~~2-550S162-54~~	~~2-550S162-68~~	~~2-550S162-68~~
~~32~~	~~2-550S162-68~~	~~2-550S162-68~~	~~2-550S162-97~~	—
~~36~~	~~2-550S162-97~~	—	—	—
~~40~~	—	—	—	—

~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. VBox shape column only in accordance with Figure R804.3.3.4(2).~~

~~b. 33 ksi steel for 33 and 43 mil material; 50 ksi steel for thicker material.~~

~~**R804.3.3.4 Hip framing connections.** Hip rafter framing connections shall be installed in accordance with the following:~~

1. ~~Jack rafters shall be connected at the eave to a parallel C-shape blocking member in accordance with Figure R804.3.3.4(1). The C-shape blocking member shall be attached to the supporting wall track with minimum two No. 10 screws.~~
2. ~~Jack rafters shall be connected to a hip member with a minimum 2-inch by 2-inch (51 mm by 51 mm) clip angle fastened with No.10 screws to the hip member in accordance with Figure R804.3.2.4 and Table R804.3.2.4. The clip angle shall have a steel thickness equivalent to or greater than the jack rafter thickness and shall extend the depth of the jack rafter member to the extent possible.~~
3. ~~The connection of the hip support columns at the ceiling line shall be in accordance with Figure R804.3.3.4(2), with an uplift strap sized in accordance with Table R804.3.3.4(1).~~
4. ~~The connection of hip support members, ridge members and hip support columns at the ridge shall be in accordance with Figures R804.3.3.4(3) and R804.3.3.4(4) and Table R804.3.3.4(2).~~
5. ~~The connection of hip members to the wall corner shall be in accordance with Figure R804.3.3.4(5) and Table R804.3.3.4(3).~~

~~TABLE R804.3.3.4(1) UPLIFT STRAP CONNECTION REQUIREMENTS HIP SUPPORT COLUMN AT CEILING LINE~~

BUILDING WIDTH (feet)	BASIC WIND SPEED (mph) EXPOSURE B				
	85	100	110	—	—
	BASIC WIND SPEED (mph) EXPOSURE C				
	—	85	—	100	110
	Number of No. 10 screws in each end of each 3 inch by 54-mil steel strap[a, b, c]				
24	3	4	4	6	7
28	4	6	6	8	10
32	5	8	8	11	13
36	7	10	11	14	17
40	—	—	—	—	—

~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 mil = 0.0254 mm.~~

~~a. Two straps are required, one each side of the column.~~

~~b. Space screws at ¾ inch on-center and provide ¾ inch end distance.~~

~~c. 50 ksi steel strap.~~

~~FIGURE R804.3.3.4(1) JACK RAFTER CONNECTION AT EAVE~~

~~TABLE R804.3.3.4(2) CONNECTION REQUIREMENTS HIP MEMBER TO HIP SUPPORT COLUMN~~

BUILDING WIDTH (feet)	NUMBER OF NO. 10 SCREWS IN EACH FRAMING ANGLE[a, b, c]			
	Equivalent ground snow load (psf)			
	0 to 20	21 to 30	31 to 50	51 to 70
24	10	10	10	12
28	10	10	14	18
32	10	12	—	—
36	14	—	—	—
	—	—	—	—

~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 mil = 0.0254 mm.~~

~~a. Screws to be divided equally between the connection to the hip member and the column. Refer to Figures R804.3.3.4(3) and R804.3.3.4(4).~~

~~b. The number of screws required in each framing angle is not to be less than shown in Table R804.3.3.4(1).~~

~~c. 50 ksi steel from the framing angle.~~

~~FIGURE 804.3.3.4(2) HIP SUPPORT COLUMN~~

~~TABLE R804.3.3.4(3) UPLIFT STRAP CONNECTION REQUIREMENTS HIP MEMBER TO WALL~~

BUILDING WIDTH (feet)	BASIC WIND SPEED (mph) EXPOSURE B				
	85	100	110	—	—
	BASIC WIND SPEED (mph) EXPOSURE C				
	—	85	—	100	110
	Number of No. 10 screws in each end of each 3 inch by 54-mil Steel strap[a, b, c]				
24	2	2	3	3	4
28	2	3	3	4	5
32	3	4	4	6	7
36	3	5	5	7	8

~~40~~	—	—	—	—	—	—

~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~a. Two straps are required, one each side of the column.~~
~~b. Space screws at ¾ inches on-center and provide ¾ inch end distance.~~
~~c. 50 ksi steel strap.~~

~~FIGURE R804.3.3.4(3) HIP CONNECTIONS AT RIDGE~~

~~FIGURE R804.3.3.4(4) HIP CONNECTIONS AT RIDGE AND BOX COLUMN~~

~~FIGURE R804.3.3.4(5) HIP MEMBER CONNECTION AT WALL CORNER~~

~~R804.3.4~~ R804.3.4 Cutting and notching. Flanges and lips of load-bearing, cold-formed steel roof framing members shall not be cut or notched.

~~R804.3.5~~ R804.3.4 Headers. Roof-ceiling framing above wall openings shall be supported on headers. The allowable spans for headers in load-bearing walls shall not exceed the values set forth in Section R603.6 and Tables R603.6(1) through ~~R603.6(24).~~ R603.6(6)

~~R804.3.6~~ R804.3.5 Framing of openings in roofs and ceilings. Openings in roofs and ceilings shall be framed with header and trimmer joists. Header joist spans shall not exceed 4 feet (1219 mm) in length. Header and trimmer joists shall be fabricated from joist and track members having a minimum size and thickness at least equivalent to the adjacent ceiling joists or roof rafters and shall be installed in accordance with Figures ~~R804.3.6(1)~~ R804.3.5(1) and ~~R804.3.6(2).~~ R804.3.5(2) Each header joist shall be connected to trimmer joists with a minimum of four 2-inch by 2-inch (51 by 51 mm) clip angles. Each clip angle shall be fastened to both the header and trimmer joists with four No. 8 screws, evenly spaced, through each leg of the clip angle. The steel thickness of the clip angles shall be not less than that of the ceiling joist or roof rafter. Each track section for a built-up header or trimmer joist shall extend the full length of the joist (continuous).

~~R804.3.7~~ R804.3.6 Roof trusses. Cold-formed steel trusses shall be designed and installed in accordance with AISI S100, Section D4. In the absence of specific bracing requirements, trusses shall be braced in accordance with accepted industry practices, such as the SBCA *Cold-Formed Steel Building Component Safety Information (CFSBCSI) Guide to Good Practice for Handling, Installing & Bracing of Cold-Formed Steel Trusses*. Trusses shall be connected to the top track of the load-bearing wall in accordance with Table R804.3, either with two No. 10 screws applied through the flange of the truss or by using a 54-mil (1.37 mm) clip angle with two No. 10 screws in each leg.

FIGURE ~~R804.3.6(1)~~ R804.3.5(1) ROOF OR CEILING OPENING

(No change to Figure)

FIGURE ~~R804.3.6(2)~~ R804.3.5(2) HEADER TO TRIMMER CONNECTION

(No change to Figure)

~~R804.3.8~~ R804.3.7 Ceiling and roof diaphragms. Ceiling and roof diaphragms shall be in accordance with this section.

~~R804.3.8.1~~ R804.3.7.1 Ceiling diaphragms. At gable endwalls a ceiling *diaphragm* shall be provided by attaching a minimum $^{1}/_{2}$-inch (12.7 mm) gypsum board ~~in accordance with Tables R804.3.8(1) and R804.3.8(2)~~ or a minimum $^{3}/_{8}$-inch (9.5 mm) wood structural panel sheathing, which complies with Section R803, ~~in accordance with Table R804.3.8(3)~~ to the bottom of ceiling joists or roof trusses and connected to wall framing in accordance with Figures ~~R804.3.8(1)~~ R804.3.7.1(1) and ~~R804.3.8(2)~~ R804.3.7.1(2), unless studs are designed as full height without bracing at the ceiling. Flat blocking shall consist of C-shape or track section with a minimum thickness of 33 mils (0.84 mm).

For a gypsum board sheathed ceiling, the diaphragm length shall be in accordance with Table R804.3.7.1. For a wood structural panel sheathed ceiling, the diaphragm length shall be a minimum of 12 ft (3658 mm) for building widths less than 36 feet (10,973 mm), or be a minimum of 14 ft (4267 mm) for building widths greater than or equal to 36 feet.

The ceiling *diaphragm* shall be secured with screws spaced at a maximum 6 inches (152 mm) o.c. at panel edges and a maximum 12 inches (305 mm) o.c. in the field. Multiplying the required lengths in Table~~s~~ ~~R804.3.8(1) and R804.3.8(2)~~ R804.3.7.1 for gypsum board sheathed ceiling diaphragms shall be permitted to be multiplied by 0.35 shall be permitted if all panel edges are blocked. Multiplying the required lengths in Tables ~~R804.3.8(1) and R804.3.8(2)~~ R804.3.7.1 for gypsum board sheathed ceiling diaphragms by 0.9 shall be permitted if all panel edges are secured with screws spaced at 4 inches (102 mm) o.c.

~~R804.3.8.2~~ R804.3.7.2 Roof diaphragm. A roof *diaphragm* shall be provided by attaching a minimum of $^3/_8$-inch (9.5 mm) wood structural panel which complies with Section R803 to roof rafters or truss top chords in accordance with Table R804.3. Buildings with 3:1 or larger plan *aspect ratio* and with roof rafter slope (pitch) of 9:12 or larger shall have the roof rafters and ceiling joists blocked in accordance with Figure ~~R804.3.8(3).~~ R804.3.7.2

~~R804.3.9~~ R804.3.8 Roof tie-down. Roof assemblies ~~subject to wind uplift pressures of 20 pounds per square foot (0.96 kPa) or greater, as established in Table R301.2(2),~~ shall ~~have rafter-to-bearing~~be connected to walls below ~~ties provided~~ in accordance with Table ~~R802.11~~ R804.3. A continuous load path shall be provided to transfer uplift loads to the foundation.

TABLE ~~R804.3.8(1)~~ R804.3.7.1 REQUIRED LENGTHS FOR CEILING DIAPHRAGMS AT GABLE ENDWALLS GYPSUM BOARD SHEATHED, CEILING HEIGHT = 8 FT [a,b,c,d,e,f, g]

		~~BASIC~~ ULTIMATE DESIGN WIND SPEED (mph)				
Exposure Category B		~~85~~	~~100~~126	~~110~~<139	—	—
Exposure Category C		—	~~85~~110	—	~~100~~126	~~110~~<139
Roof pitch	**Building endwall width (feet)**	**Minimum diaphragm length (feet)**				
3:12 to 6:12	24 - 28	~~14~~	20	22	28	32
	28 - 32	~~16~~	22	28	32	38
	32 - 36	~~20~~	26	32	38	44
	36 - 40	~~22~~	30	36	44	50
6:12 to 9:12	24 - 28	~~16~~	22	26	32	36
	28 - 32	~~20~~	26	32	38	44
	32 - 36	~~22~~	32	38	44	52
	36 - 40	~~26~~	36	44	52	60
9:12 to 12:12	24 - 28	~~18~~	26	30	36	42
	28 - 32	~~22~~	30	36	42	50
	32 - 36	~~26~~	36	42	50	60
	36 - 40	~~30~~	42	50	60	70

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s, 1 foot = 304.8 mm, 1 mil = 0.0254 mm.

a. Ceiling diaphragm is composed of ½ inch gypsum board (min. thickness) secured with screws spaced at 6 inches 0.c. at panel edges and 12 inches 0.c. infield. Use No. 8 screws (min.) when framing members have a designation thickness of 54 mils or less and No. 10 screws (min.) when framing members have a designation thickness of greater than 54 mils.
b. Maximum aspect ratio (length/width) of diaphragms is 2:1.
c. Building width is in the direction of horizontal framing members supported by the all studs.
d. Required diaphragm lengths are to be provided at each end of the structure.
e. Multiplying required diaphragm lengths by 0.35 is permitted if all panel edges are blocked.
f. Multiplying required diaphragm lengths by 0.9 is permitted if all panel edges are secured with screws spaced at 4 inches o.c.

g. To determine the minimum diaphragm length for buildings with ceiling heights of 9 ft (2743mm) or 10 ft (3048mm), values in the table above shall be multiplied by 1.15.

FIGURE ~~R804.3.8(1)~~ R804.3.7.1(1) CEILING DIAPHRAGM TO GABLE ENDWALL DETAIL

(No change to Figure)

~~TABLE R804.3.8(2)~~
~~REQUIRED LENGTHS FOR CEILING DIAPHRAGMS AT GABLE ENDWALLS GYPSUM BOARD SHEATHED CEILING HEIGHT = 9 OR 10 FT[a,b,c,d,e,f]~~

~~Exposure B~~		~~BASIC WIND SPEED (mph)~~				
		~~85~~	~~100~~	~~110~~	~~—~~	~~—~~
~~Exposure C~~		~~—~~	~~85~~	~~—~~	~~100~~	~~110~~
~~Roof pitch~~	~~Building endwall width (feet)~~	~~Minimum diaphragm length (feet)~~				
~~3:12 to 6:12~~	~~24 - 28~~	~~16~~	~~22~~	~~26~~	~~32~~	~~38~~
	~~28 - 32~~	~~20~~	~~26~~	~~32~~	~~38~~	~~44~~
	~~32 - 36~~	~~22~~	~~30~~	~~36~~	~~44~~	~~50~~
	~~36 - 40~~	~~26~~	~~36~~	~~42~~	~~50~~	~~58~~
~~6:12 to 9:12~~	~~24 - 28~~	~~18~~	~~26~~	~~30~~	~~36~~	~~42~~
	~~28 - 32~~	~~22~~	~~30~~	~~36~~	~~42~~	~~50~~
	~~32 - 36~~	~~26~~	~~36~~	~~42~~	~~50~~	~~58~~
	~~36 - 40~~	~~30~~	~~42~~	~~48~~	~~58~~	~~68~~
~~9:12 to 12:12~~	~~24 - 28~~	~~20~~	~~28~~	~~34~~	~~40~~	~~46~~
	~~28 - 32~~	~~24~~	~~34~~	~~40~~	~~48~~	~~56~~
	~~32 - 36~~	~~28~~	~~40~~	~~48~~	~~56~~	~~66~~
	~~36 - 40~~	~~34~~	~~46~~	~~56~~	~~66~~	~~78~~

~~For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s, 1 foot = 304.8 mm, 1 mil = 0.0254 mm.~~

~~a.~~ ~~Ceiling diaphragm is composed of ½ inch gypsum board (min. thickness) secured with screws spaced at 6 inches 0.c. at panel edges and 12 inches 0.c. infield. Use No. 8 screws (min.) when framing members have a designation thickness of 54 mils or less and No. 10 screws (min.) when framing members have a designation thickness of greater than 54 mils.~~
~~b.~~ ~~Maximum aspect ratio (length/width) of diaphragms is 2:1.~~
~~c.~~ ~~Building width is in the direction of horizontal framing members supported by the all studs.~~
~~d.~~ ~~Required diaphragm lengths are to be provided at each end of the structure.~~
~~e.~~ ~~Multiplying required diaphragm lengths by 0.35 is permitted if all panel edges are blocked.~~
f. ~~Multiplying required diaphragm lengths by 0.9 is permitted if all panel edges are secured with screws spaced at 4 inches o.c.~~

FIGURE ~~R804.3.8(2)~~ R804.3.7.1(2) CEILING DIAPHRAGM TO SIDEWALL DETAIL

(No change to Figure)

~~TABLE R804.3.8(3) REQUIRED LENGTHS FOR CEILING DIAPHRAGMS AT GABLE ENDWALLS WOOD STRUCTURAL PANEL SHEATHED CEILING HEIGHT = 8, 9 OR 10 FT[a, b, c, d]~~

~~Exposure B~~		~~BASIC WIND SPEED (mph)~~				
		85	~~100~~	~~110~~	~~—~~	~~—~~
~~Exposure C~~		~~—~~	~~85~~	~~—~~	~~100~~	~~110~~
~~Roof pitch~~	~~Building endwall width (feet)~~	~~Minimum diaphragm length (feet)~~				
~~3:12 to~~	~~24 - 28~~	~~10~~	~~10~~	~~10~~	~~10~~	~~10~~

~~6:12~~	~~28 - 32~~	~~12~~	~~12~~	~~12~~	~~12~~	~~12~~
	~~32 - 36~~	~~12~~	~~12~~	~~12~~	~~12~~	~~12~~
	~~36 - 40~~	~~14~~	~~14~~	~~14~~	~~14~~	~~14~~
~~6:12 to 9:12~~	~~24 - 28~~	~~10~~	~~10~~	~~10~~	~~10~~	~~10~~
	~~28 - 32~~	~~12~~	~~12~~	~~12~~	~~12~~	~~12~~
	~~32 - 36~~	~~12~~	~~12~~	~~12~~	~~12~~	~~12~~
	~~36 - 40~~	~~14~~	~~14~~	~~14~~	~~14~~	~~14~~
~~9:12 to 12:12~~	~~24 - 28~~	~~10~~	~~10~~	~~10~~	~~10~~	~~10~~
	~~28 - 32~~	~~12~~	~~12~~	~~12~~	~~12~~	~~12~~
	~~32 - 36~~	~~12~~	~~12~~	~~12~~	~~12~~	~~12~~
	~~36 - 40~~	~~14~~	~~14~~	~~14~~	~~14~~	~~14~~

~~For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s, 1 foot = 304.8 mm, 1 mil = 0.0254 mm.~~

~~a. Ceiling diaphragm is composed of ½ inch gypsum board (min. thickness) secured with screws spaced at 6 inches 0.c. at panel edges and 12 inches 0.c. infield. Use No. 8 screws (min.) when framing members have a designation thickness of 54 mils or less and No. 10 screws (min.) when framing members have a designation thickness of greater than 54 mils.~~

~~b. Maximum aspect ratio (length/width) of diaphragms is 2:1.~~

~~c. Building width is in the direction of horizontal framing members supported by the all studs.~~

~~d. Required diaphragm lengths are to be provided at each end of the structure.~~

FIGURE ~~R804.8(3)~~ R804.7.2 ROOF BLOCKING DETAIL

(No change to Figure)

Revise as follows:

M1308.1 Drilling and notching. Wood-framed structural members shall be drilled, notched or altered in accordance with the provisions of Sections R502.8, R602.6, R602.6.1 and R802.7. Holes in load-bearing members of cold-formed steel light-frame construction shall be permitted only in accordance with Sections R505.2.5, R603.2.5 and R804.2.6~~5~~. In accordance with the provisions of Sections R505.3.5, R603.3.4 and R804.3.3~~4~~, cutting and notching of flanges and lips of load-bearing members of cold-formed steel light frame construction shall not be permitted. Structural insulated panels (SIPs) shall be drilled and notched or altered in accordance with the provisions of Section R613.7.

Revise as follows:

M2101.6 Drilling and notching. Wood-framed structural members shall be drilled, notched or altered in accordance with the provisions of Sections R502.8, R602.6, R602.6.1 and R802.7. Holes in load bearing members of cold-formed steel light-frame construction shall be permitted only in accordance with Sections R505.2.5, R603.2.5 and R804.2.6~~5~~. In accordance with the provisions of Sections R505.3.5, R603.3.4 and R804.3.3~~4~~, cutting and notching of flanges and lips of load-bearing members of cold-formed steel light frame construction shall not be permitted. Structural insulated panels (SIPs) shall be drilled and notched or altered in accordance with the provisions of Section R613.

Revise as follows:

P2603.2 Drilling and notching. Wood-framed structural members shall not be drilled, notched or altered in any manner except as provided in Sections R502.8, R602.6, R802.7 and R802.7.1. Holes in load-bearing members of cold-formed steel light-frame construction shall be permitted only in accordance with Sections R505.2.5, R603.2.5 and R804.2.6~~5~~. In accordance with the provisions in Sections R505.3.5, R603.3.4 and R804.3.3~~4~~, cutting and notching of flanges and lips of load-bearing members of cold-formed steel light frame construction shall not be permitted. Structural insulated panels (SIPs) shall be drilled and notched or altered in accordance with the provisions of Section R613.7.

Reason: This proposal is one in a series intended to both update and streamline the cold-formed steel (CFS) light frame construction provisions of the IRC. The revisions are based upon recommendations made by the AISI Committee on Framing Standards (COFS) Prescriptive Methods Subcommittee, which is responsible for the requirements' base document -- AISI S230, *Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings.* For the most part, the changes are editorial in nature and work to focus the cold-formed steel solutions presented in the IRC on the most popular and readily available options. The changes also align the cold-formed steel provisions with the latest reference standards, including AISI S230-07 w/S3-12, *Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings,* 2007, with Supplement 3, 2012.

Changes specific to Section R804 include the following:

- **R804:** Title correction.
- **R804.1**: The wind speeds are updated to reflect "ultimate" design wind speeds from ASCE 7-10 and editorial adjustments are made to the language. The design wind speeds are changed based upon the following direct conversion table, which was incorporated into AISI S230-07 w/S3-12:

ASCE 7-10 Wind Speed (mph)	110	115	126	139	152	164	177	190
AISI S230 Wind Speed (mph)	85	90	100	110	120	130	140	150

- **R804.2:** Requirements are relocated to new Section R804.2.3, which is specific to dimension, thickness and material grade.
- **R804.2.1:** The references to ASTM A653 and ASTM A792 are deleted. Since these materials are included under ASTM A1003, they do not need to be repeated in this section.
- **R804.2.2:** The corrosion protection requirements are relocated from Section R804.2.3 for better flow in section.
- **R804.2.3:** Requirements from Section R804.2 are relocated into new section on dimension, thickness and material grade and Table R804.2(1) and Table R804.2(2) are combined into new Table R804.2.3. The minimum flange width, maximum flange width, and minimum lip size are moved into the charging language for the table, since these properties do not vary based upon the member designation. Also, to further streamline the provisions, the most popular and readily available grade-thickness combinations are being retained and the less popular and readily available grade-thickness combinations are being removed. For Grade 33 ksi steel, 33 and 43 mil thicknesses are specified; while, for Grade 50 ksi steel, 54 mil and 68 mil thicknesses are specified. This language is added to Section R804.2.3. Finally, the reference to 97 mil product is deleted. It is very uncommon in residential construction, and, if need be, the user can still use AISI S230, where solutions include 97 mil product.
- **R804.2.5:** The title is fixed to match others in section and the screw substitution factor is eliminated. This is seldom used in prescriptive design and adds complexity to the provisions.
- **Figures R804.2.6.1, R804.2.6.3, and R804.3:** Title correction.
- **R804.3:** Since Section R804.3.3, on hip roof framing, is recommended for deletion, coordinating text is also recommended for deletion. In Table R804.3, the wind speeds are updated to reflect "ultimate" design wind speeds from ASCE 7-10 and editorial modifications are made to the column headings to clarify the applicability of the CFSF provisions. Finally, entries on ceiling joist or roof truss to top track of bearing wall are brought into agreement with AISI S230-07 w/S3-12, which includes modifications to the table notes.
- **R804.3.1.1:** The tables for continuous ceiling joists and ceiling joists with bearing stiffeners are deleted. These add volume and complexity, but do not provide significant improvement over the single span tables and tables without bearing stiffeners. If need be, users can conservatively use the single span ceiling joist tables without bearing stiffeners – now Tables R804.3.1.1(1) and R804.3.1.1(2) – in all situations or they can also go back to AISI S230. To be consistent with changes in other sections, Tables R804.3.1.1(1) and R804.3.1.1(2) now each address both Grade 33 ksi and Grade 50 ksi. For Grade 33 ksi steel, 33 and 43 mil thicknesses are specified; while, for Grade 50 ksi steel, 54 mil and 68 mil thicknesses are specified. This language is added in new table notes. Please note that, while Grade 50 ksi steel is now required for 54 mil and 68 mil product, no changes are made to the allowable spans, thus resulting in additional conservatism. Finally, the reference to 97 mil product is deleted.
- **R804.3.1.2:** The tables for ceiling joists with bearing stiffeners are deleted in Section R804.3.1.1, so this section on ceiling joist bearing stiffeners is not needed.
- **R804.3.2:** The language in the section associated with wind speeds is updated to reflect "ultimate" design wind speeds from ASCE 7-10. A new Table R804.3.2.1(1) is created by combining the Grade 33ksi and 50 ksi tables. For Grade 33

ksi steel, 33 and 43 mil thicknesses are specified; while, for Grade 50 ksi steel, 54 mil and 68 mil thicknesses are specified. This language is added in a new table note. Also, the 97 mil product is eliminated from the table. Additionally, the newly renumbered Table R804.3.2.1(2), updates the wind speeds to reflect the "ultimate" design wind speeds from ASCE 7-10 and editorial modifications are made to the row headings to clarify the applicability of the CFSF provisions. Finally, an unnecessary wind speed – 110 mph (old 85 mph) Exposure Category B – is eliminated. Provisions at this lower wind speed are not substantively different than at the next higher wind speed.

- **R804.3.2.4:** The number of required screws is brought into agreement with AISI S230-07 w/S3-12, which may now require more than two screws in accordance with Table R804.3.
- **Figure R804.3.2.4 and Table R804.3.2.4:** Since Section R804.3.3 is recommended for deletion, coordinating text is also recommended for deletion.
- **R804.3.3:** The CFS hip roof framing provisions are deleted in the IRC. This section adds volume and complexity, but does not provide significant improvement. If need be, users can go back to AISI S230 for hip roof framing design options.
- **R804.3.7:** Existing Table R804.3.8(2) for gypsum ceiling diaphragms where ceiling height is 9 or 10 feet is replaced with a table note in Table R804.7(1) (renumbered Table R804.3.8(1)). Existing Table R804.3.8(3) for wood structural panel ceiling diaphragms is replaced in the section with text. Both changes eliminate extraneous tables, providing a more streamlined solution. In Table R804.7(1), the wind speeds are updated to reflect "ultimate" design wind speeds from ASCE 7-10 and editorial modifications are made to the column headings to clarify the applicability of the CFSF provisions. Also, an unnecessary wind speed – 110 mph (old 85 mph) Exposure Category B – is eliminated. Provisions at this lower wind speed are not substantively different than at the next higher wind speed.
- **R804.3.8:** The language on roof tie-down is brought into agreement with AISI S230-07 w/S3-12 through a reference to the newly modified Table R804.3.
- **M1308.1, M2101.6, and P2603.2**: Cross-references are updated in each of these sections.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB400-13 **AS**

Code Change No: RB401-13

Original Proposal

Section(s): R806.1

Proponent: Michael D. Fischer, Kellen Company, representing the Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

Revise as follows:

R806.1 Ventilation required. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than 1/4 inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth, or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum.
Openings in roof framing members shall conform to the requirements of Section R802.7. Required ventilation openings shall open directly to the outside air.

> ~~**Exception:** Attic ventilation shall not be required when determined not necessary by the code official due to atmospheric or climatic conditions.~~

Reason: With recent revisions to the IRC roof ventilation requirements, and an IBC change approved last year, both codes now contain specific details on both vented and unvented attics with detailed requirements related to the use of vapor retarders and climate specific instructions on the use of air-impermeable insulation. Now that the IRC contains these provisions, the current exception creates a conflict and an unnecessary alternative. Additionally, since the exception is based on climatic conditions, with no direction to the code official on matters related to construction methods or details, it cannot be applied on a project-by-project basis.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB401-13	**AS**

Code Change No: RB404-13

Original Proposal

Section(s): R806.5

Proponent: Joseph Lstiburek, Building Science Corporation, representing self (joe@buildingscience.com), Steven R Winkel, FAIA, PE, The Preview Group, Inc., representing The American Institute of Architects (swinkel@preview-group.com)

Delete and substitute as follows:

~~**R806.5 Unvented attic and unvented enclosed rafter assemblies.** Unvented *attic* assemblies (spaces between the ceiling joists of the top *story* and the roof rafters) and unvented enclosed rafter assemblies (spaces between ceilings that are applied directly to the underside of roof framing members/rafters and the structural roof sheathing at the top of the roof framing members/rafters) shall be permitted if all the following conditions are met:~~

1. ~~The unvented *attic* space is completely contained within the *building thermal envelope.*~~
2. ~~No interior Class I vapor retarders are installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed rafter assembly.~~
3. ~~Where wood shingles or shakes are used, a minimum 1/4- inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.~~
4. ~~In Climate Zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder, or shall have a Class III vapor retarder coating or covering in direct contact with the underside of the insulation.~~
5. ~~Either Items 5.1, 5.2 or 5.3 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.~~
    - ~~5.1. *Air-impermeable insulation* only. Insulation shall be applied in direct contact with the underside of the structural roof sheathing.~~
    - ~~5.2. Air-permeable insulation only. In addition to= the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing as specified in Table R806.5 for condensation control.~~
    - ~~5.3. Air-impermeable and air-permeable insulation. The *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing as specified in Table R806.5 for condensation control. The air-permeable insulation shall be installed directly under the *air-impermeable insulation.*~~
    - ~~5.4. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.~~

R806.5 Unvented attic and unvented enclosed rafter assemblies. Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings that are applied directly to the underside of the roof framing members and structural roof sheathing applied directly to the top of the roof framing members /rafters, shall be permitted where all the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.

3. Where wood shingles or shakes are used, a minimum 1/4 inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In climate zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder, or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall be located in accordance with the following:

5.1 Items 5.1.1, 5.1.2 , 5.1.3, or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.

5.1.1 Where only *air-impermeable insulation* is provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing.

5.1.2. Where air-permeable insulation is provided inside the building thermal envelope, it shall be installed per Section 5.1. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the R values in in Table R806.5 for condensation control.

5.1.3. Where both *air-impermeable* and air-permeable *insulation* are provided the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the R values in Table R806.5 for condensation control. The air-permeable insulation shall be installed directly under the *air-impermeable insulation.*

5.1.4 Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45 degrees F (7 degrees C). For calculation purposes, an interior air temperature of 68 degrees F (20 degrees C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

5.2 Where preformed insulation board is used as the *air-impermeable insulation* layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Reason: The changes to R806.5 are based on the Track A Final Action Hearing revisions to IBC Section 1203.3. These changes were made to coordinate insulation requirements for unvented attics between the IBC and the IRC. The original proposed changes to the IBC were based on the language from the 2012 IRC. In the course of the committee action and the Final Action Hearing the IBC language was cleaned up and now reads more clearly than the current 2012 IRC language. This proposed change is meant to align IRC and IBC provisions for similar conditions and to make use of the clearer new IBC language in the IRC.

Cost Impact: The code change proposal will not increase the cost of construction. Primarily editorial changes.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB404-13 **AS**

Code Change No: RB405-13

Original Proposal

Section(s): Table R806.5

Proponent: Joseph Lstiburek, Building Science Corporation, representing self (joe@buildingscience.com)

Revise as follows:

TABLE R806.5
INSULATION FOR CONDENSATION CONTROL

CLIMATE ZONE	MINIMUM RIGID BOARD ON AIR-IMPERMEABLE INSULATION *R*-VALUE[a,b]
2B and 3B tile roof only	0 (none required)
1, 2A, 2B, 3A, 3B, 3C	R-5
4C	R-10
4A, 4B	R-15
5	R-20
6	R-25
7	R-30
8	R-35

a. Contributes to but does not supersede the requirements in Section N1102.
b. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45 degrees F (7 degrees C). For calculation purposes, an interior air temperature of 68 degrees F (20 degrees C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

Reason: The R-values in the table are based on R-49 ceiling insulation in Climate Zones 4, 5, 6, 7 and 8 and R-38 insulation in Climate Zones 2 and 3. Not all roof assemblies have these ceiling insulation R-values. The footnote provides a calculation procedure to determine rigid board or air impermeable insulation R-values for roof assemblies that have different ceiling insulation R-values. Additionally, this footnote is consistent with similar language in the IBC Section 1203.3 providing alignment between the IRC and the IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

(Portions of table not shown remain unchanged)

a. Contributes to but does not supersede the requirements in Section N1102.
b. Alternatively, sufficient ~~rigid board or sheet~~ continuous insulation shall be installed directly above the structural roof sheathing

to maintain the monthly average temperature of the underside of the structural roof sheathing above 45 degrees F (7 degrees C). For calculation purposes, an interior air temperature of 68 degrees F (20 degrees C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

Committee Reason: This change adds design flexibility and correlates with the language in the IBC. The modification uses the term "continuous insulation" which is consistent with the committee's previous action on RB357-13.

Assembly Action: **None**

Final Hearing Results

RB405-13 **AM**

Code Change No: RB407-13

Original Proposal

Section(s): R807.1

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

Revise as follows:

R807.1 Attic access. Buildings with combustible ceiling or roof construction shall have an *attic* access opening to *attic* areas ~~that exceed 30 square feet (2.8 m2) and~~ <u>that</u> have a vertical height of 30 inches (762 mm) or greater <u>over an area of not less than 30 square feet</u>. The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members.

The rough-framed opening shall not be less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other readily accessible location. When located in a wall, the opening shall be a minimum of 22 inches wide by 30 inches high (559 mm wide by 762 mm high). When the access is located in a ceiling, minimum unobstructed headroom in the *attic* space shall be 30 inches (762 mm) at some point above the access measured vertically from the bottom of ceiling framing members. See Section M1305.1.3 for access requirements where mechanical *equipment* is located in *attics.*

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The primary reason for this change is to clarify that the volume of space required for an attic access should be measured as the actual usable space. The clearance should be measured to collar ties, insulation curbs, or other permanent obstructions, not always to the ceiling or roof framing members. The revision of the text describing the 30 square feet is an editorial revision and is not intended to change the requirement, but make it more understandable.

Cost Impact: The code change proposal will not increase the cost of construction. It may decrease the cost.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB407-13	**AS**

Code Change No: RB408-13

Original Proposal

Section(s): R902.1

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

R902.1 Roofing covering materials. Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in areas designated by law as requiring their use or when the edge of the roof is less than 3 feet (914 mm) from a lot line. Classes A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E 108.

Exceptions:

1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A roof assemblies include minimum 16 oz/ft^2 copper sheets installed over combustible decks.
4. Class A roof assemblies include slate installed over underlayment over combustible decks.

Reason: In IRC 2009 (and similarly in IBC 2009), the historic exemptions from fire testing for certain roof covering types, including copper sheets and slate, over combustible roof decks were amended to require ASTM E 108 or UL 790 fire testing. At the time, a lack of adequate fire test data was cited as the reason for this change.

In IRC 2012, Exception 3 was added based upon fire testing conducted by the Copper Development Association.

The National Roofing Contractors Association and the National Slate Association have conducted fire tests at Underwriters Laboratories, Inc. (UL) that documents slate installed over an underlayment over a combustible deck meets the requirements of UL 790 Class A. This testing substantiates the addition of Exception 4 as a Class A roof assembly.

This same code change proposal was submitted for the International Building Code as S20-12 in Group A and was Approved as Submitted.

A copy of this test report has been submitted with this code change proposal; additional copies are available by contacting the proponent.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB408-13 **AS**

Code Change No: RB412-13

Original Proposal

Section(s): R904.3

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

R904.3 Material specifications and physical characteristics. Roof covering materials shall conform to the applicable standards listed in this chapter. ~~In the absence of applicable standards or where materials are of questionable suitability, testing by an *approved* testing agency shall be required by the *building official* to determine the character, quality and limitations of application of the materials.~~

Reason: This code change is intended to clarify the code's intent relating to the use of roofing materials that do not specifically conform to the requirements of this Chapter.

It can be interpreted as currently written the second sentence of Section R904.3 may conflict somewhat with Section R104.11-Alternative Materials, Design and Methods of Construction and Equipment. Deleting this sentence avoids this possible conflict and allows Section R104.11 to apply.

This same code change proposal was submitted for the International Building Code as S27-12 in Group A and was Approved as Modified. This code change proposal reflects the modification.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. This removes redundant language.

Assembly Action: **None**

Final Hearing Results

RB412-13	**AS**

Code Change No: RB417-13

Original Proposal

Section(s): R905.2.4

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

R905.2.4 Asphalt shingles. Asphalt shingles shall comply with ~~ASTM D 225 or~~ ASTM D 3462.

Reason: This code change proposal is intended to remove ASTM D 225 (organic felt-reinforced asphalt shingles) as an acceptable product standard in the Code.

Organic felt-reinforced asphalt shingles are no longer manufactured in North America and ASTM International has withdrawn ASTM D 225.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change removes a product standard that has been withdrawn by ASTM.

Assembly Action: **None**

Final Hearing Results

RB417-13	**AS**

Code Change No: RB418-13

Original Proposal

Section(s): R905.2.4.1, Table R905.2.4.1, Table R905.2.4.1(1), Table R905.2.4.1(2), R905.2.7.2, R905.3.3.3, R905.3.7, R905.4.3.2, R905.5.3.2, R905.6.3.2, R905.7.3.2, R905.8.3.2, R905.10.5.1

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Revise as follows:

R905.2.4.1 Wind resistance of asphalt shingles. Asphalt shingles shall be tested in accordance with ASTM D 7158. Asphalt shingles shall meet the classification requirements of Table R905.2.4.1~~(1)~~ for the appropriate maximum basic wind speed. Asphalt shingle packaging shall bear a label to indicate compliance with ASTM D 7158 and the required classification in Table R905.2.4.1~~(1)~~.

> **Exception:** Asphalt shingles not included in the scope of ASTM D 7158 shall be tested and labeled to indicate compliance with ASTM D 3161 and the required classification in Table R905.2.4.1~~(2)~~.

~~TABLE R905.2.4.1(1)~~
~~CLASSIFICATION OF ASPHALT ROOF SHINGLES PER ASTM D 7158~~

~~MAXIMUM BASIC WIND SPEED FROM FIGURE 301.2(4)A (mph)~~	~~CLASSIFICATION REQUIREMENT~~
~~85~~	~~D, G or H~~
~~90~~	~~D, G or H~~
~~100~~	~~G or H~~
~~110~~	~~G or H~~
~~120~~	~~G or H~~
~~130~~	~~H~~
~~140~~	~~H~~
~~150~~	~~H~~

~~For SI: 1 mile per hour = 0.447 m/s.~~

~~TABLE R905.2.4.1(2)~~
~~CLASSIFICATION OF ASPHALT SHINGLES PER ASTM D 3161~~

~~MAXIMUM BASIC WIND SPEED FROM FIGURE 301.2(4)A (mph)~~	~~CLASSIFICATION REQUIREMENT~~
~~85~~	~~A, D or F~~
~~90~~	~~A, D or F~~
~~100~~	~~A, D or F~~
~~110~~	~~F~~
~~120~~	~~F~~

~~130~~	~~F~~
~~140~~	~~F~~
~~150~~	~~F~~

~~For SI: 1 mile per hour = 0.447 m/s.~~

TABLE R905.2.4.1
CLASSIFICATION OF ASPHALT ROOF SHINGLES

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ULT} FROM FIGURE R301.2(4)A	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3	ASTM D 7158~~A~~ SHINGLE CLASSIFICATION	ASTM D 3161 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

For SI: 1 foot = 304.8 mm; 1 mph = 0.447 m/s.
a. The standard calculations contained in ASTM D 7158 assume exposure category B or C and building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

R905.2.7.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above ~~110~~ 140 mph (~~49~~ 63 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds ~~120~~ 150 mph (~~54~~ 67 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

R905.3.3.3 Underlayment and high winds. Underlayment applied in areas subject to high wind [above ~~110~~ 140 mph (~~49~~ 63 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds ~~120~~ 150 mph (~~54~~ 67 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4-inch (19 mm) into the roof sheathing.

R905.3.7 Application. Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, based on the following:

1. Climatic conditions.

2. Roof slope.

3. Underlayment system.

4. Type of tile being installed.

Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m2) require a minimum of one fastener per tile regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the wind speed exceeds ~~100~~ 130 miles per hour (~~45~~ 58 m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above grade. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.

R905.4.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above ~~110~~ 140 mph (~~49~~ 63 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds ~~120~~ 150 mph (~~54~~ 67 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

R905.5.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above ~~110~~ 140 mph (~~49~~ 63 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds ~~120~~ 150 mph (~~54~~ 67 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

R905.6.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above ~~110~~ 140 mph (~~49~~ 63 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds ~~120~~ 150 mph (~~54~~ 67 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

R905.7.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above ~~110~~ 140 mph (~~49~~ 63 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds ~~120~~ 150 mph (~~54~~ 67 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all Head laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

R905.8.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds ~~110~~ 140 mph (~~49~~ 63 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds ~~120~~ 150 mph (~~54~~ 67 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

R905.10.5.1 Underlayment and high winds. Underlayment applied in areas subject to high winds ~~110~~ 140 mph (~~49~~ 63 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds ~~120~~ 150 mph (~~54~~ 67 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Reason: The purpose of this code change is to bring the wind provisions of the IRC in line with the 2012 IBC and ASCE 7-10. As a result of the schedule changes implemented during the 2009-2010 ICC code development cycle, there was not sufficient time to revise the IRC to fully implement the new ultimate wind speed basis of ASCE 7-10 and the 2012 IBC, due to the extent of prescriptive IRC provisions and tables which are directly related to basic wind speed.. New maps based on the ASCE 7-10 ultimate wind speed data but converted back down to nominal (ASD) basis were provided in the IRC. This has led to a fair amount of confusion among those stakeholders who work with both codes.

A working group of stakeholders including NAHB, the major material associations, ASCE, and the Insurance Institute for Business and Home Safety developed a series of IRC proposals to implement the new ultimate wind speed basis. This proposal updates the Chapter 9 provisions for roof coverings, including asphalt shingle classifications and triggers for high-wind roof covering and underlayment installation requirements. A similar table to new table R905.2.4.1 was proposed by ARMA and approved for the 2015 IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. Consistent with the committee's previous action.

Assembly Action: **None**

Final Hearing Results

RB418-13	**AS**

Code Change No: RB422-13

Original Proposal

Section(s): R905.2.5

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

R905.2.5 Fasteners. Fasteners for asphalt shingles shall be galvanized steel, stainless steel, aluminum or copper roofing nails, minimum 12 gage [0.105 inch (3 mm)] shank with a minimum 3/8-inch-diameter (10 mm) head, complying with ASTM F 1667, of a length to penetrate through the roofing materials and a minimum of ¾ inch (19 mm) into the roof sheathing. Where the roof sheathing is less than ¾ inch (19 mm) thick, the fasteners shall penetrate through the sheathing. ~~Fasteners shall comply with F 1667.~~

Reason: This code change proposal is intended to remove a redundant requirement with Section R905.2.5.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB422-13	**AS**

Code Change No: RB425-13

Original Proposal

Section(s): R905.2.7.1

Proponent: Bill McHugh, Chicago Roofing Contractors Association (bill@crca.org)

Revise as follows:

R905.2.7.1 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exceptions:

1. Detached *accessory structures* that contain no *conditioned floor area*.
2. Roofs with slope equal to or greater than 8 units vertical in 12 units horizontal, the ice barrier shall be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.

Reason: In steep slope applications in climates where ice forms at the eave edge of roofs, ice melts due to heat from below, then freezes where the water meets roof surfaces that are over unheated areas, making a buildup of ice. This buildup becomes a 'dam' that backs water up under the roof covering and underlayment leaking into the building.

The purpose of this proposal is to bring the Code into alignment with the practical application of the ice barrier underlayment products in the field. Since gravity stops water from backing up very far on super steep slopes greater than 8" in 12" there needs to be a limit to the amount of ice barrier underlayment applied.

On very steep sloped roofs, the ice dams will still occur. However, buildup of ice cannot build far beyond the ball that forms at the gutter edge on slopes greater than 8" in 12" due to the slope. Secondly, the water will not defy gravity and move very far upward, when the physics of the application are that the water will drip over the dam first.

For very high sloped roofs where the vertical surface never intersects the heated wall, complete coverage of underlayment is needed. In short, the way the current code is written, ice barrier material may be needed on the complete 'high sloped' roof deck rather than protect just the eave edges and 3' up slope. The intent of 3' of underlayment applied past the warm vertical wall intersection up slope is met with this change.

Through clarifying this requirement with the second exception, the intent of the code is met while not burdening the building official with a variance request on a very small cost item.

Cost Impact: The code change proposal will not increase the cost of construction. It decreases the cost.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R905.2.7.1 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building. Roofs with slope equal to or greater than 8 units vertical in 12 units horizontal, the ice barrier shall be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.

Exception~~s~~:

~~1.~~ Detached *accessory structures* that contain no *conditioned floor area*.

~~2. Roofs with slope equal to or greater than 8 units vertical in 12 units horizontal, the ice barrier shall be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.~~

Committee Reason: Approval was based upon the proponent's published reason. The modification adds clarity by moving the exception into the body of the text.

Assembly Action: None

Public Comments

Public Comment:

Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB), requests Approved as Modified by this Public Comment.

Further modify the proposal as follows:

R905.2.7.1 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building~~. Roofs~~ On roofs with slope equal to or greater than 8 units vertical in 12 units horizontal, the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area*.

Commenter's Reason: The purpose of this public comment is to further amend RB425 as it was modified at the IRC Building hearings. The approved floor modification is an improvement to the original proposal, however it still leaves a potential issue with the application of ice barriers. The critical dimension for applying ice barriers to reduce the risk of ice dams is the 24" horizontal measurement inward from the exterior wall line of the building. This applies regardless of the length of the overhang. The language approved in Dallas has the potential to result in the ice barrier not extending inward 24" horizontally from the exterior wall line if a steep overhang is sufficiently long, thus increasing the risk of ice dams. This public comment makes a further modification to insure that both requirements apply and the proper length of ice barrier is provided.

Final Hearing Results

RB425-13 AMPC

Code Change No: RB429-13

Original Proposal

Section(s): R905.2.7.2, R905.3.3.3, R905.4.3.2, R905.5.3.2, R905.6.3.2, R905.7.3.2, R905.8.3.2, R905.10.5.1

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R905.2.7.2, R905.3.3.3, R905.4.3.2, R905.5.3.2, R905.6.3.2, R905.7.3.2, R905.8.3.2, R905.10.5.1

Proponent: John Kurtz, International Staple, Nail & Tool Association (isanta@ameritech.net)

Revise as follows:

R905.2.7.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~ <u>Underlayment shall be attached using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap-nail shank shall be a minimum of 12 gauge (0.105 inches). Staple gage shall be a minimum 21 gage. Cap-nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u>

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.3.3.3 Underlayment and high winds. Underlayment applied in areas subject to high wind [above 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$-inch (19 mm) into the roof sheathing.~~ <u>Underlayment shall be attached</u>

using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap-nail shank shall be a minimum of 12 gauge (0.105 inches). Staple gage shall be a minimum 21 gage. Cap-nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.4.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap-nail shank shall be a minimum of 12 gauge (0.105 inches). Staple gage shall be a minimum 21 gage. Cap-nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.5.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap-nail shank shall be a minimum of 12 gauge (0.105 inches). Staple gage shall be a minimum 21 gage. Cap-nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.6.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.
Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap-nail shank shall be a minimum of 12 gauge (0.105 inches). Staple gage shall be a minimum 21 gage. Cap-nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.7.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all Head laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap-nail shank shall be a minimum of 12 gauge (0.105 inches). Staple gage shall be a minimum 21 gage. Cap-nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.8.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter~~

~~of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap-nail shank shall be a minimum of 12 gauge (0.105 inches). Staple gage shall be a minimum 21 gage. Cap-nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.10.5.1 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap-nail shank shall be a minimum of 12 gauge (0.105 inches). Staple gage shall be a minimum 21 gage. Cap-nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

Reason: The IRC requirement for cap nails for attachment of roof covering underlayment in high-wind areas does not reflect commercially available cap staples successfully used in roofing material application. This proposal expands fastener to include cap staples based on tests indicating underlayment tears before proposed cap staples fail. Cap staple bearing area on underlayment is same as for cap nail - being determined by cap diameter.

Tests were conducted with ASTM D 4869 Type IV underlayment ("30 pound"). That underlayment is at high end of the thickness and toughness range of code-required underlayment - a "worst-case test" for the cap staple.

Test procedure and results accompany this proposal. (below)

Report on Testing
July 2012

Testing was performed by Stanley Black & Decker at the request of International Staple, Nail and Tool Association (ISANTA.)

Reference Standards

State of Florida

- Testing Application Standards (TAS) published in the State of Florida Building Code, 2007 for High Velocity Hurricane Zone (HVHZ) product approval testing.
- TAS 111(B)-95, Test Procedure for Edge Metal Pull-off Performance.
- TAS 117(C)-95, Test Procedure for Dynamic Pull-off Performance of Roofing Nail Heads or Fasteners with Bearing Plates.
- TAS 117(A)-95, Test Procedure for Withdrawal Resistance Testing of Mechanical Fasteners Used in Roof System Assemblies.
- TAS 117(B)-95, test Procedure for Dynamic Pull-through Performance of Roofing Membranes over Fastener Heads or Fasteners with Metal Bearing Plates.

ASTM Standards

- D1037, Standard Test Methods for Evaluating Properties of Wood-base fiber and Particle Panel Materials, Nail head Pull-through Test.
- D4869, Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing.
- D412, Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.

Acceptance Criteria

- ICC-ES, AC188: Acceptance Criteria for Roof Underlayments. July 2007.

Materials

- Roofing paper, 30# (ASTM D 4869, Type IV)
- Sheathing material – 4-ply, 15/32-in. Southern Pine Plywood, cut in 2 by 2 in. squares
- Fasteners – Ring shank cap nails with nail shank diameters before threading of 0.083 inch and 0.105 inch. Cap staples, 18 gage and 21 gage.
- Caps – 1 inch diameter plastic caps

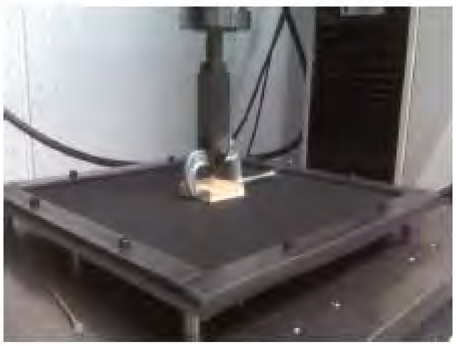
Method - The test method was designed to facilitate one of three potential failure modes: cap failure, fastener withdrawal, or cap pulling through underlayment. A 14x14-in. sheet of underlayment was cut from the roll. The cap-fastener was driven through the center of the underlayment sheet into a 2x2-in. block of sheathing material. The assembled test specimen was turned over so that the sheathing block was visible and the fastener head was down. The assembled specimen was secured in the test fixture base with the fastener centered below sheathing block clamping fixture. The sheathing block was clamped by the fixture attached to the traversing head of the test machine. The test specimen was loaded at constant displacement of 1 in./min. until failure. Load and displacement were monitored continuously during the test. Failure mode was observed and peak force was recorded as the failure load. Photographs provided.

Discussion - The test is intended to evaluate the functionality of the ISANTA proposal for adding additional commercially available cap fasteners for use on same spacing as IBC's 0.105" cap nail with a plastic or metal 1" diameter cap (as specified.) The underlayment is not wind qualified. However, AC188 evaluation includes a requirement for tensile strength by using one of three ASTM standards, for example, ASTM D412. The AC does not include a punch-through or pull-through evaluation. The minimum tensile strength criterion of AC188 is 20 lbf/in-width. The 20 lbf/in-width is a valuable benchmark in that it could also be used to assess the potential uplift resistance of the underlayment because that is controlled by tensile strength.

Tensile strength also appears to be a predictor of pull-through performance. The 1-in. caps generally pulled through the underlayment at approximately 32 lb. Some nonlinear behavior occurs at the start of the loading process, then the load-deflection diagram becomes linear, and as the load approaches the maximum a minor plastic region develops that reflects fiber separation and cap yielding. This was generally characteristic for all cap-fasteners.

Conclusions - From the testing and review of test standards and acceptance criteria, we can conclude that the underlayment minimum tensile strength is the controlling strength property of the system and it can be used as a reasonable approximation of the potential holding capacity of the cap-fasteners based on the cap diameter. Engineering analysis of the negative pressures on roof surfaces should provide reasonable estimates of expected forces that will be resisted by fasteners and can be used to establish fastening schedules that reflect the fastener holding capacity (pull-through or withdrawal) and tensile strength of the underlayment when loaded as a membrane between fasteners.

Test machine fixtures for the pull-through test.



Pull-through test in progress; (left) early in test; (right) nearing failure.

Metal cap with roofing nail fastener after the pull-through test. Observe the permanent deformation of the metal cap and the pull-through tears in the underlayment.

Results of Cap Fastener Testing with ASTM D 4869, Type IV Underlayment

Cap Fastener [1]	**Failure Load (pounds)**	**Number of Failures, by Failure Mode**		
		Fastener Withdrawal	**Cap Failure**	**Under-layment Tear**
"Code" Nail 2012 IBC Cap Nail 0.105" nail diameter ring shank nail	31.8	1	7	8
0.083" nail diameter ring shank nail	32.4	0	4	2
21 Gage staple	36.2	0	0	5
18 Gage staple	32.1	0	2	9

[1] All cap fasteners had plastic caps meeting IBC requirements.

Cost Impact: The code change proposal will not increase the cost of construction. Proposed option would allow contractors to select option which provides equivalent protection with minimized material and labor costs.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Provides for the use of cap staples for underlayment attachment. This provides an alternative which will provide equivalent protection.

Assembly Action: **None**

Final Hearing Results

RB429-13 **AS**

Code Change No: RB430-13

Original Proposal

Section(s): R905.2.7.2, R905.3.3.3, R905.4.3.2, R905.5.3.2, R905.6.3.2, R905.7.3.2, 905.8.3.2, R905.10.5.1

Proponent: John Kurtz, International Staple, Nail & Tool Association (mgraham@nrca.net)

Revise as follows:

R905.2.7.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm~~). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~ <u>Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm.) Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). The cap-nail shank shall be a minimum of 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nails shall have a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u>

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.3.3.3 Underlayment and high winds. Underlayment applied in areas subject to high wind [above 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~ <u>Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm.) Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). The cap-nail shank shall be a minimum of 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nails shall have a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u>

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.4.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~ <u>Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm.) Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). The cap-nail shank shall be a minimum of 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nails shall have a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u>

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.5.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~ <u>Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm.) Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). The cap-nail shank shall be a minimum of 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nails shall have a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u>

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.6.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm.) Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). The cap-nail shank shall be a minimum of 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nails shall have a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.7.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all Head laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm.) Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). The cap-nail shank shall be a minimum of 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nails shall have a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.8.3.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm.) Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of

0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). The cap-nail shank shall be a minimum of 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nails shall have a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

R905.10.5.1 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm.) Metal caps shall have a thickness of at least 32-gauge sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). The cap-nail shank shall be a minimum of 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nails shall have a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

Reason: The cap nail listed for attachment of roof covering underlayment in high-wind areas does not reflect commercially available cap nails successfully used in roofing material application. IRC presently lists a minimum nail shank diameter of 0.105". This proposal lowers the minimum shank diameter based on tests indicating underlayment tears before proposed cap nails fail. (Minimum diameter of 0.083" for ring shank cap nails and minimum diameter of 0.091" for smooth shank cap nails.)

Tests were conducted with ASTM D 4869 Type IV underlayment ("30 pound"). That underlayment is at high end of the thickness and toughness range of code-required underlayment - a "worst-case test" for the fastener. Proposal addresses both commercially available hand-driven and power-driven cap-nails.

Test procedure and results accompany this proposal. (below)

Report on Testing
July 2012

Testing was performed by Stanley Black & Decker at the request of International Staple, Nail and Tool Association (ISANTA.)

Reference Standards

State of Florida

- Testing Application Standards (TAS) published in the State of Florida Building Code, 2007 for High Velocity Hurricane Zone (HVHZ) product approval testing.
- TAS 111(B)-95, Test Procedure for Edge Metal Pull-off Performance.
- TAS 117(C)-95, Test Procedure for Dynamic Pull-off Performance of Roofing Nail Heads or Fasteners with Bearing Plates.
- TAS 117(A)-95, Test Procedure for Withdrawal Resistance Testing of Mechanical Fasteners Used in Roof System Assemblies.
- TAS 117(B)-95, test Procedure for Dynamic Pull-through Performance of Roofing Membranes over Fastener Heads or Fasteners with Metal Bearing Plates.

ASTM Standards

- D1037, Standard Test Methods for Evaluating Properties of Wood-base fiber and Particle Panel Materials, Nail head Pull-through Test.

- D4869, Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing.
- D412, Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.

Acceptance Criteria

- ICC-ES, AC188: Acceptance Criteria for Roof Underlayments. July 2007.

Materials

- Roofing paper, 30# (ASTM D 4869, Type IV)
- Sheathing material – 4-ply, 15/32-in. Southern Pine Plywood, cut in 2 by 2 in. squares
- Fasteners – Ring shank cap nails with nail shank diameters before threading of 0.083 inch and 0.105 inch. Cap staples, 18 gage and 21 gage.
- Caps – 1 inch diameter plastic caps

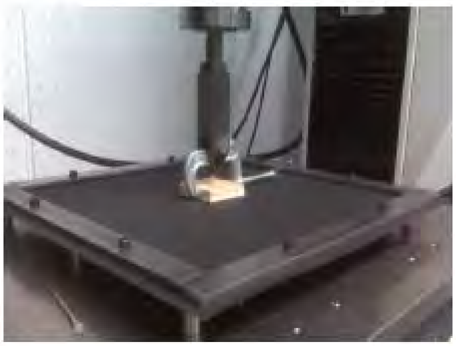
Method - The test method was designed to facilitate one of three potential failure modes: cap failure, fastener withdrawal, or cap pulling through underlayment. A 14x14-in. sheet of underlayment was cut from the roll. The cap-fastener was driven through the center of the underlayment sheet into a 2x2-in. block of sheathing material. The assembled test specimen was turned over so that the sheathing block was visible and the fastener head was down. The assembled specimen was secured in the test fixture base with the fastener centered below sheathing block clamping fixture. The sheathing block was clamped by the fixture attached to the traversing head of the test machine. The test specimen was loaded at constant displacement of 1 in./min. until failure. Load and displacement were monitored continuously during the test. Failure mode was observed and peak force was recorded as the failure load. Photographs provided.

Discussion - The test is intended to evaluate the functionality of the ISANTA proposal for adding additional commercially available cap fasteners for use on same spacing as IBC's 0.105" cap nail with a plastic or metal 1" diameter cap (as specified.) The underlayment is not wind qualified. However, AC188 evaluation includes a requirement for tensile strength by using one of three ASTM standards, for example, ASTM D412. The AC does not include a punch-through or pull-through evaluation. The minimum tensile strength criterion of AC188 is 20 lbf/in-width. The 20 lbf/in-width is a valuable benchmark in that it could also be used to assess the potential uplift resistance of the underlayment because that is controlled by tensile strength.

Tensile strength also appears to be a predictor of pull-through performance. The 1-in. caps generally pulled through the underlayment at approximately 32 lb. Some nonlinear behavior occurs at the start of the loading process, then the load-deflection diagram becomes linear, and as the load approaches the maximum a minor plastic region develops that reflects fiber separation and cap yielding. This was generally characteristic for all cap-fasteners.

Conclusions - From the testing and review of test standards and acceptance criteria, we can conclude that the underlayment minimum tensile strength is the controlling strength property of the system and it can be used as a reasonable approximation of the potential holding capacity of the cap-fasteners based on the cap diameter. Engineering analysis of the negative pressures on roof surfaces should provide reasonable estimates of expected forces that will be resisted by fasteners and can be used to establish fastening schedules that reflect the fastener holding capacity (pull-through or withdrawal) and tensile strength of the underlayment when loaded as a membrane between fasteners.

Test machine fixtures for the pull-through test.



Pull-through test in progress; (left) early in test; (right) nearing failure.

Metal cap with roofing nail fastener after the pull-through test. Observe the permanent deformation of the metal cap and the pull-through tears in the underlayment.

Results of Cap Fastener Testing with ASTM D 4869, Type IV Underlayment

Cap Fastener [1]	Failure Load (pounds)	Number of Failures, by Failure Mode		
		Fastener Withdrawal	Cap Failure	Under-layment Tear
"Code" Nail 2012 IBC Cap Nail 0.105" nail diameter ring shank nail	31.8	1	7	8
0.083" nail diameter ring shank nail	32.4	0	4	2
21 Gage staple	36.2	0	0	5
18 Gage staple	32.1	0	2	9

[1] All cap fasteners had plastic caps meeting IBC requirements.

Cost Impact: The code change proposal will not increase the cost of construction. Proposed options would allow contractors to select options which provide equivalent protection with minimized material and labor costs.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB430-13 **AS**

Code Change No: RB435-13

Original Proposal

Section(s): R905.1.1 (NEW), R905.1.2 (NEW), Table R905.1.1(1) (NEW), Table R905.1.1(2) (NEW), Table R905.1.1(3) (NEW), R905.2.3, R905.2.7, R905.2.7.1, R905.2.7.2, R905.3.3, R905.3.3.1, R905.3.3.2, R905.3.3.3, R905.4.3, R905.4.3.1, R905.4.3.2, R905.5.3, R905.5.3.1, R905.5.3.2, R905.6.3, R905.6.3.1, R905.6.3.2, R905.7.3, R905.7.3.1, R905.7.3.2, R905.8.3, R905.8.3.1, R905.8.3.2, R905.10.5, R905.10.5.1

Proponent: T. Eric Stafford, representing Insurance Institute for Business and Home Safety

Revise as follows:

R905.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, and metal roof panels shall be in accordance with this section. Underlayment types shall be in accordance with Table R905.1.1(1). Underlayment shall be applied in accordance with Table R905.1.1(2). Underlayment shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer modified bitumen underlayment complying with ASTM D 1970 installed in accordance with the manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.

2. As an alternative, a minimum 4-inch wide strip of self-adhering polymer modified bitumen membrane complying with ASTM D 1970 installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph shall be applied over the 4-inch wide membrane strips.

R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, and wood shakes. The ice barrier shall consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area*.

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

Roof Covering	Section	Design Wind Speed < 120 mph	Design Wind Speed ≥ 120 mph
Asphalt shingles	R905.2	ASTM D 226 Type I ASTM D 4869 Type I ASTM D 6757	ASTM D 226 Type II ASTM D 4869 Type IV ASTM D 6757
Clay and concrete tile	R905.3	ASTM D 226 Type II ASTM D 2626 Type I	ASTM D 226 Type II ASTM D 2626 Type I

		ASTM D 6380 Class M mineral surfaced roll roofing	ASTM D 6380 Class M mineral surfaced roll roofing
Metal roof shingles	R905.4	ASTM D 226 Type I or Type II ASTM D 4869 Type I or Type II	ASTM D 226 Type II ASTM D 4869 Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D 226 Type I ASTM D 4869 Type I or Type II	ASTM D 226 Type II ASTM D 4869 Type IV
Slate and slate-type shingles	R905.6	ASTM D 226 Type I ASTM D 4869 Type I or Type II	ASTM D 226 Type II ASTM D 4869 Type IV
Wood shingles	R905.7	ASTM D 226 Type I ASTM D 4869 Type I or Type II	ASTM D 226 Type II ASTM D 4869 Type IV
Wood shakes	R905.8	ASTM D 226 Type I ASTM D 4869 Type I or Type II	ASTM D 226 Type II ASTM D 4869 Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D 226 Type II ASTM D 4869 Type IV

TABLE R905.1.1(2)
UNDERLAYMENT APPLICATION

Roof Covering	**Section**	**Design Wind Speed < 120 mph**	**Design Wind Speed ≥ 120 mph**
Asphalt shingles	R905.2	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner. Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm). Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet (1829 mm).	Same as Design Wind Speeds < 120 mph except all laps shall be a minimum of 4 inches.
Clay and concrete tile	R905.3	For roof slopes from two and one-half units vertical in 12 units horizontal (2 1/2:12), up to four	Same as Design Wind Speeds < 120 mph except all laps shall be a minimum

		units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows. Starting at the eave, apply a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave. Starting at the eave, apply a36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483 mm). For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches (51 mm). End laps shall be 4 inches and shall be offset by 6 feet (1829 mm).	of 4 inches.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner. Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently to hold in place. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm), End laps shall be 4 inches and shall be offset by 6 feet (1829
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

			mm).

TABLE R905.1.1(3)
UNDERLAYMENT ATTACHMENT

Roof Covering	**Section**	**Design Wind Speed ≤ 110 mph**	**110 mph < Design Wind Speed < 120 mph**	**Design Wind Speed ≥ 120 mph**
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	Corrosion-resistant fasteners in accordance with the manufacturer's installation instruction. Apply fasteners along laps not farther apart than 36 inches (914 mm) on center.	The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.
Clay and concrete tile	R905.3			
Metal roof shingles	R905.4	Manufacturer's installation instructions.	Corrosion-resistant fasteners in accordance with the manufacturer's installation instruction. Apply fasteners along laps not farther apart than 36 inches (914 mm) on center.	The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.
Mineral-surfaced roll roofing	R905.5			
Slate and slate-type shingles	R905.6			
Wood shingles	R905.7			
Wood shakes	R905.8			
Metal panels	R905.10			

R905.2.3 Underlayment. Underlayment shall comply with Section R905.1.1. ~~Unless otherwise noted, required underlayment shall conform to ASTM D 226 Type I, ASTM D 4869 Type I, or ASTM D 6757. Self-adhering polymer modified bitumen sheet shall comply with ASTM D 1970.~~

~~**R905.2.7 Underlayment application.** For roof slopes from two units vertical in 12 units horizontal (17-percent slope), up to four units vertical in 12 units horizontal (33- percent slope), underlayment shall be two layers applied in the following manner. Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be offset by 6 feet (1829 mm).~~

~~**R905.2.7.1**~~ **R905.2.7 Ice barrier.** Where required, ice barriers shall comply with Section R905.1.2. ~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached *accessory structures* that contain no *conditioned floor area*.~~

~~**R905.2.7.2 Underlayment and high winds.** Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.3.3 Underlayment. Underlayment shall comply with Section R905.1.1. ~~Unless otherwise noted, required underlayment shall conform to ASTM D 226 Type II; ASTM D 2626 Type I; or ASTM D 6380 Class M mineral surfaced roll roofing.~~

~~**R905.3.3.1 Low slope roofs.** For roof slopes from two and one-half units vertical in 12 units horizontal (21/2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~
~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently in place.~~

~~**R905.3.3.2 High slope roofs.** For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches (51 mm), fastened sufficiently in place.~~

~~**R905.3.3.3 Underlayment and high winds.** Underlayment applied in areas subject to high wind [above 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-~~

~~resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section~~s ~~R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4-inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.4.3 Underlayment. Underlayment shall comply with Section R905.1.1. ~~ASTM D 226, Type I or Type II, ASTM D 4869, Type I or Type II, or ASTM D 1970. Underlayment shall be installed in accordance with the manufacturer's installation instructions.~~

R905.4.3.1 Ice barrier. Where required, ice barriers shall comply with Section R905.1.2. ~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached *accessory structures* that contain no *conditioned floor area*.~~

~~**R905.4.3.2 Underlayment and high winds.** Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with~~u~~Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.5.3 Underlayment. Underlayment shall comply with Section R905.1.1 ~~ASTM D 226, Type I or ASTM D 4869, Type I or II~~.

R905.5.3.1 Ice barrier. Where required, ice barriers shall comply with Section R905.1.2. ~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached *accessory structures* that contain no *conditioned floor area*.~~

~~**R905.5.3.2 Underlayment and high winds.** Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant~~

~~fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.6.3 Underlayment. Underlayment shall comply with <u>Section R905.1.1.</u> ~~ASTM D 226, Type I, or ASTM D 4869, Type I or II. Underlayment shall be installed in accordance with the manufacturer's installation instructions.~~

R905.6.3.1 Ice barrier. <u>Where required, ice barriers shall comply with Section R905.1.2.</u> ~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached *accessory structures* that contain no *conditioned floor area*.~~

~~**R905.6.3.2 Underlayment and high winds.** Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.7.3 Underlayment. Underlayment shall comply with <u>Section R905.1.1.</u> ~~ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

R905.7.3.1 Ice barrier. <u>Where required, ice barriers shall comply with Section R905.1.2.</u> ~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached *accessory structures* that contain no *conditioned floor area*.~~

~~**R905.7.3.2 Underlayment and high winds.** Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all Head laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.8.3 Underlayment. Underlayment shall comply with Section R905.1.1. ~~ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

R905.8.3.1 Ice barrier. Where required, ice barriers shall comply with Section R905.1.2. ~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached *accessory structures* that contain no *conditioned floor area*.~~

~~**R905.8.3.2 Underlayment and high winds.** Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.10.5 Underlayment. Underlayment shall comply with Section R905.1.1. ~~be installed in accordance with the manufacturer's installation instructions.~~

~~**R905.10.5.1 Underlayment and high winds.** Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm).~~

~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

Reason: This proposal is primarily a reorganization of the underlayment provisions contained within the IRC. In the current IRC, underlayment provisions are specified individually for each type of roof covering. Many of the roof covering provisions contain similar and overlapping requirements for underlayment type, application, and attachment. This proposal relocates the underlayment requirements for each roof covering to a single section at the beginning of Section R905. This reorganization results in three new tables that address underlayment type, application, and attachment for each of the roof covings in the IRC that require underlayment. Consolidating the underlayment requirements into a single section will make the provisions more user-friendly and in particular highlights the key differences between the requirements for underlayment for the different types of roof coverings addressed by the IRC.

This proposal also includes two minor technical changes. ASTM D 4859 Type IV underlayment is included as an acceptable underlayment for metal roof panels where wind speeds are 120 mph and greater. The IBC permits this underlayment for metal roof panels and there is no reason it should not be permitted for metal roof panels installed in accordance with the IRC.

The second technical change is primarily a clarification regarding the use of ASTM D 1970 as an underlayment. The proposal does not require the use of the self-adhering membrane, as it is already permitted by the code. In fact, the existing exception for using the self-adhering membrane was requested to be included by the IBC Structural Committee, and subsequently approved by the IRC Committee during the last code change cycle so that it was clear that a self-adhering membrane was permitted as an alternative to the underlayment provisions for high wind. This proposal simply clarifies the permitted installations of the self-adhering membrane that would provide an equivalent or better level of water intrusion prevention to the underlayment requirements for high wind. The criteria specified are consistent with the IBHS Fortified program requirements for creating a “sealed roof deck”. Additionally, the provisions of this proposal are the most widely accepted methods recognized by insurance companies for providing discounts and credits in hurricane-prone regions.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

R905.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, and metal roof panels shall ~~be in accordance with this section~~ conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D 226, D 1970, D 4869 and D 6757 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated in~~. Underlayment types shall be in accordance with~~ Table R905.1.1(1). Underlayment shall be applied in accordance with Table R905.1.1(2). Underlayment shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer modified bitumen underlayment complying with ASTM D 1970 installed in accordance with both the underlayment manufacturer’s and roof covering manufacturer’s installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch wide strip of self-adhering polymer modified bitumen membrane complying with ASTM D 1970 installed in accordance with the manufacturer’s installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for maximum ultimate design wind speeds V_{ult} less than ~~120~~ 140 mph shall be applied over the entire roof over the 4-inch wide membrane strips.

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

Roof Covering	Section	Maximum Ultimate Design Wind Speed, V_{ult} < ~~120~~ 140 mph	Maximum Ultimate Design Wind Speed, V_{ult} ≥ ~~120~~ 140 mph
Asphalt shingles	R905.2	ASTM D 226 Type I or II ASTM D 4869 Type I, II, III or IV ASTM D 6757	ASTM D 226 Type II ASTM D 4869 Type IV ASTM D 6757
Metal roof shingles	R905.4	ASTM D 226 Type I or ~~Type~~ II ASTM D 4869 Type I ~~or Type~~ II, III or IV	ASTM D 226 Type II ASTM D 4869 Type IV

Roof Covering	Section	Maximum Ultimate Design Wind Speed, V_{ult} < ~~120~~ 140 mph	Maximum Ultimate Design Wind Speed, V_{ult} ≥ ~~120~~ 140 mph
Mineral-surfaced roll roofing	R905.5	ASTM D 226 Type I or II ASTM D 4869 Type I ~~or Type~~ II, III or IV	ASTM D 226 Type II ASTM D 4869 Type IV
Slate and slate-type shingles	R905.6	ASTM D 226 Type ~~I~~ II ASTM D 4869 Type I ~~or Type~~ II, III or IV	ASTM D 226 Type II ASTM D 4869 Type IV
Wood shingles	R905.7	ASTM D 226 Type I or II ASTM D 4869 Type I ~~or Type~~ II, III or IV	ASTM D 226 Type II ASTM D 4869 Type IV
Wood shakes	R905.8	ASTM D 226 Type I or II ASTM D 4869 Type I ~~or Type~~ II, III or IV	ASTM D 226 Type II ASTM D 4869 Type IV

(Portions of table not shown remain unchanged)

TABLE R905.1.1(2)
UNDERLAYMENT APPLICATION

Roof Covering	Section	Maximum Ultimate Design Wind Speed, V_{ult} < ~~120~~ 140 mph	Maximum Ultimate Design Wind Speed, V_{ult} ≥ ~~120~~ 140 mph
Asphalt shingles	R905.2	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner. Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm). Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet (1829 mm).	Same as Maximum Ultimate Design Wind Speeds, V_{ult} < ~~120~~ 140 mph except all laps shall be a minimum of 4 inches.
Clay and concrete tile	R905.3	For roof slopes from two and one-half units vertical in 12 units horizontal (2 1/2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows. Starting at the eave, apply a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave. Starting at the eave, apply a36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483	Same as Maximum Ultimate Design Wind Speeds, V_{ult} < ~~120~~ 140 mph except all laps shall be a minimum of 4 inches.

Roof Covering	Section	Maximum Ultimate Design Wind Speed, V_{ult} < ~~120~~ 140 mph	Maximum Ultimate Design Wind Speed, V_{ult} ≥ ~~120~~ 140 mph
		mm). For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches (51 mm). End laps shall be 4 inches and shall be offset by 6 feet (1829 mm).	

(Portions of table not shown remain unchanged)

TABLE R905.1.1(3)
UNDERLAYMENT ATTACHMENT

Roof Covering	Section	Maximum Ultimate Design Wind Speed, V_{ult} < ~~120~~ 140 mph	~~110 mph < Design Wind Speed < 120 mph~~	Maximum Ultimate Design Wind Speed, V_{ult} ≥ ~~120~~ 140 mph
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	~~Corrosion-resistant fasteners in accordance with the manufacturer's installation instruction. Apply fasteners along laps not farther apart than 36 inches (914 mm) on center.~~	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.
Clay and concrete tile	R905.3			
Metal roof shingles	R905.4	Manufacturer's installation instructions.	~~Corrosion-resistant fasteners in accordance with the manufacturer's installation instruction. Apply fasteners along laps not farther apart than 36 inches (914 mm) on center.~~	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.
Mineral-surfaced roll roofing	R905.5			
Slate and slate-type shingles	R905.6			
Wood shingles	R905.7			
Wood shakes	R905.8			
Metal panels	R905.10			

Committee Reason: This is a good reorganization and brings the underlayment requirements together into tables, that makes it easier to read and enforce. The modification brings in changes from other proposals and correlates the wind speeds with ASCE 7-10. The modification also requires the underlayment to bear a label. The proponent should bring back a public comment to correct this.

Assembly Action: **None**

Final Hearing Results

RB435-13 **AM**

Code Change No: RB439-13

Original Proposal

Section(s): R905.2.8.5

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

R905.2.8.5 Drip edge. A drip edge shall be provided at eaves and ~~gables~~ rake edges of shingle roofs. Adjacent ~~pieces~~ segments of drip edge shall be overlapped a minimum of 2 inches (51 mm). Drip edges shall extend a minimum of 0.25 inch (6.4 mm) below the roof sheathing and extend ~~up~~ back on to the roof deck a minimum of 2 inches (51 mm). Drip edges shall be mechanically fastened to the roof deck at a maximum of 12 inches (305 mm) o.c. with fasteners as specified in Section R905.2.5. Underlayment shall be installed over the drip edge along eaves and under the underlayment ~~on gables~~ along rake edges. ~~Unless specified differently by the shingle manufacturer, shingles are permitted to be flush with the drip edge.~~

Reason: This code change proposal is intended to clarify the Code's intent regarding drip edges for asphalt shingle roofs, makes the provision conform to industry practices and makes the IRC's requirements consistent with the requirements in IBC's Section 1507.2.9.3, which was modified by Group A code change S36-12 that was Approved as Modified.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB439-13 **AS**

Code Change No: RB442-13

Original Proposal

Section(s): R905.6

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

R905.6 Slate ~~and slate-type~~ shingles. The installation of slate ~~and slate-type~~ shingles shall comply with the provisions of this section.

Reason: This code change proposal is intended to remove "slate-type" shingle products from being applicable to this section. Slate-type products are not defined and the material standard requirement in Section R905.6.4-Material Standards applies specifically to slate products and not synthetic slate or slate-type products.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB442-13	**AS**

Code Change No: RB443-13

Original Proposal

Section(s): R905.14.2, Chapter 44

Proponent: Steve Loftis, NFCI Polyurethanes

Revise as follows:

R905.14.2 Material standards. Spray-applied polyurethane foam insulation shall comply with ~~ASTM C 1029, Type III or IV~~ ASTM D7425.

Add new standard to Chapter 44 as follows:

ASTM

D 7425-11 Standard Specification for Spray Polyurethane Foam Used for Roofing Applications

Reason: ASTM D7425 Standard Specification for Spray Polyurethane Foam Used for Roofing Applications was developed to establish the required physical properties of spray foam (SPF) for use in SPF roofing applications. ASTM C1029 is a specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation and does not specifically address properties of SPF for use in roofing applications. ASTM D7425 is the appropriate reference standard.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ASTM D 7425 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ASTM D7425-11 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R905.14.2 Material standards. Spray-applied polyurethane foam insulation shall comply with ASTM C 1029, Type III or IV or ASTM D7425.

(Portions of proposal not shown remain unchanged)

Committee Reason: This change adds a new product standard to the code. The modification retains the proposed deleted standard to allow for the transition to the new standard.

Assembly Action: **None**

Final Hearing Results

RB443-13 **AM**

Code Change No: RB445-13 Part I

Original Proposal

Section(s): R202, R905.16, R905.16.1, R905.16.2, R905.16.3

Proponent: Lorraine Ross, Intech Consulting Inc., representing The Dow Chemical Company (intech@tampabay.rr.com)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE IRC RESIDENTIAL BUILDING CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY IRC PLUMBING/MECHANCIALCODE DEVELOPMENT COMMITTEE.

PART I – IRC BUILDING

Revise as follows:

R905.16 Photovoltaic ~~modules/~~shingles. The installation of photovoltaic ~~modules/~~shingles shall comply with the provisions of this section.

R905.16.1 Material standards. Photovoltaic ~~modules/~~shingles shall be listed and labeled in accordance with UL 1703.

R905.16.2 Attachment. Photovoltaic ~~modules/~~shingles shall be attached in accordance with the manufacturer's installation instructions.

R905.16.3 Wind resistance. Photovoltaic ~~modules/~~shingles shall be tested in accordance with procedures and acceptance criteria in ASTM D 3161. Photovoltaic ~~modules/~~shingles shall comply with the classification requirements of Table R905.2.4.1(2) for the appropriate maximum basic wind speed. Photovoltaic ~~modules/~~shingle packaging shall bear a label to indicate compliance with the procedures in ASTM D 3161 and the required classification from Table R905.2.4.1(2).

Reason: This code change is intended to coordinate with action taken for photovoltaic shingles in the 2015 *International Building Code* development hearings. Appropriate section numbers have been added here for the *International Residential Code*. Both definitions proposed in this code change were also approved in the 2015 IBC.

The successful IBC code change was referenced as S2-12 and contained this reasoning statement:

"This code change proposal is intended to clarify the term and definition for "Photovoltaic modules/shingles" in Chapter 2-Definitions and carrying this clarification through to the specific requirements for photovoltaic shingles in Section 1507.17

The word "modules" is being deleted from the term and definition because it is not defined in the code in the context of photovoltaic applications and it is not necessary to clearly identify and define the term. Similarly, "/" is being deleted because it is not necessary to identify or define the term; it is not clear whether the "/" is intended to mean "and" or "or". Also, "flat-plate", "three-tab" and "composite" are being deleted because these are not defined in the IBC and these are not necessary to clearly define the term."

No changes in the current code's technical requirements are intended with this code change proposal."

Cost Impact: The code change will not increase the cost of construction.

Public Hearing Results

PART I – IRC Building
Committee Action: **Approved as Submitted**

Committee Reason: This makes the terms used consistent with the IBC and industry practice.

Assembly Action: **None**

Final Hearing Results

RB445-13 Part I AS

Code Change No: RB446-13

Original Proposal

Section(s): R905.16, R905.16.1, R905.16.2, R905.16.3, R905.16.4, R905.16.4.1, R905.16.4.2

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

R905.16 Photovoltaic ~~modules/~~shingles. The installation of photovoltaic ~~modules/~~shingles shall comply with the provisions of this section, Section M2302 and NFPA 70.

R905.16.1 Deck requirements. Photovoltaic shingles shall be applied to a solid or closely-fitted deck, except where the roof covering is specifically designed to be applied over spaced sheathing.

R905.16.2 Deck slope. Photovoltaic shingles shall be used only on roof slopes of three units vertical in 12 units horizontal (3:12) or greater.

R905.16.3 Underlayment. Unless otherwise noted, required underlayment shall conform to ASTM D 4869 or ASTM D6757.

R905.16.4 Underlayment application. Underlayment shall be applied shingle fashion, parallel to and starting from the eave, lapped 2 inches (51 mm) and fastened sufficiently to hold in place.

R905.16.4.1 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area*.

R905.16.4.2 Underlayment and high winds. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~R905.16.1~~ R905.16.5 Material standards. Photovoltaic ~~modules/~~shingles shall be listed and labeled in accordance with UL 1703.

~~R905.16.2~~ <u>R905.16.6</u> **Attachment.** Photovoltaic ~~modules/~~shingles shall be attached in accordance with the manufacturer's installation instructions.

~~R905.16.3~~ <u>R905.16.7</u> **Wind resistance.** Photovoltaic ~~modules/~~shingles shall be tested in accordance with procedures and acceptance criteria in ASTM D 3161. Photovoltaic ~~modules/~~shingles shall comply with the classification requirements of Table R905.2.4.1(2) for the appropriate maximum basic wind speed. Photovoltaic ~~modules/~~shingle packaging shall bear a label to indicate compliance with the procedures in ASTM D 3161 and the required classification from Table R905.2.4.1(2).

Reason: This code change proposal adds specific requirements for roof decks, roof deck slope, underlayment, underlayment application, ice barrier, and underlayment for high wind areas to Section R905.16.

The specific requirements being added are consistent with similar attributes for other steep-slope, shingle-type roof coverings.

Reference to IRC Section M2302-Photovoltaic Solar Energy Systems and NFPA 70 is added.

This same code change proposal was submitted for consideration as S47-12 for Group A of the International Building Code and was Approved as Modified; the modifications are included as a part of this text here

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels the PV requirement should be in an appendix and this proposal does not fix all the issues.

Assembly Action: **Approved as Modified**

Modify the proposal as follows:

R905.16.2 Deck slope. Photovoltaic shingles shall be used only on roof slopes of ~~three~~ <u>two</u> units vertical in 12 units horizontal (~~3~~ <u>2</u>:12) or greater.

(Portions of proposal not shown remain unchanged)

Final Hearing Results

RB446-13 **AM**

Code Change No: RB447-13

Original Proposal

Section(s): R907 (NEW)

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Add new text as follows:

SECTION R907
ROOFTOP-MOUNTED PHOTVOLTAIC SYSTEMS

R907.1 Rooftop-mounted photovoltaic systems. Rooftop-mounted photovoltaic panels or modules shall be installed in accordance with this section, Section M2302 and NFPA 70.

R907.2 Wind resistance. Rooftop-mounted photovoltaic panel or modules systems shall be installed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

R907.3 Fire classification. Rooftop-mounted photovoltaic panels or modules shall have the same fire classification as the roof assembly required in Section R902.

R907.4 Installation. Rooftop mounted photovoltaic panels or modules shall be installed in accordance with the manufacturer's installation instructions.

R907.5 Photovoltaic panels and modules. Rooftop-mounted photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703 and shall be installed in accordance with the manufacturer's printed installation instructions.

Reason: : This code change proposal is intended to add specific requirements applicable to rooftop-mounted photovoltaic panels and modules, and complement the already existing requirements for photovoltaic solar energy systems in Section M2302.

The roofing-specific requirements proposed here are adapted from IBC Section 1509.7-Photovoltaic Systems, which address rooftop-mounted panel and rack systems.

Building-integrated photovoltaic systems, such as photovoltaic shingles, are already addressed in IRC Section 905.16.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB447-13	**AS**

Code Change No: RB449-13

Original Proposal

Section(s): Table R906.2

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

TABLE R906.2
MATERIAL STANDARDS FOR ROOF INSULATION

Cellular glass board	ASTM C 552
Composite boards	ASTM C 1289, Type III, IV, V or VI
Expanded polystyrene	ASTM C 578
Extruded polystyrene board	ASTM C 578
Perlite board	ASTM C 728
Polyisocyanurate board	ASTM C 1289, Type I or II
Wood fiberboard	ASTM C 208
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177

Reason: This code change proposal is intended to add recognized product standards to Table R906.2-Material Standards for Roof Insulation for fiber-reinforced gypsum board and glass-faced gypsum board commonly used in roof assemblies.

ASTM C 1278, "Standard Specification for Fiber-Reinforced Gypsum Panel," is the U.S. product standard applicable to fiber-reinforced gypsum board used in roof assemblies.

ASTM C1177, "Standard Specification for Glass Mat Substrate Used as Sheathing," is the U.S. product standard applicable to glass-faced gypsum board used in roof assemblies.

This same code change proposal was submitted for the International Building Code as S50-12 in Group A and was Approved as Submitted.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. Consistent with the IBC Structural committee's action on S50-12.

Assembly Action: **None**

Final Hearing Results

RB449-13 **AS**

Code Change No: RB451-13

Original Proposal

Section(s): R907.1

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

R907.1 General. Materials and methods of application used for re-covering or replacing an existing roof covering shall comply with the requirements of Chapter 9.

Exceptions:

1. Reroofing shall not be required to meet the minimum design slope requirements of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section R905 for roofs that provide positive drainage.
2. For roofs that provide positive drainage, re-covering or replacing an existing roof covering shall not require the secondary (emergency overflow) drains or scuppers of Section R903.4.1 to be added to an existing roof.

Reason: : IRC 2006 and subsequent editions include a requirement in Section R903.4-Roof Drainage that for roof drainage systems with roof drains or scuppers, secondary (emergency overflow) drains or scuppers also be provided in the event the primary roof drainage systems becomes clogged.

Section R907.1-Reroofing requires all materials and methods used in re-covering or replacing an existing roof covering comply with the requirements of Chapter 9 (except the minimum roof slope requirement of ¼:12 can be waived for roofs that provide "…positive roof drainage."). This statement can be interpreted to require the secondary (emergency overflow) drains and scupper provision also apply in reroofing. Since many existing buildings were designed and constructed before the code included a secondary requirement, the secondary drainage provision being applicable in reroofing and the need for adding secondary drains in existing buildings during reroofing can be a very costly and disruptive undertaking for owners and occupants.

This proposed code change adds an exception to Section R907.1-Reroofing that waives the secondary drainage requirement when reroofing existing buildings when the roof drains properly, that being provides positive drainage as is defined by the Code.

This same code change proposal was submitted for the International Building Code as S60-12 in Group A and was Approved as Modified by Public Comment 2. This proposal includes the AMPC2 language.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change clarifies where there is no need to provide a secondary drain. This is consistent with the final action on S60-12.

Assembly Action: **None**

Final Hearing Results

RB451-13	AS

Code Change No: RB453-13

Original Proposal

Section(s): R907.3, R907.3.1 (NEW), R907.3.1.1 (NEW)

Proponent: Michael D. Fischer, Kellen Company, representing the Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

Revise as follows:

~~**R907.3 Recovering versus replacement.** New roof coverings shall not be installed without first removing all existing layers of roof coverings where any of the following conditions exist:~~

1. ~~Where the existing roof or roof covering is watersoaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.~~
2. ~~Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.~~
3. ~~Where the existing roof has two or more applications of any type of roof covering.~~

~~**Exceptions:**~~

1. ~~Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.~~
2. ~~Installation of metal panel, metal shingle and concrete and clay tile roof coverings over existing wood shake roofs shall be permitted when the application is in accordance with Section R907.4.~~
3. ~~The application of new protective coating over existing spray polyurethane foam roofing systems shall be permitted without tear-off of existing roof coverings.~~
4. ~~Where the existing roof assembly includes an ice barrier membrane that adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.~~

R907.3 Roof replacement. Roof replacement shall include the removal of all existing layers of roof coverings down to the roof deck.

Exception: Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.

R907.3.1 Roof recover. The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

1. Where the new roof covering is installed in accordance with the roof covering manufacturers approved installation instructions
2. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.

3. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section R907.4.
4. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.

R907.3.1.1 A *roof recover* shall not be permitted where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

Reason: The intent of this proposal is to clarify the requirements for roof recover and roof replacement. In the new Section R907.3, the requirements for roof replacement (and the exception for ice barrier membranes) remain intact. The new Section R907.3.1 provides a much clearer path to identify those conditions where recover is permitted by the code. The current provisions for roof recover remain intact, except for two technical changes:

1. The current code contains a conflict related to the covering of wood shakes. The public comment provides a remedy by eliminating the prohibition contained in the text, which is in conflict with the application in accordance with Section R907.4.

2. The code lists several prescriptive options for recover, but does not specifically provide for other conditions where products have been evaluated for recover applications. The proposal includes that option, but requires installation in accordance with the manufacturer's instructions.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB453-13 **AS**

Code Change No: RB455-13

Original Proposal

Section(s): R1002.2, R1002.5, Chapter 44

Proponent: Timothy N. Seaton, B.S.C.E., Empire Masonry Heaters LLC (tseaton@timelyconstruction.com)

Revise as follows:

1002.2 Installation. Masonry heaters shall be installed in accordance with this section and comply with one of the following:

1. Masonry heaters shall comply with the requirements of ASTM E 1602; or
2. Masonry heaters shall be *listed* and labeled in accordance with UL 1482 <u>or EN 15250</u> and installed in accordance with the manufacturer's installation instructions.

1002.5 Masonry heater clearance. Combustible materials shall not be placed within 36 inches (765 mm) of the outside surface of a masonry heater in accordance with NFPA 211, Section 8-7 (clearances for solid fuel-burning appliances), and the required space between the heater and combustible material shall be fully vented to permit the free flow of air around all heater surfaces.

Exceptions:

1. When the masonry heater wall thickness is at least 8 inches (203 mm) thick of solid masonry and the wall thickness of the heat exchange channels is at least 5 inches (127 mm) thick of solid masonry, combustible materials shall not be placed within 4 inches (102 mm) of the outside surface of a masonry heater. A clearance of at least 8 inches (203 mm) shall be provided between the gas-tight capping slab of the heater and a combustible ceiling.
2. Masonry heaters *listed* and labeled in accordance with UL 1482 <u>or EN 15250</u> and installed in accordance with the manufacturer's instructions.

Add new standard to Chapter 44 as follows:

<u>**EN European Committee for Standardization (EN)**</u>
<u>**Central Secretariat**</u>
<u>**Rue de stassart 36**</u>
<u>**B-10 50 Brussels**</u>

<u>EN 15250 Slow Heat Release Appliances Fired By Solid Fuel. Requirements And Test Methods.</u>

Reason: This proposal harmonizes IRC Section 1002 with the corresponding 2013 IBC Section 2112.

UL 1482, *Solid-Fuel Type Room Heaters*, was created to evaluate wood stoves and similar appliances. It does not address thermal mass storage devices of masonry construction such as masonry heaters and contains significant deficiencies in evaluating them. Specifically, UL 1482 stipulates fueling the appliance until temperature equilibrium is reached at which point the safety clearances are verified. This is not an appropriate end of test for masonry heaters and cannot in testing application actually be clearly reached. While UL 1482 may eventually be modified to specifically address masonry heaters, in 2007 the European standard EN 15250, *Slow heat release appliances fired by solid fuel. Requirements and test method,* was finalized specifically to address masonry heaters and similar devices and has since been adopted by 37 countries in Europe and elsewhere. Since Europe is the original source of virtually all masonry heater technology and since IBC already references European Union standards elsewhere, it is appropriate to reference this standard here. EN 15250 stipulates the same allowable temperature elevations of adjacent combustible materials as UL 1482 but uses an appropriate test fueling method.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, EN 15250 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2012.

Public Hearing Results

For staff analysis of the content of ISO EN 15250 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The committee feels the European standard is appropriate for use in this application. This was approved for the IBC in the Group A action.

Assembly Action: **None**

Final Hearing Results

RB455-13 **AS**

Code Change No: RB458-13

Original Proposal

Section(s): R1003.18

Proponent: Jim Buckley, Buckley Rumford Co. representing Masonry Alliance for Codes and Standards and Clay Lining Institute (buckley@rumford.com)

Revise as follows:

R1003.18 Chimney clearances. Any portion of a masonry chimney located in the interior of the building or within the exterior wall of the building shall have a minimum air space clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the building, including chimneys that pass through the soffit or cornice, shall have a minimum air space clearance of 1 inch (25 mm). The air space shall not be filled, except to provide fire blocking in accordance with Section R1003.19.

Exceptions:

1. Masonry chimneys equipped with a chimney lining system listed and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's installation instructions are permitted to have combustible material in contact with their exterior surfaces.
2. When masonry chimneys are constructed as part of masonry or concrete walls, combustible materials shall not be in contact with the masonry or concrete wall less than 12 inches (305 mm) from the inside surface of the nearest flue lining.
3. Exposed combustible trim and the edges of sheathing materials, such as wood siding and flooring, shall be permitted to abut the masonry chimney side walls, in accordance with Figure R1003.18, provided such combustible trim or sheathing is a minimum of ~~12 inches (305 mm)~~ <u>8 inches (203 mm)</u> from the inside surface of the nearest flue lining. ~~Combustible material and trim shall not overlap the corners of the chimney by more than 1 inch (25 mm).~~

Reason: Tests have shown that the currently required 12" chimney wall thickness for the chimney to be in contact with combustible trim is overly restrictive. Chimneys with enclosing walls of 8" in contact with combustible material are at least as safe as the current basic code requiring chimneys to have 4" thick solid masonry walls two inches clear of combustibles. This change would provide for timber frame or wood ceilings to safely abut a masonry chimney.

Eight Inch Chimney Wall Test
In support of Buckley Code Change Proposal R1003.18 - 9/20/12

Purpose of test: To determine if a chimney built so that the clay flue liner is enclosed with 8" of solid masonry in contact with combustible materials is as safe as the current code requirement that the clay flue liner be enclosed with 4" of solid masonry plus 2" of air space to combustible materials.

We conclude that building chimney walls 8" thick in contact with combustible materials is at least as safe as building chimneys with 4" thick walls 2" clear of combustible materials which is current code.

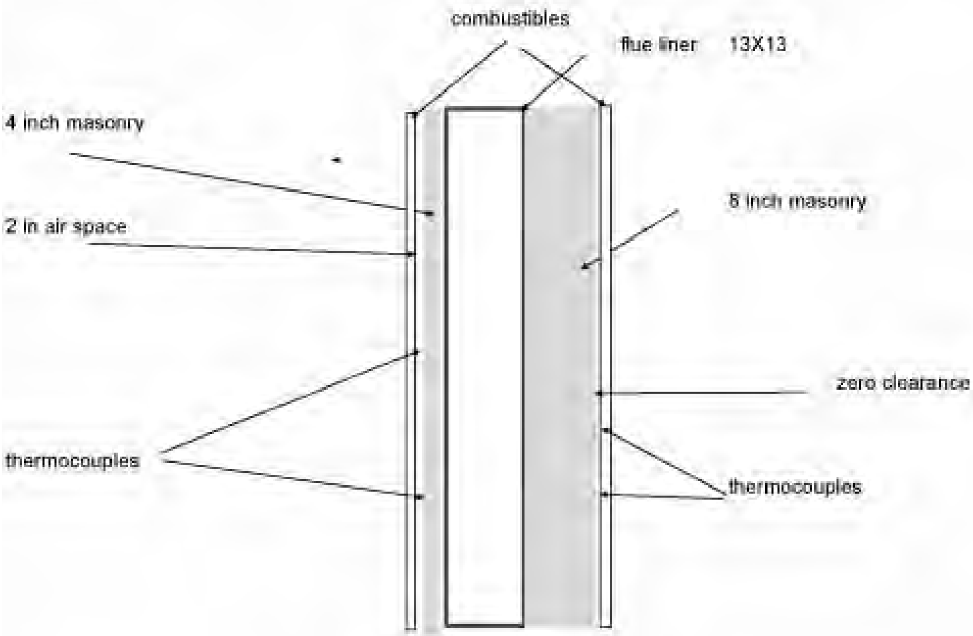
Method: To build a masonry chimney with one side built to code - 4" thick wall plus 2" of air space to combustibles - and the opposite side built 8" thick in contact with combustibles and subject the chimney to flue gas temperatures representing an over fire or chimney fire condition. If the combustibles in contact with the 8" thick masonry did not become as hot as the combustibles 2" clear of a 4" thick masonry chimney wall (the code compliant condition) we can conclude that a chimney with 8" thick walls in contact with combustibles is at least as safe as the code compliant chimney with 4" walls plus a 2" air space to combustibles.

Results:

The combustibles on the code compliant side - 4" thick wall plus 2" of air space to combustibles - reached 90 deg.F above ambient temperature after four hours at a flue gas temperature of 1,000 deg. F while the combustibles in contact with the 8" thick side made it to five hours before reaching 90 degrees above ambient. By that time the combustibles on the code compliant side had reached 45 deg.F above the 90 deg.F above ambient failure temperature.

sept 14 2012 chimney test

4 inch brick with 2 inch air space versus 8 inch brick zero clearance



Time	flue	flue	zero	zero	zero	2 inch	2 inch	2 inch	ambient
start	71	71	66	66	66	66	66	66	56
1 hour	1000	1008	66	66	66	66	71	74	56
2 hr	1000	1005	85	78	79	94	102	111	56
3 hr	1001	992	111	102	104	127	132	137	58
4 hr	1001	993	147	142	142	168	165	175	57
5 hr	1002	995	144	160	168	200	201	197	74
6 hr	1000	992	167	170	170	220	226	227	78
7 hr	1000	992	191	194	197	230	232	236	83
8 hr	1002	995	203	202	205	231	231	240	83
1 hour of cooling time	387	423	217	220	220	211	215	214	85
temps declined after this point									

Test #2 Sept 19, 2012
1 Hr to heat chimney to 1400 then held for 3 hrs at 1400 then spiked to 2100 for 10 min cooled 1 hr and repeated twice

Time									
start	47	49	52	49	51	51	52	49	47
1 hour	1400	1338	52	53	53	71	71	76	52
2 hour	1403	1358	61	62	65	137	142	143	55
3 hour	1403	1355	87	94	101	208	215	218	61
4 hour	1401	1357	127	125	119	243	236	222	60
10 min hold at 2100	2100	1911	107	113	114	236	242	221	61
after 1 hour cool	702	693	136	143	147	235	241	248	64
10 min hold at 2100	2100	1928	131	135	137	239	241	248	62
after 1 hr cool	637	714	135	138	143	229	268	270	64
10 min hold at 2100	2073	1962	127	127	136	218	257	255	64
peak temp during2 1/2 hr cooling	329	406	139	139	180	206	287	288	63

Cost Impact: The code change proposal will not increase the cost of construction, it would reduce the cost.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB458-13	**AS**

Code Change No: RB459-13

Original Proposal

Section(s): R1004.5 (NEW)

Proponent: Bob Eugene, Underwriters Laboratories Inc, UL (robert.eugene@ul.com), David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new text as follows:

R1004.5 Gasketed fireplace doors. A gasketed fireplace door shall not be installed on a factory-built fireplace except where the fireplace system has been specifically tested, *listed* and *labeled* for such use in accordance with UL 127.

Reason:
(Eugene) Consistent with action on Proposal M163-12 in Group A codes.

(Hall) Because of requirements in the IECC that require all fireplaces to be provided with gasketed doors, a great deal of controversy has resulted. Most factory-built fireplaces are not tested for use with sealed glass doors and installing such doors on fireplaces that are not tested for these doors could cause overheating of the fireplace resulting in a fire hazard. Without testing, the effect of the doors will be an unknown. This text was approved for the 2015 IMC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB459-13 **AS**

Code Change No: RB461-13

Original Proposal

Section(s): R1006.2, R1006.5

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

THIS CODE CHANGE WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Revise as follows:

R1006.2 Exterior air intake. The exterior air intake shall be capable of supplying all *combustion air* from the exterior of the *dwelling* or from spaces within the *dwelling* ventilated with ~~outside~~ outdoor air such as nonmechanically ventilated crawl or *attic* spaces. The exterior air intake shall not be located within the garage or *basement* of the *dwelling.* ~~nor~~ The exterior air intake, for other than listed factory-built fireplaces, shall not ~~the air intake~~ be located at an elevation higher than the firebox. The exterior air intake shall be covered with a corrosion-resistant screen of 1/4-inch (6 mm) mesh.

R1006.5 Outlet. ~~Locating the exterior air outlet in the back or sides of the firebox chamber or within 24 inches of the firebox opening on or near the floor is permitted.~~ The exterior air outlet shall be located in the back or side of the firebox chamber or shall be located outside of the firebox, at the level of the hearth and not greater than 24 inches (610mm) from the firebox opening. The outlet shall be closable and designed to prevent burning material from dropping into concealed combustible spaces.

Reason: The requirement that the exterior air intake not be located higher than the firebox appears to conflict with Section R1006.1.1 which simply defers the installation to the fireplace manufacturer's instructions. The proposed revision makes this requirement applicable only to masonry fireplaces. If the exterior air intake was not allowed to be higher than the firebox, listed factory-built fireplaces could not be installed in basements or the lower levels of split level homes. The only way around this appears to be the case where the air outlet is installed outside of the firebox as allowed in Section R1006.5, thus negating the concern for fire and hot gases entering the exterior air duct. (this hazard is not possible if the outlet in not within the firebox).
The revision to Section R1006.5 simply cleans up language and eliminates subjective text. The current first sentence does not require anything, rather, it offers some things that you are allowed to do. The location text "on or near the floor" is subjective. The intent is simply at the same level as the hearth, so, the outlet could be in the floor or in a wall at the intersection of the floor and wall.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB461-13	**AS**

Code Change No: RB465-13

Original Proposal

Section(s): Appendix G, R324 (New), R324.1 (New)

Proponent: Kris Bridges, CBO, Chair, ICC Swimming Pool Code Drafting Committee (SPCDC)

Delete Appendix G in its entirety:

~~**APPENDIX G**~~
~~**SWIMMING POOLS, SPAS AND HOT TUBS**~~

Add new Section and new text as follows:

<u>**SECTION R324**</u>
<u>**SWIMMING POOLS, SPAS AND HOT TUBS**</u>

<u>**R324.1 General.** The design and construction of aquatic vessels shall comply with the *International Swimming Pool and Spa Code*.</u>

Reason: The drafting of the *International Swimming Pool and Spa Code* (ISPSC) started in October/2010 by the Swimming Pool Code Drafting Committee (SPCDC) which was established by the ICC Board of Directors, with the Association of Pool & Spa Professionals (APSP) as a Cooperating Sponsor. The SPCDC was a broad based committee representing a balance of interests composed of 15 individuals from public, private and nonprofit sectors with expertise in disciplines critical to the topics in the *International Swimming Pool and Spa Code*. The SPCDC was supported by four Work Groups composed of numerous interested parties and stakeholders.
The intent was to develop a comprehensive set of regulations for swimming pools and spas consistent and coordinated with the I-Codes. Technical content was developed from provisions from the International Codes and the applicable APSP standards. The APSP standards considered were:

- ANSI-1 2003 Public Swimming Pools
- ANSI-2 1999 Public Spas
- ANSI-3 1999 Permanent Residential Spas
- ANSI-4 2007 Aboveground/On-ground Residential Swimming Pools
- ANSI-5 2003 Residential In-ground Swimming Pools
- ANSI-6 1999 Portal Spas
- ANSI-7 2006 Suction Entrapment Avoidance
- ANSI-8 2005 Model Barrier Code
- ANSI-9 2005 Aquatic Recreational Facilities
- ANSI-11 2009 Standard for water quality in public swimming pools and spas

The SPCDC and its Work Groups comprehensively reviewed the requirements in the existing 2009 International Codes and the standards noted above in an effort to draft comprehensive language for pool and spa safety while at the same time making sure the language resulted in adoptable and enforceable I-Code language.
The SPCDC held three face-to-face drafting meetings and there were weekly work group conference calls. The drafting effort of the SBCDC culminated in Public Version 1.0 (PV 1.0) which was completed in February/2011.
Public Version 1.0 was then subjected to a full cycle of ICC Code Development in 2011 as follows:

- PV 1.0 posted for code change submittals on February 1, 2011
- 100 code changes were submitted
- The ISPSC code committee comprised of both SBCDC members and new members acted on the code changes at the 2011 Code Development Hearings held May 16, 2011 in Dallas.
- Public comments were submitted on 22 of the code changes and were acted on by the ICC membership at the 2011 Final Action Hearings held October 31, 2011 in Phoenix
- The 2012 International Swimming Pool and Spa Code is published.

The ISPSC uses the term “aquatic vessels” to cover all types of vessels including pools, water parks, spas and hot tubs. This proposal is limited to the use and application of vessels under the IRC, including pools, spas and hot tubs. The ISPSC provisions comprehensively address all aspects of such vessels including;

- Administration and Definitions
- Construction features for pools including size and depth, wall and floor construction, and calculation of bather occupant load
- Safety features such as barriers to pool entry, depth markers and throwing ropes
- Mechanical, plumbing and electrical provisions
- Equipment such as suction entrapment avoidance, circulation, filters, pumps and motors, skimmers, heaters, return and suction fittings
- Appurtenances such as ladders and diving equipment

The ISPSC covers both residential and public aquatic vessels. A similar proposal was submitted to Section 3109 of the IBC in Group A 2012 (G193 Part I). The committee action was AM. The final action was D.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change is appropriate and provides a pointer to the ISPSC. The proponent should work with the opponents to resolve the questions about the pool deck interface and bring back a public comment.

Assembly Action: **None**

Final Hearing Results

RB465-13 **AS**

Code Change No: RB466-13

Original Proposal

Section(s): AH106.4.1, AH106.4.3, Table AH106.4(1), Table AH106.4(2), Figure AH106 (New)

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org); Daniel J. Walker, P.E., Thomas Associates, Inc. representing National Sunroom Association.

Revise as follows:

AH106.4.1 Wind Load. Structural members supporting screen enclosures shall be designed to support the minimum wind loads given in Tables AH106.4(1) and AH106.4(2) for the ultimate design wind speed, V_{ult}, determined from Figure AH106. Where any value is less than 10 pounds per square foot (psf) (0.479 kN/m^2) use 10 pounds per square ~~feet~~ foot (0.479 kN/m^2).

~~**AH106.4.3 Importance factor.** The wind factor for screen enclosures shall be 0.77 in accordance with Section 6.5.5 of ASCE 7.~~

~~**TABLE AH106.4(1)**~~
~~**DESIGN WIND PRESSURES FOR ALUMINUM SCREEN ENCLOSURE FRAMING WITH AN IMPORTANCE FACTOR OF 0.77**~~[a, b, c]

~~LOAD CASE~~	~~WALL~~	~~Basic Wind Speed (mph)~~											
		~~100~~		~~110~~		~~120~~		~~130~~		~~140~~		~~150~~	
		~~Exposure Category Design Pressure (psf)~~											
		~~C~~	~~B~~	~~C~~	~~B~~	~~C~~	~~B~~	~~C~~	~~B~~	~~C~~	~~B~~	~~C~~	~~B~~
~~A~~[d]	~~Windward and leeward walls (flow thru) and windward wall (nonflow thru) *L/W* = 0-1~~	~~12~~	~~8~~	~~14~~	~~10~~	~~17~~	~~12~~	~~19~~	~~14~~	~~23~~	~~16~~	~~26~~	~~18~~
~~A~~[d]	~~Windward and leeward walls (flow thru) and windward wall (nonflow thru) *L/W* = 2~~	~~13~~	~~9~~	~~16~~	~~11~~	~~19~~	~~14~~	~~22~~	~~16~~	~~26~~	~~18~~	~~30~~	~~21~~
~~B~~[e]	~~Windward: Nongable roof~~	~~16~~	~~12~~	~~20~~	~~14~~	~~24~~	~~17~~	~~28~~	~~20~~	~~32~~	~~23~~	~~37~~	~~26~~
~~B~~[e]	~~Windward: Gable roof~~	~~22~~	~~16~~	~~27~~	~~19~~	~~32~~	~~23~~	~~38~~	~~27~~	~~44~~	~~31~~	~~50~~	~~36~~
-	~~ROOF~~	-											
~~All~~[f]	~~Roof-screen~~	~~4~~	~~3~~	~~5~~	~~4~~	~~6~~	~~4~~	~~7~~	~~5~~	~~8~~	~~6~~	~~9~~	~~7~~
~~All~~[f]	~~Roof-solid~~	~~12~~	~~9~~	~~15~~	~~11~~	~~18~~	~~13~~	~~21~~	~~15~~	~~24~~	~~17~~	~~28~~	~~20~~

~~For SI: 1 mile per hour = 0.44 m/s, 1 pound per square foot = 0.0479 kPa, 1 foot = 304.8 mm.~~

~~a. Values have been reduced for 0.77 importance factor in accordance with Section AH106.4.3.~~

~~b. Minimum design pressure shall be 10 psf in accordance with Section AH106.4.1.~~

~~c. Loads are applicable to screen enclosures with a mean roof height of 30 feet or less. For screen enclosures of different heights, the pressures given shall be adjusted by multiplying the table pressure by the adjustment factor given in Table AH106.4(2).~~

~~d. For Load Case A flow thru condition, the pressure given shall be applied simultaneously to both the upwind and downwind screen walls acting in the same direction as the wind. The structure shall also be analyzed for wind coming from the opposite direction. For the nonflow thru condition, the screen enclosure wall shall be analyzed for the load applied acting toward the interior of the enclosure.~~

~~e. For Load Case B, the table pressure multiplied by the projected frontal area of the screen enclosure is the total drag force, including drag on screen surfaces parallel to the wind, which must be transmitted to the ground. Use Load Case A for members directly supporting the screen surface perpendicular to the wind. Load Case B loads shall be applied only to structural members which carry wind loads from more than one surface.~~

~~f. The roof structure shall be analyzed for the pressure given occurring both upward and downward.~~

~~**TABLE AH106.4(2)**~~
~~**HEIGHT ADJUSTMENT FACTORS**~~

~~**MEAN**~~	~~**EXPOSURE**~~	
~~**Roof Height (feet)**~~	~~**B**~~	~~**C**~~
~~15~~	~~1~~	~~0.86~~
~~20~~	~~1~~	~~0.92~~
~~25~~	~~1~~	~~0.96~~
~~30~~	~~1~~	~~1.00~~
~~35~~	~~1.05~~	~~1.03~~
~~40~~	~~1.09~~	~~1.06~~
~~45~~	~~1.12~~	~~1.09~~
~~50~~	~~1.16~~	~~1.11~~
~~55~~	~~1.19~~	~~1.14~~
~~60~~	~~1.22~~	~~1.16~~

~~For SI: 1 foot = 304.8 mm.~~

TABLE AH106.4(1)
DESIGN WIND PRESSURES FOR SCREEN ENCLOSURE FRAMING[a,b,e,f,g,h]

LOAD CASE	WALL	Ultimate Design Wind Speed, V_{ult} (mph)									
		100	105	110	120	130	140	150	160	170	180
		Exposure Category B Design Pressure (psf)									
A[c]	Windward and leeward walls (flow thru) and windward wall (nonflow thru) *L/W* = 0-1	6	7	8	9	11	13	14	16	18	21
A[c]	Windward and leeward walls (flow thru) and windward wall (nonflow thru) *L/W* = 2	7	8	9	11	12	14	16	19	21	24
B[d]	Windward: Nongable roof	9	10	11	13	15	18	21	23	26	30
B[d]	Windward: Gable roof	11	13	14	16	19	22	26	29	33	37
	ROOF										
All[e]	Roof-screen	2	3	3	3	4	4	5	6	7	7
All[e]	Roof-solid	7	8	8	10	12	13	15	18	20	22

For SI: 1 mile per hour = 0.44 m/s, 1 pound per square foot = 0.0479 kPa, 1 foot = 304.8 mm.

a. Minimum design pressure shall be 10 psf in accordance with Section AH106.4.1

b. Loads are applicable to screen enclosures with a mean roof height of 30 feet or less in Exposure B. For screen enclosures of different heights or exposure, the pressures given shall be adjusted by multiplying the table pressure by the adjustment factor given in Table AH106.4(2).

c. For Load Case A flow thru condition, the pressure given shall be applied simultaneously to both the upwind and downwind screen walls acting in the same direction as the wind. The structure shall also be analyzed for wind coming from the opposite direction. For the nonflow thru condition, the screen enclosure wall shall be analyzed for the load applied acting toward the interior of the enclosure.

d. For Load Case B, the table pressure multiplied by the projected frontal area of the screen enclosure is the total drag force, including drag on screen surfaces parallel to the wind, which must be transmitted to the ground. Use Load Case A for members directly supporting the screen surface perpendicular to the wind. Load Case B loads shall be applied only to structural members which carry wind loads from more than one surface.

e. The roof structure shall be analyzed for the pressure given occurring both upward and downward.

f. Table pressures are MWFRS loads. The design of solid roof panels and their attachments shall be based on component and cladding loads for enclosed or partially enclosed structures as appropriate.

g. Table pressures apply to 20 x 20 x 0.013” mesh screen. For 18 x 14 x 0.013” mesh screen, pressures on screen surfaces shall be permitted to be multiplied by 0.88. For screen densities greater than 20 x 20 x 0.013”, pressures for enclosed buildings shall be used.

h. Linear interpolated shall be permitted.

TABLE AH106.4(2)
ADJUSTMENT FACTOR
FOR BUILDING HEIGHT AND EXPOSURE

Mean Roof Height (ft)	Exposure		
	B	C	D
15	1.00	1.21	1.47
20	1.00	1.29	1.55
25	1.00	1.35	1.61
30	1.00	1.40	1.66
35	1.05	1.45	1.70
40	1.09	1.49	1.74
45	1.12	1.53	1.78
50	1.16	1.56	1.81
55	1.19	1.59	1.84
60	1.22	1.62	1.87

For SI: 1 foot = 304.8mm

Figure AH106
Ultimate Design Wind Speeds for Patio Covers and Screen Enclosures

Reason: The purpose of this code change is to bring the wind provisions of the IRC in line with the 2012 IBC and ASCE 7-10. As a result of the schedule changes implemented during the 2009-2010 ICC code development cycle, there was not sufficient time to revise the IRC to fully implement the new ultimate wind speed basis of ASCE 7-10 and the 2012 IBC, due to the extent of prescriptive IRC provisions and tables which are directly related to basic wind speed.. New maps based on the ASCE 7-10 ultimate wind speed data but converted back down to nominal (ASD) basis were provided in the IRC. This has led to a fair amount of confusion among those stakeholders who work with both codes.

A working group of stakeholders including NAHB, the major material associations, ASCE, and the Insurance Institute for Business and Home Safety developed a series of IRC proposals to implement the new ultimate wind speed basis. This proposal updates Table AH106.4(1) and AH106.4(2) for patio covers. Since ASCE 7-10 implemented a new 300-year mean return interval map for Risk Category I structures (which includes patio covers) to replace the use of the 0.87 (non-hurricane) and 0.77 (hurricane) importance factors, Section AH106.4.3 is deleted and a new Figure AH106 copies the Risk Category I wind map from IBC Figure 1609C.

The coefficients used to produce the updated table are the same as that from the previous tables in IRC Appendix "H", which were based on wind tunnel testing commissioned by the Aluminum Association of Florida and conducted at the Clemson and Virginia Tech wind tunnels by Dr. Timothy Reinhold, P.E., Ph.D and Mr. Charley Everly, P.E. The original test report can be downloaded for review from the following link:
http://aaof.org/documents/WindLoadsOnScreenEnclosures%28Reinhold%29.pdf. Additional clarification has also been added to the table footnotes based on additional details found in the referenced report.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB466-13	**AS**

Code Change No: RB467-13

Original Proposal

Section(s): Appendix J

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee (cbaldassarra@rjagroup.com)

Revise as follows:

AJ102.4 Replacement windows and replacement safety glazing. Regardless of the category of work, when an existing window, including the sash and glazed portion, or safety glazing is replaced, the replacement window or safety glazing shall comply with the following requirements as applicable: ~~of Chapter 11.~~

AJ102.4.1 Energy efficiency. Replacement windows shall comply with the requirements of Chapter 11.

AJ102.4.2 Safety glazing. Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

AJ102.4.3 Emergency escape and rescue openings. Where windows are required to provide *emergency escape and rescue openings*, replacement windows shall be exempt from the maximum sill height requirements of Sections R310.1 and the requirements of Sections R310.1.1, R310.1.2, R310.1.3 and R310.2 provided the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement window is not part of a change of occupancy.
3. Window opening control devices complying with ASTM F 2090 shall be permitted for use on windows required to provide *emergency escape and rescue openings.*

AJ102.4.4 Window control devices. Where window fall prevention devices complying with ASTM F2090 are not provided, window opening control devices complying with ASTM F 2090 shall be installed where an existing window is replaced and where all the following apply to the replacement window:

1. The window is operable;
2. The window replacement includes replacement of the sash and the frame;
3. The top of the sill of the window opening is at a height less than 24 inches (610 mm) above the finished floor;
4. The window will permit openings that will allow passage of a 4-inch diameter (102 mm) sphere when the window is in its largest opened position; and,
5. The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit.

~~**AJ301.3 Safety glazing.** Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.1.~~

Reason: This proposed change is a result of the CTC's investigation of the area of study entitled "Child Window Safety". The scope of the activity is noted as:

To evaluate the necessity of developing code proposals for the inclusion of requirements dealing with the conditions, circumstances and devices for window safety which could reduce the number of falls by children to surfaces below.

The purpose of this proposal is to coordinate the existing building provisions of the IRC with the changes approved to the IBC/IEBC in the 2012 Group A cycle. Code changes G225-12 and G227-12 were approved as modified by public comment to revise Section 3407 of the IBC (IEBC Section 406 – see below). In addition, Code change G201-12 last cycle removed the existing building provisions from Chapter 34 of the IBC in favor of a reference to the IEBC. This action was subsequently affirmed by the ICC Board as this was a code change related to I-Code scoping.

The format/terminology of Appendix J in the IRC is a bit different than the approach in the IEBC. However, Section AJ102 stipulates that the provisions of the section are applicable to all categories of work. It is for this reason that the provisions have been comprehensively located in AJ102 versus the sections that deal with the different categories of work (ie repairs in AJ301; renovations in AJ401; and alterations in AJ501.

For reference, the approved IEBC text is as follows:

IEBC SECTION 406
GLASS REPLACEMENT AND REPLACEMENT WINDOWS

406.1 Replacement glass. *The installation or replacement of glass shall be as required for new installations.*

406.2 Replacement Window Opening Control Devices. *In Group R-2 or R-3 buildings containing dwelling units, window opening control devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all the following apply to the replacement window:*

1. The window is operable;
2. The window replacement includes replacement of the sash and the frame;
3. The top of the sill of the window opening is at a height less than 36 inches (915 mm) above the finished floor;
4. The window will permit openings that will allow passage of a 4-inch diameter (102 mm) sphere when the window is in its largest opened position; and
5. The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2.

Exceptions:

1. Operable windows where the top of the sill of the window opening is located more than 75 feet (22.86 m) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F 2006.
2. Operable windows with openings that are provided with window fall prevention devices that comply with ASTM F2090.

406.3 Replacement Window Emergency Escape and Rescue Openings. *Where windows are required to provide emergency escape and rescue openings in Group R-2 and R-3 occupancies, replacement windows shall be exempt from the requirements of Sections 1029.2, 1029.3 and 1029.5 provided the replacement window meets the following conditions:*

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement of the window is not part of a change of occupancy.

This proposal is submitted by the ICC Code Technology Committee. The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/default.aspx. Since its inception in April/2005, the CTC has held twenty-five meetings - all open to the public. In 2012, three of the 25 face-to face meetings were held. In addition to the CTC meetings, the CTC established Study Groups (SG) of interested parties for each of the areas of study. These SG's are responsible for reviewing the available information and making recommendations to the CTC. All totaled, the SG's held over 70 conference calls in 2012.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. The proponent should bring back a public comment to address the committee's concern about the largest standard window size.

Assembly Action: **None**

Final Hearing Results

RB467-13	**AS**

Code Change No: RB469-13

Original Proposal

Section(s): AJ102.6

Proponent: David Bonowitz, Chair, Existing Buildings Subcommittee, Code Advisory Committee, National Council of Structural Engineers Associations (dbonowitz@att.net)

Revise as follows:

AJ102.6 Equivalent alternatives. Work performed in accordance with the *International Existing Building Code* shall be deemed to comply with the provisions of this appendix. These provisions are not intended to prevent the use of any alternative material, alternative design or alternative method of construction not specifically prescribed herein, provided any alternative has been deemed to be equivalent and its use authorized by the *building official*.

Reason: This proposal recognizes the IEBC as a specific "deemed to comply" alternative to Appendix J. The proposed provision would parallel IRC section R301.1.3, which states, "Engineered design in accordance with the *International Building Code* is permitted for all buildings and structures, and parts thereof, included in the scope of this code." It is also consistent with IRC section R104.11, which states, "Compliance with the specific performance-based provisions of the International Codes in lieu of specific requirements of this code shall also be permitted as an alternate."

From its terminology and organization, it is clear that Appendix J and the current IEBC Work Area method have a common ancestor; they each evolved from the "Nationally Applicable Recommended Rehabilitation Provisions," written by NAHB and others for HUD and published in 1997. The IEBC is thus a natural and appropriate alternative to Appendix J.

Indeed, one could easily make a case that Appendix J (as well as some of the IRC's other provisions for existing buildings) could, or should, be replaced in its entirety by a reference to the IEBC. We have not proposed that step. For now, we are merely proposing that the IEBC be recognized as an appropriate alternative.

While its provisions differ slightly (owing to the fact that the IEBC has been maintained and improved in recent cycles while Appendix J has not), the IEBC does offer certain advantages to the design professional and code official. It has more complete and consistent provisions that address specific load cases and combinations, cite appropriate national standards, include Appendix A3 for prescriptive seismic retrofit, include appropriate quality control measures, etc. Using the IEBC would also avoid some of the obsolete and internally inconsistent provisions in Appendix J (such as the definitions of "dangerous" and "load-bearing element," the confusing reference to "extensive alterations," etc.).

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB469-13 **AS**

Code Change No: RB470-13

Original Proposal

Section(s): AJ102.7

Proponent: David Bonowitz, Chair, Existing Buildings Subcommittee, Code Advisory Committee, National Council of Structural Engineers Associations (dbonowitz@att.net)

Revise text as follows:

AJ102.7 Other alternatives. Where compliance with these provisions or with this code as required by these provisions is technically infeasible or would impose disproportionate costs because of ~~structural,~~ construction or dimensional difficulties, other alternatives may be accepted by the building official. These alternatives may include materials, design features and/or operational features.

Reason: This proposal removes the "structural" conditions from the list of conditions that might be found cost-prohibitive. The idea of allowing workarounds and reasonable variances for "technically infeasible" triggered improvements is fair; usually it applies only to accessibility improvements and sometimes to prescriptive requirements for new construction that are not met to the letter by an existing building. But we do not believe it is the intent of the IRC to allow the code official to waive basic structural safety requirements triggered by the IRC or Appendix J.

Further, Appendix J is already careful to trigger structural work only in rare cases of demonstrated deficiency and or in cases of major alterations. Triggered structural upgrades will be rare, and where they are triggered they will address actual hazards, not just procedural nonconformities. Therefore, it is inappropriate to allow structural safety provisions to be waived simply on cost grounds.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB470-13	**AS**

Code Change No: RB471-13

Original Proposal

Section(s): Appendix R (New)

Proponent: Paula Baker-Laporte, FAIA, EcoNest Company, representing Natural Building Network (paula@econest.com)

Add new text as follows:

APPENDIX R
LIGHT STRAW-CLAY CONSTRUCTION

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION AR101
GENERAL

AR101.1 Scope. This appendix shall govern the use of light straw-clay as a non-bearing building material and wall infill system.

SECTION AR102
DEFINITIONS

AR102.1. General. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the *International Residential Code* for general definitions.

CLAY. Inorganic soil with particle sizes of less than 0.00008 inch (0.002 mm) having the characteristics of high to very high dry strength and medium to high plasticity.

CLAY SLIP. A suspension of clay soil in water.

CLAY SOIL. Inorganic soil containing 50% or more clay by volume.

INFILL. Light straw-clay that is placed between the structural members of a building.

LIGHT STRAW-CLAY. A mixture of straw and clay compacted to form insulation and plaster substrate between or around structural and non-structural members in a wall.

NON-BEARING. Not bearing the weight of the building other than the weight of the light straw-clay itself and its finish.

STRAW. The dry stems of cereal grains after the seed heads have been removed.

VOID. Any space in a light straw-clay wall in which a 2-inch (51 mm) sphere can be inserted.

SECTION AR103
NON-BEARING LIGHT STRAW-CLAY CONSTRUCTION

AR103.1 General. Light straw-clay shall be limited to infill between or around structural and nonstructural wall framing members.

AR103.2 Structure. The structure of buildings using light straw-clay shall be in accordance with the *International Residential Code* or shall be in accordance with an approved design by a *registered design professional*.

AR103.2.1 Number of stories. Use of light straw-clay infill shall be limited to buildings that are not more than one-story above grade plane.

Exception: Buildings using light straw-clay infill that are greater than one-story above grade plane shall be in accordance with an *approved* design by a *registered design professional*.

AR103.2.2 Bracing. Wind and seismic bracing shall be in accordance with Section R602.10 and shall use Method LIB. The required length of bracing shall comply with Section R602.10.3, with the additional requirements that Table 602.10.3(3) shall be applicable to all buildings in Seismic Design Category C, and that the minimum total length of bracing in Table R602.10.3(3) shall be increased by 90%. In lieu of these prescriptive requirements, wind and seismic bracing shall be in accordance with an *approved* design by *a registered design professional*. Walls with light straw-clay infill shall not be sheathed with solid sheathing.

AR103.2.3 Weight of light straw-clay. Light straw-clay shall be deemed to have a design dead load of 40 pounds per cubic foot (640 kg per cubic meter) unless otherwise demonstrated to the building official.

AR103. 2.4 Reinforcement of light straw-clay. Light straw-clay shall be reinforced as follows:

1. Vertical reinforcing shall be a minimum of nominal 2-inch by 6-inch (51 mm by 152 mm) wood members at a maximum of 32 inches (813 mm) on center where the vertical reinforcing is nonload-bearing and at 24"(610mm) on center where it is load-bearing. The vertical reinforcing shall not exceed an unrestrained height of 10 feet (3,048 mm) and shall be attached at top and bottom in accordance with Chapter 6 of the International Residential Code. In lieu of these requirements, vertical reinforcing shall be in accordance with an approved design by a registered design professional.
2. Horizontal reinforcing shall be installed in the center of the wall at not more than 24 inches (610 mm) on center and shall be secured to vertical members. Horizontal reinforcing shall be of any of the following: ¾ inch (19 mm) bamboo, ½ inch (13 mm) fiberglass rod, 1-inch (25 mm) wood dowel or nominal 1-inch by 2-inch (25 mm by 51 mm) wood.

AR103.3 Materials. The materials used in light straw-clay construction shall be in accordance with Sections AR103.3.1 through AR103.3.4.

AR103.3.1 Straw. Straw shall be wheat, rye, oats, rice, or barley, and shall be free of visible decay and insects.

AR103.3.2 Clay soil. Suitability of clay soil shall be determined in accordance with the Figure 2 Ribbon Test or the Figure 3 Ball Test of the Appendix to ASTM E2392/E2392M.

AR103.3.3 Clay slip. Clay slip shall be of sufficient viscosity such that a finger dipped in the slip and withdrawn remains coated with an opaque coating.

AR103.3.4 Light straw-clay mixture. Light straw-clay shall contain a not less than 65% and not more than 85% straw, by volume of bale-compacted straw to clay soil. Loose straw shall be mixed and coated with clay slip such that there is not more than 5% uncoated straw.

AR103.4 Wall Construction. Light straw-clay wall construction shall be in accordance with the requirements of Sections AR103.4.1 through AR103.4.7.

AR103.4.1 Light straw-clay maximum thickness. Light straw-clay shall be not more than 12 inches (305 mm) thick, to allow adequate drying of the installed material.

AR103.4.2 Distance above grade. Light straw-clay and its exterior finish shall be not less than 8 inches (203 mm) above exterior finished grade.

AR103.4.3 Moisture barrier. An *approved* moisture barrier shall separate the bottom of light straw-clay walls from any masonry or concrete foundation or slab that directly supports the walls. Penetrations and joints in the barrier shall be sealed with an *approved* sealant.

AR103.4.4 Contact with wood members. Light straw clay shall be permitted to be in contact with untreated wood members.

AR103.4.5 Contact with non-wood structural members. Non-wood structural members in contact with light straw-clay shall be resistant to corrosion or shall be coated to prevent corrosion with an *approved* coating.

AR103.4.6 Installation. Light straw-clay shall be installed in accordance with the following:

1. Formwork shall be sufficiently strong to resist bowing when the light straw-clay is compacted into the forms.
2. Light straw-clay shall be uniformly placed into forms and evenly tamped to achieve stable walls free of voids. Light straw-clay shall be placed in lifts of no more than 6 inches (152 mm) and shall be thoroughly tamped before additional material is added.
3. Formwork shall be removed from walls within 24 hours after tamping, and walls shall remain exposed until moisture content is in accordance with Section AR103.5.1. Any visible voids shall be patched with light straw-clay prior to plastering.

AR103.4.7 Openings in Walls. Openings in walls shall be in accordance with the following:

1. Rough framing for doors and windows shall be fastened to structural members in accordance with the -*International Residential Code*. Windows and doors shall be flashed in accordance with the *International Residential Code*.
2. An *approved* moisture barrier shall be installed at window sills in light straw-clay walls prior to installation of windows.

AR103.5 Wall Finishes. The interior and exterior surfaces of light straw-clay walls shall be protected with a finish in accordance with Sections AR103.5.1 through AR103.5.5.

AR103.5.1 Moisture content of light straw-clay prior to application of finish. Light straw-clay walls shall be dry to a moisture content of not more than 20% at a depth of 4 inches (102 mm), as measured from each side of the wall, prior to the application of finish on either side of the wall. Moisture content shall be measured with a moisture meter equipped with a probe that is designed for use with baled straw or hay.

AR103.5.2 Plaster finish. Exterior plaster finishes shall be clay plaster or lime plaster. Interior plaster finishes shall be clay plaster, lime plaster, or gypsum plaster. Plasters shall be permitted to be applied directly to the surface of the light straw-clay walls without reinforcement, except that the juncture of dissimilar substrates shall be in accordance with Section AR103.5.3. Plasters shall have a thickness of not less than ½ inch (13 mm) and not more than 1 inch (25 mm) and shall be installed in no less than 2 coats. Exterior clay plaster shall be finished with a lime-based or silicate-mineral coating.

AR103.5.3 Separation of wood and plaster. Where wood framing occurs in light straw-clay walls, such wood surfaces shall be separated from exterior plaster with No.15 asphalt felt, grade D paper, or other *approved* material except where the wood is *preservative-treated* or *naturally durable*.

Exception: Exterior clay plasters shall not be required to be separated from wood.

AR103.5.4 Bridging across dissimilar substrates. Bridging shall be installed across dissimilar substrates prior to the application of plaster. Acceptable bridging materials include: expanded metal lath, woven wire mesh, welded wire mesh, fiberglass mesh, reed matting, or burlap. Bridging shall extend not less than 4 inches (102 mm), on both sides of the juncture.

AR103.5.5 Exterior siding. Exterior wood, metal, or composite material siding shall be spaced at least 3/4 inch (19 mm) from the light straw-clay such that a ventilation space is created to allow for moisture diffusion. The siding shall be fastened to wood furring strips in accordance with manufacturer's recommendations. Furring strips shall be spaced not more than 32 inches (813 mm) on center, and shall be securely fastened to the vertical wall reinforcing or structural framing. Insect screening shall be provided at the top and bottom of the ventilation space. An *air barrier* consisting of not more than 3/8" thick clay plaster or lime plaster shall be applied to the light straw-clay prior to application of siding.

SECTION AR104
THERMAL INSULATION

AR104.1 R-value. Light straw-clay, where installed in accordance with this appendix, shall be deemed to have an R-value of 1.6 per inch.

SECTION AR105
REFERENCED STANDARDS

ASTM E 2392/E 2392M-10 Standard Guide for Design of Earthen Wall Building Systems AR104.1

Reason: The purpose of the proposed code change is to include Light Straw Clay as a nonload-bearing building material and wall infill system into the IRC because no such section currently exists.

Light straw-clay construction has proven to be a viable, ecologically sound, and energy efficient building method. To date, permitting of light straw-clay construction has generally been left to the discretion of individual building officials on a case-by-case basis. Two exceptions are the State of New Mexico and the State of Oregon. Since 1998 the State of New Mexico has successfully permitted straw-clay construction using its standard permitting process when a project complies with its "Clay Straw Guidelines".

The proposed light straw-clay section of the IBC is derived from and builds upon the fourteen years of success of New Mexico's Clay Straw Guidelines. In October of 2011 the Oregon Reach Code (ORC) was amended to include light straw-clay construction. Inclusion in the IBC would make proven provisions accessible to more designers and builders interested in using this environmentally beneficial material and to building officials who will be evaluating and enforcing its proper use.

The proposed mixture of clay and straw as a monolithic non-load bearing building enclosure has been successfully used in the United States since 1990 and since 1950 in Europe. Prior to this a heavier form of clay, straw, and woven wood construction known as wattle and daub was in common use throughout Europe, Africa, Asia, and North and South America. Many thousands of existing structures dating back 300-400 years have been continuously occupied, attesting to the durability of these natural materials. In the United States residential and non-residential structures using straw-clay have been completed in 17 states, and most of those have been constructed with full permits and inspections.

The centuries old European predecessors and light straw clay buildings built to date in North America have all been constructed without the use of a moisture barrier. The proposed light straw clay materials are vapor permeable and do not require a moisture barrier. Code precedents for vapor permeable construction exist for adobe construction, log construction and half-timber construction. In these systems as in light straw clay construction there is sufficient hygric capacity to hold and re-release moisture without damage to structural members or degradation of the wall due to weather related moisture fluctuations. Furthermore for exterior siding applications, with ventilated space and rain screen a water resistive barrier is not necessary.

Through The EcoNest Company, and as a licensed architect for over 25 years, I have been involved in the design and/or construction of over 50 buildings utilizing light straw-clay construction. In 2005 I co-authored, with my husband and business partner Robert Laporte, the book "Econest, Creating Sustainable Sanctuaries of Clay, Straw and Timber".

Official guidelines for straw-clay construction have been in effect in New Mexico since 1998. At least 20 residential structures have been successfully permitted and built since that time in New Mexico following these guidelines. Other building officials in surrounding States have also permitted straw-clay construction in their jurisdictions based on these guidelines.

In 2004 the Canada Mortgage and Housing Corporation (CMHC) funded a study to explore the material characteristics of Straw Light Clay (SLC) construction. The proposed section for the IBC uses this study as well as the many years of experience of our company and other practitioners of light straw-clay construction as its basis. The CMHC study includes issues of thermal performance, fire-resistance, moisture, and vapor permeability. The CMHC study and other supporting documentation is available for viewing and download at: http://www.econesthomes.com/natural-building-resources/technical/. EcoNest's numerous projects utilizing light straw-clay construction can be viewed at www.econesthomes.com

Bibliography:
2011 Oregon Reach Code (Section 1307) (Based on 2012 International Green Construction Code)

Baker-Laporte, Laporte (2005) *Econest, Creating Sustainable Sanctuaries of Clay, Straw and Timber*, Gibbs Smith Publishers (This book is available only by purchase. See http://www.econesthomes.com/bookstore/)
J. Thornton (2004) *Initial Material Characterization of Straw Light Clay* Canada Mortgage and Housing Corporation
State of New Mexico Construction Industries Division (2001) *Clay Straw Guidelines*
Richard Duncan PE, Resistance to Out-Of -Plane Lateral Forces of Light Straw Clay Wall Infill

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [ASTM E2392/E2392M-10] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

AR101.1 Scope. This appendix shall govern the use of light straw-clay as a non-bearing building material and wall infill system <u>in Seismic Design Categories A and B</u>.

AR103.2.2 Bracing. Wind and seismic bracing shall be in accordance with Section R602.10 and shall use Method LIB. ~~The required length of bracing shall comply with Section R602.10.3, with the additional requirements that Table 602.10.3(3) shall be applicable to all buildings in Seismic Design Category C, and that the minimum total length of bracing in Table R602.10.3(3) shall be increased by 90%. In lieu of these prescriptive requirements, wind and seismic bracing shall be in accordance with an *approved* design by *a registered design professional*.~~ Walls with light straw-clay infill shall not be sheathed with solid sheathing.

Committee Reason: Approval was based upon the proponent's published reason. The modification limits the scope to seismic design categories A and B. There is not enough data to justify use in high seismic areas.

Assembly Action: **None**

Final Hearing Results

RB471-13	**AM**

Code Change No: RB472-13

Original Proposal

Section(s): Appendix R (New)

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association representing the Plastic Pipe and Fittings Association (PPFA) (mikec@cmservnet.com)

Add new appendix and text as follows:

APPENDIX R
PIPING STANDARDS FOR VARIOUS APPLICATIONS

SECTION AR101
PLASTIC PIPING STANDARDS

AR101.1 Plastic piping. Table AR101.1 provides a listing of plastic piping product standards for various applications.

TABLE AR101.1
PLASTIC PIPING STANDARDS
FOR
VARIOUS APPLICATIONS[a,b]

APPLICATION	LOCATION	TYPE OF PLASTIC PIPING								
		ABS	CPVC	PE	PE-AL-PE	PE-RT	PEX	PEX-AL-PEX	PP	PVC
CENTRAL VACUUM	SYSTEM PIPING	-	-	-	-	-	-	-	-	ASTM F2158
FOUNDATION DRAINAGE	SYSTEM PIPING	ASTM F628	-	ASTM F405	-	-	-	-	-	ASTM D2665 ASTM D2729 ASTM D3034
GEOTHERMAL GROUNDLOOP	SYSTEM PIPING	-	ASTM F441 ASTM F442 ASTM F2855 ASTM D2846 CSA B137.6	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2241 CSA B137.3

APPLICATION	LOCATION	TYPE OF PLASTIC PIPING								
		ABS	CPVC	PE	PE-AL-PE	PE-RT	PEX	PEX-AL-PEX	PP	PVC
	LOOP PIPING	-	-	ASTM D2239 ASTM D2737 ASTM D3035 NSF 358-1	ASTM F1282	ASTM F2623 ASTM F2769	ASTM F876 CSA B137.5	-	ASTM F2389 CSA B137.11	-
GRAY WATER	NON-PRESS-URE DISTRIBU-TION / COLLEC-TION	ASTM F628	-	ASTM D2239 ASTM D2737 ASTM D3035 ASTM F2306	-	-	-	-	ASTM F2389 CSA B137.11	ASTM F891 ASTM D2949 ASTM D1785 ASTM D2729 ASTM D3034 ASTM F1760 CSA B137.3
	PRESS-URE / DISTRIBU-TION	-	ASTM F441 ASTM F442 ASTM F2855 ASTM D2846 CSA B137.6	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2241 CSA B137.3
RADIANT COOLING	LOOP PIPING	-	ASTM F441 ASTM F442 ASTM F2855 ASTM D2846	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	-
RADIANT HEATING	LOOP PIPING	-	ASTM	-	ASTM F1282	ASTM F2623	ASTM F876	ASTM F1281	ASTM F2389	-

APPLICATION	LOCATION	TYPE OF PLASTIC PIPING								
		ABS	CPVC	PE	PE-AL-PE	PE-RT	PEX	PEX-AL-PEX	PP	PVC
			F441 ASTM F442 ASTM F2855 ASTM D2846			ASTM F2769	CSA B137.5		CSA B137.11	
RAINWATER HARVESTING	NON-PRESS-URE / COLLEC-TION	ASTM F628	-	ASTM F1901	-	-	-	-	ASTM F2389 CSA B137.11	ASTM F891 ASTM D2949 ASTM D1785 ASTM D2729 ASTM F1760 CSA B137.3
	PRESS-URE / DISTRIBU-TION	-	ASTM F441 ASTM F442 ASTM F2855 ASTM D2846 CSA B137.6	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2241 CSA B137.3
RADON VENTING	SYSTEM PIPING	ASTM F628	-	-	-	-	-	-	-	ASTM F891 ASTM D1785 ASTM F1760

APPLICATION	LOCATION	TYPE OF PLASTIC PIPING								
		ABS	CPVC	PE	PE-AL-PE	PE-RT	PEX	PEX-AL-PEX	PP	PVC
RECLAIMED WATER	MAIN TO BUILDING SERVICE	-	ASTM F441 ASTM F442 ASTM F2855 ASTM D2846 CSA B137.6	ASTM D3035 AWWA C901 CSA B137.1	ASTM F1282	ASTM F2623 ASTM F2769	ASTM F876 AWWA C904 CSA B137.5	-	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2241 AWWA C905 CSA B137.3
	PRESS-URE / DISTRIBU-TION / IRRIGA-TION	-	ASTM F441 ASTM F442 ASTM F2855 ASTM D2846 CSA B137.6	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11 AWWA C900	ASTM D1785 ASTM D2241 AWWA C900
RESIDENTIAL FIRE SPRINKLERS[c]	SPRINK-LER PIPING	-	ASTM F441 ASTM F442 CSA B137.6 UL 1821	-	-	ASTM F2769	ASTM F876 CSA B137.5 UL 1821		ASTM F2389 CSA B137.11	-
SOLAR HEATING	PRESS-URE / DISTRIBU-TION		ASTM F441 ASTM F442 ASTM F2855 ASTM D2846	-	-	ASTM F2623 ASTM F2769	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	-

a. This table indicates manufacturing standards for plastic piping materials that are suitable for use in the applications indicated. Such applications support green and sustainable building practices. The system designer or the installer of piping shall verify that the piping chosen for an application complies with local codes and the recommendations of the manufacturer of the piping.
b. Fittings applicable for the piping shall be as recommended by the manufacturer of the piping.
c. Piping systems for fire sprinkler applications shall be listed for the application.

Add standards to Chapter 44 as follows:

ASTM

F1760-01(2011)	Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content
F1901-10	Standard Specification for Polyethylene (PE) Pipe and Fittings for Roof Drain Systems
F2158-08	Standard Specification for Residential Central-Vacuum Tube and Fittings
F2306-08	12" to 60" Annular Corrugated Profile-wall Polyethylene (PE) Pipe and Fittings for Gravity Flow Storm Sewer and Subsurface Drainage Applications
F2623-08	Standard Specification for Polyethylene of Raised Temperature (PE-RT) SDR 9 Tubing
F2855-12	Standard Specification for Chlorinated Poly(Vinyl Chloride)/Aluminum/Chlorinated Poly(Vinyl Chloride) (CPVC-AL-CPVC) Composite Pressure Tubing

AWWA

900-07	Polyvinyl chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (350mm through 1200mm), for Water transmission and Distributuion
905-10	Polyvinyl chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (100 mm through 300mm)

NSF

358-1-2012	Polyethylene Pipe and Fittings for Water-Based Ground-Source "Geothermal" Heat Pump Systems

UL

1821-2011	Standard for Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service

Reason: PPFA is recommending that this table to be added as an appendix. The table will assist builders and code officials to properly select and inspect plastic piping used in green and sustainable piping systems that may be encouraged or required due to other codes, standards or rating systems. These systems are often not covered in the model codes, and some guidance would improve the code until all the applications are covered in the code body.

Cost Impact: None

Analysis: A review of the standards proposed for inclusion in the code, ASTM F1760, F1901, F2158 and F2855; AWWA C900 and C905; NSF 358-1 and UL 1821 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1 2013. The following standards proposed for inclusion in the code are already referenced by other 2012 I-codes: ASTM F2306 (IPC) and F2623 (IMC).

Public Hearing Results

For staff analysis of the content of ASTM F1760, F1901, F2158 and F2855; AWWA C900 and C905; NSF 358-1 and UL 1821 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This proposal provides a needed clear reference for uses of plastic pipe that includes applicable standards.

Assembly Action: **None**

Final Hearing Results

RB472-13 **AS**

Code Change No: RB473-13

Original Proposal

Section(s): Appendix R (New)

Proponent: Martin Hammer, representing: California Straw Building Association, Colorado Straw Bale Association, Straw Bale Construction Association – New Mexico, Ontario Straw Bale Building Coalition, Development Center for Appropriate Technology and Ecological Building Network (mfhammer@pacbell.net)

Add new text as follows:

APPENDIX R
STRAWBALE CONSTRUCTION

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION AR101
GENERAL

AR101.1 Scope. This appendix provides prescriptive and performance-based requirements for the use of baled straw as a building material. Other methods of strawbale construction shall be subject to approval in accordance with Section 104.11 of the *International Residential Code*. Buildings using strawbale walls shall comply with the *International Residential Code* except as otherwise stated in this appendix.

SECTION AR102
DEFINITIONS

AR102.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the *International Residential Code* for general definitions.

BALE. Equivalent to *straw bale*.

CLAY. Inorganic soil with particle sizes less than 0.00008 in. (0.002 mm) having the characteristics of high to very high dry strength and medium to high plasticity.

CLAY SLIP. A suspension of *clay* particles in water.

FINISH. Completed compilation of materials on the interior or exterior faces of stacked *bales*.

FLAKE. An intact section of compressed *straw* removed from an untied *bale*.

LAID FLAT. The orientation of a *bale* with its largest faces horizontal, its longest dimension parallel with the wall plane, its *ties* concealed in the unfinished wall and its *straw* lengths oriented across the thickness of the wall.

LOAD-BEARING WALL. A strawbale wall that supports more than 100 pounds per linear foot (1459 N/m) of vertical load in addition its own weight.

MESH. An openwork fabric of linked strands of metal, plastic, or natural or synthetic fiber, embedded in plaster.

NONSTRUCTURAL WALL. All walls other than *load-bearing walls* or *shear walls*.

ON-EDGE. The orientation of a *bale* with its largest faces vertical, its longest dimension parallel with the wall plane, its *ties* on the face of the wall, and its *straw* lengths oriented vertically.

PIN. A vertical metal rod, wood dowel, or bamboo, driven into the center of stacked *bales*, or placed on opposite surfaces of stacked *bales* and through-tied.

PLASTER. Gypsum or cement plaster, as defined in Section R702 and in Section AR104, or clay plaster, soil-cement plaster, lime plaster, or cement-lime plaster as defined in Section AR104.

PRE-COMPRESSION. Vertical compression of stacked *bales* before the application of *finish*.

REINFORCED PLASTER. A plaster containing mesh reinforcement.

RUNNING BOND. The placement of *straw bales* such that the head joints in successive courses are offset at least one-quarter the bale length.

SHEAR WALL. A *strawbale* wall designed and constructed to resist lateral seismic and wind forces parallel to the plane of the wall in accordance with Section AR106.13.

SKIN. The compilation of *plaster* and reinforcing, if any, applied to the surface of stacked bales.

STRUCTURAL WALL. A wall that meets the definition for a *load-bearing wall* or *shear wall*.

STACK BOND. The placement of *straw bales* such that head joints in successive courses are vertically aligned.

STRAW. The dry stems of cereal grains after the seed heads have been removed.

STRAW BALE. A rectangular compressed block of *straw*, bound by *ties*.

STRAWBALE. The adjective form of *straw bale*.

STRAW-CLAY. Loose *straw* mixed and coated with *clay slip*.

TIE. A synthetic fiber, natural fiber, or metal wire used to confine a *straw bale*.

TRUTH WINDOW. An area of a *strawbale* wall left without its *finish*, to allow view of the *straw* otherwise concealed by its *finish*.

SECTION AR103
BALES

AR103.1 Shape. Bales shall be rectangular in shape.

AR103.2 Size. Bales shall have a minimum height and thickness of 12 inches (305 mm), except as otherwise permitted or required in this appendix. Bales used within a continuous wall shall be of consistent height and thickness to ensure even distribution of loads within the wall system.

AR103.3 Ties. Bales shall be confined by synthetic fiber, natural fiber, or metal ties sufficient to maintain required bale density. Ties shall be not less than 3 inches (76 mm) and not more than 6 inches (152 mm) from the two faces without ties and shall be spaced not more than 12 (305 mm) inches apart. Bales with broken ties shall be retied with sufficient tension to maintain required bale density.

AR103.4 Moisture content. The moisture content of bales at the time of application of the first coat of plaster or the installation of another finish shall not exceed 20 percent of the weight of the bale. The moisture content of bales shall be determined by use of a moisture meter designed for use with baled straw or hay, equipped with a probe of sufficient length to reach the center of the bale. At least 5 percent and not less than ten bales used shall be randomly selected and tested.

AR103.5 Density. Bales shall have a minimum dry density of 6.5 pounds per cubic foot (104 kg/cubic meter). The dry density shall be calculated by subtracting the weight of the moisture in pounds (kg) from the actual bale weight and dividing by the volume of the bale in cubic feet (cubic meters). At least 2 percent and not less than five bales to be used shall be randomly selected and tested on site.

AR103.6 Partial bales. Partial bales made after original fabrication shall be retied with ties complying with Section AR103.3.

AR103.7 Types of straw. Bales shall be composed of straw from wheat, rice, rye, barley, or oat.

AR103.8 Other baled material. The dry stems of other cereal grains shall be acceptable when *approved* by the *building official*.

SECTION AR104
FINISHES

AR104.1 General. Finishes applied to strawbale walls shall be any type permitted by the *International Residential Code*, and shall comply with this section and with Chapters 3 and 7 of the *International Residential Code* unless stated otherwise in this section.

AR104.2 Purpose, and where required. Strawbale walls shall be finished so as to provide mechanical protection, fire resistance, protection from weather, and to restrict the passage of air through the bales, in accordance with this appendix and the *International Residential Code*. Vertical strawbale wall surfaces shall receive a coat of plaster not less than 3/8 inches (10 mm) thick, or greater where required elsewhere in this appendix, or shall fit tightly against a solid wall panel. The tops of strawbale walls shall receive a coat of plaster not less than 3/8 inches (10 m) thick where straw would otherwise be exposed.

Exception: Truth windows shall be permitted where a fire-resistive rating is not required. Weather-exposed truth windows shall be fitted with a weather-tight cover. Interior truth windows in Climate Zones 5, 6, 7, 8, and Marine 4 shall be fitted with an air-tight cover.

AR104.3 Vapor retarders. Class I and Class II vapor retarders shall not be used on a strawbale wall, nor shall any other material be used that has a vapor permeance rating of less than 3 perms, except as permitted or required elsewhere in this appendix.

AR104.4 Plaster. Plaster applied to bales shall be any type described in this section, and as required or limited in this appendix. Plaster thickness shall not exceed 2 inches (51 mm).

AR104.4.1 Plaster and membranes. Plaster shall be applied directly to strawbale walls to facilitate transpiration of moisture from the bales, and to secure a mechanical bond between the *skin* and the bales, except where a membrane is allowed or required elsewhere in this appendix.

AR104.4.2 Lath and mesh for plaster. The surface of the straw bales functions as lath, and no other lath or mesh shall be required, except as required for out-of-plane resistance by Table 105.4, or for *structural walls* by Table AR106.12 and Table AR106.13(1).

AR104.4.3 Clay plaster. Clay plaster shall comply with Sections AR104.4.3.1 through AR104.4.3.6.

AR104.4.3.1 General. Clay plaster shall be any plaster having a clay or clay-soil binder. Such plaster shall contain sufficient clay to fully bind the plaster, sand or other inert granular material, and shall be permitted to contain reinforcing fibers. Acceptable reinforcing fibers include chopped straw, sisal, and animal hair.

AR104.4.3.2 Lath and mesh. Clay plaster shall not be required to contain reinforcing lath or mesh except as required in Table AR105.4 and Table AR106.13(1). Where provided, mesh shall be natural fiber, corrosion-resistant metal, nylon, high-density polypropylene, or other *approved* material.

AR104.4.3.3 Thickness and coats. Clay plaster shall be not less than 1 inch (25 mm) thick, except where required to be thicker for *structural walls*, as described elsewhere in this appendix, and shall be applied in not less than two coats.

AR104.4.3.4 Rain-exposed. Clay plaster, where exposed to rain, shall be finished with lime wash, lime plaster linseed oil, or other *approved* erosion-resistant finish.

AR104.4.3.5 Prohibited finish coat. Plaster containing Portland cement shall not be permitted as a finish coat over clay plasters.

AR104.4.3.6 Plaster additives. Additives shall be permitted to increase plaster workability, durability, strength, or water resistance.

AR104.4.4 Soil-cement plaster. Soil-cement plaster shall comply with Sections AR104.4.4.1 through AR104.4.4.3.

AR104.4.4.1 General. Soil-cement plaster shall be comprised of soil (free of organic matter), sand, and not less than 10 percent and not more than 20 percent Portland cement by volume, and shall be permitted to contain reinforcing fibers.

AR104.4.4.2 Lath and mesh. Soil-cement plaster shall use any corrosion-resistant lath or mesh permitted by the *International Residential Code*, or as required in Section AR106 where used on *structural walls*.

AR104.4.4.3 Thickness. Soil-cement plaster shall be not less than 1 inch (25 mm) thick.

AR104.4.5 Gypsum plaster. Gypsum plaster shall comply with Section R702. Gypsum plaster shall be limited to use on interior surfaces of non-structural walls, and as an interior finish coat over a structural plaster that complies with this appendix.

AR104.4.6 Lime plaster. Lime plaster shall comply with Sections AR104.4.6.1 and AR104.4.6.3.

AR104.4.6.1 General. Lime plaster is any plaster whose binder is comprised of calcium hydroxide (CaOH) including Type N or Type S hydrated lime, hydraulic lime, natural hydraulic lime, or quicklime. Hydrated lime shall comply with ASTM C 206. Hydraulic lime shall comply with ASTM C 1707. Natural hydraulic lime shall comply with ASTM C 141 and EN 459. Quicklime shall comply with ASTM C 5.

AR104.4.6.2 Thickness and coats. Lime plaster shall be not less than 7/8 inch (22 mm) thick, and shall be applied in not less than three coats.

AR104.4.6.3 On structural walls. Lime plaster on strawbale *structural walls* in accordance with Table AR106.12 or Table AR106.13(1) shall use a binder of hydraulic or natural hydraulic lime.

AR104.4.7 Cement-lime plaster. Cement-lime plaster shall be plaster mixes CL, F, or FL as described in ASTM C 926.

AR104.4.8 Cement plaster. Cement plaster shall conform to ASTM C 926 and shall comply with Sections R703.6.2, R703.6.4 and R703.6.5, except that the amount of lime in all plaster coats shall be not less than 1 part lime to 6 parts cement to allow a minimum acceptable vapor permeability. The combined thickness of all plaster coats shall be not more than 1 1/2 inch (38 mm) thick.

SECTION AR105
STRAWBALE WALLS – GENERAL

AR105.1 General. Strawbale walls shall be designed and constructed in accordance with this section. Strawbale *structural walls* shall be in accordance with the additional requirements of Section AR106.

AR105.2 Building requirements for use of strawbale nonstructural walls. Buildings using strawbale *nonstructural walls* shall be subject to the following limitations and requirements:

1. Number of stories: not more than one, except that two stories shall be allowed with an *approved* engineered design.
2. Building height: not more than 25 feet (7620 mm)
3. Wall height: in accordance with Table AR105.4
4. Braced wall panel length, and increase in seismic design categories C, D_0, D_1 and D_2: the required length of bracing for buildings using strawbale *nonstructural walls* shall comply with Section R602.10.3 of the *International Residential Code*, with the additional requirements that Table 602.10.3(3) shall be applicable to all buildings in Seismic Design Category C, and that the minimum total length of *braced wall panels* in Table R602.10.3(3) shall be increased by 60 percent.

AR105.3 Sill plates. Sill plates shall support and be flush with each face of the straw bales above and shall be of *naturally durable* or *preservative-treated wood* where required by the *International Residential Code*. Sill plates shall be not less than nominal 2 inches by 4 inches (51 mm by 102 mm) with anchoring complying with Section R403.1.6 and the additional requirements of Tables AR105.4 and AR106.16(1) where applicable.

AR105.4 Out-of-plane resistance and unrestrained wall dimensions. Strawbale walls shall employ a method of out-of-plane resistance in accordance with Table AR105.4, and comply with its associated limits and requirements.

AR105.4.1 Determination of out-of-plane loading. Out-of-plane loading for the use of Table AR105.4 shall be in terms of the design wind speed and seismic design category as determined in accordance with Sections R301.2.1 and R301.2.2 of the *International Residential Code*.

TABLE AR105.4
OUT-OF-PLANE RESISTANCE AND UNRESTRAINED WALL DIMENSIONS

Method of Out-of-Plane Resistance[a]	For Wind Design Speeds (mph)	For Seismic Design Categories	Unrestrained Wall Dimensions, H[b]		Mesh Staple Spacing at Boundary Restraints
			Absolute limit in feet	Limit based on bale thickness T[c] in feet (mm)	
Non-plaster finish or unreinforced plaster	≤100	A, B, C, D_0	H ≤ 8	H ≤ 5T	none required
Pins per Section AR105.4.2	≤100	A, B, C, D_0	H ≤ 12	H ≤ 8T	none required
Pins per Section AR105.4.2	≤110	A, B, C, D_0, D_1, D_2	H ≤ 10	H ≤ 7T	none required
Reinforced[c] clay plaster	≤110	A, B, C, D_0, D_1, D_2	H ≤ 10	$H \le 8T^{0.5}$ ($H \le 140T^{0.5}$)	≤ 6 inches

Reinforced[c] clay plaster	≤110	A, B, C, D_0, D_1, D_2	10 < H ≤ 12	H ≤ $8T^{0.5}$ (H ≤ $140T^{0.5}$)	≤ 4 inches[e]
Reinforced[c] cement, cement-lime, lime, or soil-cement plaster	≤110	A, B, C, D_0, D_1, D_2	H ≤ 10	H ≤ $9T^{0.5}$ (H ≤ $157T^{0.5}$)	≤ 6 inches
Reinforced[c] cement, cement-lime, lime, or soil-cement plaster	≤120	A, B, C, D_0, D_1, D_2,	H ≤ 12	H ≤ $9T^{0.5}$ (H ≤ $157T^{0.5}$)	≤ 4 inches[e]

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm

a. Finishes applied to both sides of stacked bales. Where different finishes are used on opposite sides of a wall, the more restrictive requirements shall apply.

b. H = stacked bale height in feet (mm) between sill plate ant top plate or other *approved* horizontal restraint, or the horizontal distance in feet (mm) between *approved* vertical restraints. For load-bearing walls, H refers to vertical height only.

c. T= bale thickness in feet (mm).

d. Plaster reinforcement shall be any mesh allowed in Table AR106.16 for the matching plaster type, but with staple spacing per this table. Mesh shall be installed in accordance with Section AR106.9.

e. Sill plate attachment shall be with 5/8 inch anchor bolts or *approved* equivalent at a maximum of 48 inches on center where staple spacing is required to be ≤ 4 inches.

AR105.4.2 Pins. Pins used for out-of-plane resistance shall comply with the following or shall be in accordance with an *approved* engineered design. Pins may be external, internal or a combination of the two.

1. Pins shall be 1/2 inch (13 mm) diameter steel, 3/4 inch (19 mm) diameter wood, or 1/2 inch (13 mm) diameter bamboo.
2. External pins shall be installed vertically on both sides of the wall at a spacing of not more than 24 inches (610 mm) on center. External pins shall have full lateral bearing on the sill plate and the top plate or roof-bearing element, and shall be tightly tied through the wall to an opposing pin with ties spaced not more than 32 inches (813 mm) apart and not more than 8 inches (203 mm) from each end of the pins.
3. Internal pins shall be installed vertically within the center third of the bales, at spacing of not more than 24 inches (610 mm) and shall extend from top course to bottom course. The bottom course shall be similarly connected to its support and the top course shall be similarly connected to the roof- or floor-bearing member above with pins or other *approved* means. Internal pins shall be continuous or shall overlap through not less than one bale course.

AR105.5 Connection of light-frame walls to strawbale walls. Light-frame walls perpendicular to, or at an angle to a straw bale wall assembly, shall be fastened to the bottom and top wood members of the strawbale wall in accordance with requirements for wood or cold-formed steel light-frame walls in the *International Residential Code*, or the abutting stud shall be connected to alternating straw bale courses with a 1/2 inch (13mm) diameter steel, 3/4” diameter (19 mm) wood, or 5/8” diameter (16 mm) bamboo dowel, with not less than 8 inch (203 mm) penetration.

AR105.6 Moisture control. Strawbale walls shall be protected from moisture intrusion and damage in accordance with Sections AR105.6.1 through AR105.6.8.

AR105.6.1 Water-resistive barriers and vapor permeance ratings. Plastered bale walls shall be constructed without any membrane barrier between straw and plaster to facilitate transpiration of moisture from the bales, and to secure a structural bond between straw and plaster, except as permitted or required elsewhere in this appendix. Where a water-resistive barrier is placed behind an exterior finish, it shall have a vapor permeance rating of not less than 5 perms, except as permitted or required elsewhere in this appendix.

AR105.6.2 Vapor retarders. Wall finishes shall have an equivalent vapor permeance rating of a Class III vapor retarder on the interior side of exterior strawbale walls in Climate Zones 5, 6, 7, 8 and Marine 4 as defined in Chapter 11. Bales in walls enclosing showers or steam rooms shall be protected on the interior side by a Class I or Class II vapor retarder.

AR105.6.3 Penetrations in exterior strawbale walls. Penetrations in exterior strawbale walls shall be sealed with an *approved* sealant or gasket on the exterior side of the wall in all Climate Zones, and on the interior side of the wall in Climate Zones 5, 6, 7, 8 and Marine 4 as defined in Chapter 11.

AR105.6.4 Horizontal surfaces. Bale walls and other bale elements shall be provided with a *water-resistive barrier* at all weather-exposed horizontal surfaces. The *water-resistive barrier* shall be of a material and installation that will prevent water from entering the wall system. Horizontal surfaces shall include exterior window sills, sills at exterior niches, and buttresses. The finish material at such surfaces shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain away from all bale walls and elements. Where the *water-resistive barrier* is below the finish material, it shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain to the outside surface of the bales wall's vertical finish.

AR105.6.5 Separation of bales and concrete. A sheet or liquid-applied Class II *vapor retarder* shall be installed between bales and supporting concrete or masonry. The bales shall be separated from the *vapor retarder* by not less than 3/4 inch (19 mm), and that space shall be filled with an insulating material such as wood or rigid insulation, or a material that allows vapor dispersion such as gravel, or other *approved* insulating or vapor dispersion material. Sill plates shall be installed at this interface in accordance with Section AR105.3. Where bales abut a concrete or masonry wall that retains earth, a Class II *vapor retarder* shall be provided between such wall and the bales.

AR105.6.6 Separation of bales and earth. Bales shall be separated from earth by not less than of 8" (203 mm).

AR105.6.7 Separation of exterior plaster and earth. Exterior plaster applied to straw bales shall be located not less than 6 inches (102 mm) above earth or 3 inches (51 mm) above paved areas.

AR105.6.8 Separation of wood and plaster. Where wood framing or wood sheathing occurs on the exterior face of strawbale walls, such wood surfaces shall be separated from exterior plaster with 2 layers of grade D paper, No. 15 asphalt felt, or other *approved* material in accordance with Section R703.6.3.

Exceptions:

1. Where the wood is preservative-treated or *naturally durable* and is no greater than 1-1/2 inches (38 mm) in width.

2. Clay plaster shall not be required to be separated from untreated wood that is no greater than 1-1/2 inches (38 mm) in width.

AR105.7 Inspections. The *building official* shall inspect the following aspects of strawbale construction in accordance with Section R109.1:

1. Sill plate anchors, as part of and in accordance with Section R109.1.1 Foundation inspection.

2. Mesh placement and attachment, where mesh is required by this appendix.

3.*Pins,* where required by and in accordance with Section AR105.4.

SECTION AR106
STRAWBALE WALLS - STRUCTURAL

AR106.1 General. Plastered strawbale walls shall be permitted to be used as *structural walls* in one-story buildings in accordance with the prescriptive provisions of this section.

AR106.2 Loads and other limitations. Live and dead loads and other limitations shall be in accordance with Section R301 of the *International Residential Code*. Strawbale wall dead loads shall not exceed 60 psf (2872 N/m^2) per face area of wall.

AR106.3 Foundations. Foundations for plastered strawbale walls shall be in accordance with Chapter 4.

AR106.4 Configuration of bales. Bales in strawbale *structural walls* shall be *laid flat* or *on-edge* and in a *running bond* or *stack bond*, except that bales in *structural walls* with unreinforced plasters shall be laid in a *running bond* only.

AR106.5 Voids and stuffing. Voids between bales in strawbale *structural walls* shall not exceed 4 inches (102 mm) in width, and such voids shall be stuffed with *flakes* of straw or *straw-clay*, before application of finish.

AR106.6 Plaster on structural walls. Plaster on *load-bearing* walls shall be in accordance with Table AR106.12. Plaster on *shear walls* shall be in accordance with Table AR106.13(1).

AR106.6.1 Compressive strength. For plasters on strawbale *structural walls*, the *building official* is authorized to require a 2 inch (51mm) cube test conforming with ASTM C 109 to demonstrate a minimum compressive strength in accordance with Table AR106.6.1.

TABLE AR106.6.1
MINIMUM COMPRESSIVE STRENGTH FOR PLASTERS ON STRUCTURAL WALLS

PLASTER TYPE	MINIMUM COMPRESSIVE STRENGTH (psi)
Clay	100
Soil-cement	1000
Lime	600
Cement-lime	1000
Cement	1400

For SI: 1 pound per square inch = 6894.76 N/m^2.

AR106.7 Straightness of plaster. Plaster on strawbale *structural walls* shall be straight, as a function of the bale wall surfaces they are applied to, in accordance with the following:

1. As measured across the face of a bale, straw bulges shall not protrude more than 3/4 inch (19 mm) across 2 feet (610 mm) of its height or length,
2. As measured across the face of a bale wall, straw bulges shall not protrude from the vertical plane of a bale wall more than 2 inches (51 mm) over 8 feet (2438 mm), and
3. The vertical faces of adjacent bales shall not be offset more than 3/8 inch (10 mm).

AR106.8 Plaster and membranes. Strawbale *structural walls* shall not have a membrane between straw and plaster, or shall have attachment through the bale wall from one plaster *skin* to the other in accordance with an *approved* engineered design.

AR106.9 Mesh. Mesh in plasters on strawbale *structural walls*, and where required by Table AR105.4, shall be installed in accordance with Sections AR106.9.1 through AR106.9.4.

AR106.9.1 Mesh laps. Mesh required by Tables AR106.12 or Table AR105.4 shall be installed with not less than 4-inch (102 mm) laps. Mesh required by Table AR106.13(1) or in walls designed to resist wind uplift of more than 100 plf (1459 N/m), shall run continuous vertically from sill plate to the top plate or roof-bearing element, or shall lap not less than 8 inches (203 mm). Horizontal laps in such mesh shall be not less than 4 inches (102 mm).

AR106.9.2 Mesh attachment. Mesh shall be attached with staples to top plates or roof-bearing elements and to sill plates in accordance with the following:

1. **Staples.** Staples shall be pneumatically driven, stainless steel or electro-galvanized, 16 gauge with 1 1/2-inch (38 mm) legs, 7/16-inch (11 mm) crown; or manually driven, galvanized, 15 gauge with 1-inch (25 mm) legs. Other staples shall be permitted to be used as designed by a *registered design professional*. Staples into preservative-treated wood shall be stainless steel.
2. **Staple orientation.** Staples shall be firmly driven diagonally across mesh intersections at the required spacing.
3. **Staple spacing.** Staples shall be spaced not more than 4-inches (102 mm) on center, except where a lesser spacing is required by Table AR106.13(1) or Section AR106.14 as applicable.

AR106.9.3 Steel mesh. Steel mesh shall be galvanized, and shall be separated from preservative-treated wood by grade D paper, 15# roofing felt, or other *approved* barrier.

AR106.9.4 Mesh in plaster. Required mesh shall be embedded in the plaster except where staples fasten the mesh to horizontal boundary elements.

AR106.10 Support of plaster skins. Plaster *skins* on strawbale *structural walls* shall be continuously supported along their bottom edge. Acceptable supports include: a concrete or masonry stem wall, a concrete slab-on-grade, a wood-framed floor blocked with an *approved* engineered design, or a steel angle anchored with an *approved* engineered design. A weep screed as described in R703.2.1 is not an acceptable support.

AR106.11 Transfer of loads to and from plaster skins. Where plastered strawbale walls are used to support superimposed vertical loads, such loads shall be transferred to the plaster *skins* by continuous direct bearing or by an *approved* engineered design. Where plastered strawbale walls are used to resist in-plane lateral loads, such loads shall be transferred to the reinforcing mesh from the structural member or assembly above and to the sill plate in accordance with Table AR106.13(3).

AR106.12 Load-bearing walls. Plastered strawbale walls shall be permitted to be used as *load-bearing walls* in one-story buildings to support vertical loads imposed according to Section R301, in accordance with and not more than the allowable bearing capacities indicated in Table AR106.12.
AR106.12.1 Pre-compression of load-bearing strawbale walls. Prior to application of plaster, walls designed to be *load-bearing* shall be pre-compressed by a uniform load of not less than 100 plf (1459 N/m).

AR106.12.2 Concentrated loads. Concentrated loads shall be distributed by structural elements capable of distributing the loads to the bearing wall within the allowable bearing capacity listed in Table AR106.12 for the plaster type used.

TABLE AR106.12
ALLOWABLE SUPERIMPOSED VERTICAL LOADS (LBS/FOOT)
FOR PLASTERED LOAD-BEARING STRAWBALE WALLS

WALL DESIGNATION	PLASTER[a] (both sides) Minimum thickness each side	MESH[b]	STAPLES[c]	ALLOWABLE BEARING CAPACITY[d] (plf)
A	Clay 1-1/2”	None required	None required	400
B	Soil-cement 1”	required	required	800
C	Lime 7/8”	required	required	500
D	Cement-lime 7/8”	required	required	800
E	Cement 7/8”	required	required	800

For SI: 1 inch=25.4mm, 1 pound per foot = 14.5939 N/m.

a. Plasters shall conform with Sections AR104.4.3through AR104.4.8, AR106.7, and AR106.10.
b. Any metal mesh allowed by this appendix and installed in accordance with Section AR106.9.
c. In accordance with Section AR106.9.2, except as required to transfer roof loads to the plaster skins in accordance with Section AR106.11.
d. For walls with a different plaster on each side, the lower value shall be used.

AR106.13 Braced panels. Plastered strawbale walls shall be permitted to be used as *braced wall panels* for one-story buildings in accordance with Section R602.10 of the I*nternational Residential Code,* and with Tables AR106.13 (1), AR106.13(2) and AR106.13(3). Wind design criteria shall be in accordance with Section R301.2.1. Seismic design criteria shall be in accordance with Section R301.2.2.

AR106.13.1 Bale wall thickness. The thickness of the stacked bale wall without its plaster shall not be less than 15 inches (381 mm).

AR106.13.2 Sill plates. Sill plates shall be in accordance with Table AR106.13(1).

AR106.13.3 Sill plate fasteners. Sill plates shall be fastened with not less than 5/8-inch (16 mm) diameter steel anchor bolts with 3-inch by 3-inch by 3/16-inch steel washers, with not less than 7-inch embedment in a concrete or masonry foundation, or shall be an *approved* equivalent, with the spacing shown in Table AR106.13(1). Anchor bolts or other fasteners into framed floors shall be of an *approved* engineered design.

TABLE AR106.13(1)
PLASTERED STRAWBALE BRACED WALL PANEL TYPES

WALL DESIGNATION	PLASTER[a] (both sides)		SILL PLATES[b] (nominal size in inches)	ANCHOR BOLT[c] SPACING (on center)	MESH[d]	STAPLE SPACING[e] (on center)
	TYPE	THICK-NESS (minimum, each side)				
A1	Clay	1.5”	2 x 4	32”	None	None
A2	Clay	1.5”	2 x 4	32”	2” x 2” high-density polypropylene	2”
A3	Clay	1.5”	2 x 4	32”	2” x 2” x 14ga[f]	4”
B	Soil-cement	1”	4 x 4	24”	2” x 2” x 14ga[i]	2”
C1	Lime	7/8”	2 x 4	32”	17 ga woven wire	3”
C2	Lime	7/8”	4 x 4	24”	2” x 2” x 14ga[f]	2”
D1	Cement-lime	7/8”	4 x 4	32”	17 ga woven wire	2”
D2	Cement-lime	7/8”	4 x 4	24”	2” x 2” x 14ga[i]	2”
E1	Cement	7/8”	4 x 4	32”	2” x 2” x 14ga[l]	2”
E2	Cement	1.5”	4 x 4	24”	2 “ x 2” x 14ga[l]	2”

SI: 1 inch=25.4 mm
a. Plasters shall conform with Sections AR104.4.3 through AR104.4.8, AR106.7, AR106.8, and AR106.12.
b. Sill plates shall be Douglas fir-larch or southern pine and shall be *preservative-treated* where required by the *International Residential Code.*
c. Anchor bolts shall be in accordance with Section AR106.13.3 at the spacing shown in this table.
d. Installed in accordance with Section AR106.9.
e. Staples shall be in accordance with Section AR106.9.2 at the spacing shown in this table.

TABLE AR106.13(2)
BRACING REQUIREMENTS FOR STRAWBALE BRACED WALL PANELS BASED ON WIND SPEED

• **EXPOSURE CATEGORY B**[d] • **25 FOOT MEAN ROOF HEIGHT** • **10 FOOT EAVE-TO-RIDGE HEIGHT**[d] • **10 FOOT WALL HEIGHT**[d] • **2 BRACED WALL LINES**[d]			**MINIMUM TOTAL LENGTH (FEET) OF STRAWBALE BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE**[a, b, c, d]		
Basic Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing (feet)**	**Strawbale Braced Wall Panel**[e] **A2, A3**	**Strawbale Braced Wall Panel**[e] **C1, C2, D1**	**Strawbale Braced Wall Panel**[e] **D2, E1, E2**
≤ 85	One-story building	10	6.4	3.8	3.0
		20	8.5	5.1	4.0
		30	10.2	6.1	4.8
		40	13.3	6.9	5.5
		50	16.3	7.7	6.1
		60	19.4	8.3	6.6
≤ 90	One-story building	10	6.4	3.8	3.0
		20	9.0	5.4	4.3
		30	11.2	6.4	5.1
		40	15.3	7.4	5.9
		50	18.4	8.1	6.5
		60	21.4	8.8	7.0
≤ 100	One-story building	10	7.1	4.3	3.4
		20	10.2	6.1	4.8
		30	14.3	7.2	5.7
		40	18.4	8.1	6.5
		50	22.4	9.0	7.1
		60	26.5	9.8	7.8
≤ 110	One-story building	10	7.8	4.7	3.7
		20	12.2	6.6	5.3
		30	17.3	7.9	6.3
		40	22.4	9.0	7.1
		50	26.5	9.8	7.8
		60	31.6	11.4	8.5

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 mile per hour = 0.447 m/s.
a. Linear interpolation shall be permitted.
b. All braced wall panels shall be without openings and shall have an *aspect ratio* (H:L) ≤ 2:1.
c. Tabulated minimum total lengths are for braced wall lines using single braced wall panels with an *aspect ratio* (H:L) ≤ 2:1, or using multiple braced wall panels with *aspect ratios* (H:L) ≤ 1:1. For braced wall lines using two or more braced wall panels with an *aspect ratio* (H:L) > 1:1, the minimum total length shall be multiplied by the largest *aspect ratio* (H:L) of braced wall panels in that line.
d. Subject to applicable wind adjustment factors associated with “All methods” in Table R602.10.3(2)
e. Strawbale braced panel types indicated shall comply with AR106.13.1 through AR106.13.3 and with Table AR106.13(1)

TABLE AR106.17.4(2)
BRACING REQUIREMENTS FOR STRAWBALE BRACED WALL PANELS
BASED ON SEISMIC DESIGN CATEGORY

• SOIL CLASS D[d] • WALL HEIGHT = 10 FEET[d] • 15 PSF ROOF/CEILING DEAD LOAD[d] • BRACED WALL LINE SPACING ≤ 25 FEET[d]			MINIMUM TOTAL LENGTH (FEET) OF STRAWBALE BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a, b, c, d]	
Seismic Design Category	**Story Location**	**Braced Wall Line Length (feet)**	**Strawbale Braced Wall Panel[e] A2, C1, C2, D1**	**Strawbale Braced Wall Panel[e] B, D2, E1, E2**
C	One-story building	10 20 30 40 50	5.7 8.0 9.8 12.9 16.1	4.6 6.5 7.9 9.1 10.4
D_0	One-story building	10 20 30 40 50	6.0 8.5 10.9 14.5 18.1	4.8 6.8 8.4 9.7 11.7
D_1	One-story building	10 20 30 40 50	6.3 9.0 12.1 16.1 20.1	5.1 7.2 8.8 10.4 13.0
D_2	One-story building	10 20 30 40 50	7.1 10.1 15.1 20.1 25.1	5.7 8.1 9.9 13.0 16.3

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.
a. Linear interpolation shall be permitted.
b. All braced wall panels shall be without openings and shall have an *aspect ratio* (H:L) ≤ 2:1.
c. Tabulated minimum total lengths are for braced wall lines using single braced wall panels with an *aspect ratio* (H:L) ≤ 2:1, or using multiple braced wall panels with *aspect ratios* (H:L) ≤ 1:1. For braced wall lines using two or more braced wall panels with an *aspect ratio* (H:L) > 1:1, the minimum total length shall be multiplied by the largest *aspect ratio* (H:L) of braced wall panels in that line.
d. Subject to applicable seismic adjustment factors associated with “All methods” in Table R602.10.3(4), except “Wall dead load”.
e. Strawbale braced wall panel types indicated shall comply with Sections AR106.13.1 through AR106.13.3 and with Table AR106.13(1)

AR106.14 Resistance to wind uplift forces. Plaster mesh in *skins* of strawbale walls that resist uplift forces from the roof assembly, as determined in accordance with Section R802.11, shall be in accordance with the following:

1. Plaster shall be any type and thickness allowed in Section AR 104.
2. Mesh shall be any type allowed in Table AR106.13(1), and shall be attached to top plates or roof-bearing elements and to sill plates in accordance with Section AR106.9.2.
3. Sill plates shall be a minimum nominal 2-inch by 4-inch (51 mm by 102 mm) with anchoring complying with Section R403.1.6.
4. Mesh attached with staples at 4 inches (51 mm) on center, shall be considered capable of resisting uplift forces of 100 plf (1459 N/m) for each plaster *skin*.
5. Mesh attached with staples at 2 inches (51 mm) on center, shall be considered capable of resisting uplift forces of 200 plf (2918 N/m) for each plaster *skin*.

SECTION AR107
FIRE RESISTANCE

AR107.1 Fire-resistance rating. Strawbale walls shall be considered to be non-rated, except for walls constructed in accordance with Section AR107.1.1 or AR107.1.2. Alternately, fire-resistance ratings of strawbale walls shall be determined in accordance with Section R302 of the *International Residential Code*.

AR107.1.1 1-hour rated clay plastered wall. 1-hour fire-resistance-rated non-load-bearing clay plastered strawbale walls shall comply with the following:

1. Bales shall be *laid flat* or *on-edge* in a *running bond*;
2. Bales shall maintain thickness of not less than 18 inches (457 mm);
3. Gaps shall be stuffed with *straw-clay*;
4. Clay plaster on each side of the wall shall be not less than 1 inch (25 mm) thick and shall be comprised of a mixture of 3 parts clay, 2 parts chopped straw, and 6 parts sand, or an alternative *approved* clay plaster; and
5. Plaster application shall be in accordance with AR104.4.3.3 for the number and thickness of coats.

AR107.1.2 2-hour rated cement plastered wall. 2-hour fire-resistance-rated non-load-bearing cement plastered strawbale walls shall comply with the following:

1. Bales shall be *laid flat* or *on-edge* in a *running bond*;
2. Bales shall maintain a thickness of not less than 14 inches (356 mm);
3. Gaps shall be stuffed with *straw-clay*;
4. 1 1/2 inch (38 mm) by 17 gauge galvanized woven wire mesh shall be attached to wood members with 1 1/2 inch (38 mm) staples at 6 inches (406 mm) on center. 9 gauge U-pins with minimum 8 inch (203 mm) legs shall be installed at 18 inches (457 mm) on center to fasten the mesh to the bales;
5. Cement plaster on each side of the wall shall be not less than 1 inch (25 mm) thick; and
6. Plaster application shall be in accordance with Section AR104.4.8 for the number and thickness of coats.

AR107.2 Openings in rated walls. Openings and penetrations in bale walls required to have a fire-resistance rating shall satisfy the same requirements for openings and penetrations as prescribed in the *International Residential Code*.

AR107.3 Clearance to fireplaces and chimneys. Strawbale surfaces adjacent to fireplaces or chimneys shall be finished with a minimum 3/8 inch (10 mm) thick plaster of any type permitted by this appendix. Clearance from the face of such plaster to fireplaces and chimneys shall be maintained as required from fireplaces and chimneys to combustibles in Chapter 10, or as required by manufacturer's installation instructions, whichever is more restrictive.

SECTION AR108
THERMAL INSULATION

AR108.1 R-value. The unit R-value of a strawbale wall with bales laid flat is R-1.3 per inch of bale thickness. The unit R-value of a strawbale wall with bales on-edge is R-2 per inch of bale thickness.

SECTION AR109
REFERENCED STANDARDS

ASTM

C 5 – 10	Standard Specification for Quicklime for Structural Purposes……….AR104.4.6.1
C 109/C 109M - 12	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars…. AR106.6.1
C 141 / C 141M – 09	Standard Specification for Hydrated Hydraulic Lime for Structural Purposes……………………………………………………………………AR104.4.6.1
C 206 – 03	Standard Specification for Finishing Hydrated Lime…………………..AR104.4.6.1

C 926 – 12a	Standard Specification for Application of Portland Cement Based Plaster……… AR104.4.7, AR104.4.8
C 1707 – 11	Standard Specification for Pozzolanic Hydraulic Lime for Structural Purposes…. AR104.4.6.1

EN	European Committee for Standardization Central Secretariat Rue de Stassart 36 B-10 50 Brussels

459 – 2010	Part 1: Building Lime. Definitions, Specifications and Conformity Criteria; Part 2: Test Methods….. AR104.4.6.1

Reason: Strawbale construction has proven to be a safe, durable, resource efficient, and fully viable method of construction. However, the International Residential Code (IRC) does not contain a section on strawbale construction, which has been an impediment to this construction system's proper and broader use.

First practiced in Nebraska in the late 1800's, with buildings over 100 years old still in service, strawbale construction was rediscovered in the 1980's in the American southwest. Since then it has been further developed and explored, including considerable testing and research regarding structural performance (under vertical and lateral loads), moisture, fire, and its thermal and acoustic properties.

Currently only New Mexico and Oregon have adopted statewide strawbale building codes. California has legislated strawbale construction guidelines for voluntary adoption by local jurisdictions. In addition, nine U.S. cities or counties have adopted strawbale building codes. Three countries outside of the United States – Germany, France, and Belarus - have limited strawbale building codes.

Most of the strawbale building codes that do exist are derived from the first such code, created for and adopted by Tucson / Pima County, Arizona in 1996. Much experience, testing and research since then have proven these codes to be deficient. They are often either too restrictive, or not restrictive enough, and in some cases don't address important issues at all.

Although strawbale codes are both few and flawed, strawbale buildings are now found in 49 of the 50 United States, and strawbale construction is practiced in over 45 countries throughout the world and in every climate. There are an estimated 600 strawbale buildings in California alone. The strawbale buildings in the U.S. include residences, public and private schools, libraries, office and retail buildings, wineries, multi-story buildings, buildings over 10,000 sq.ft in floor area, load-bearing strawbale structures, and structures in areas of high seismic risk (plastered strawbale walls are particularly resistant to earthquakes because they are energy-absorbing and tough). The practice of, and the desire to utilize strawbale construction, continues to increase and promises to accelerate as increased pressure is exacted on our environment and natural resources.

There is great need for a comprehensive strawbale code, with full benefit of the experience and knowledge that has been gained to date about this method of construction. The proposed Strawbale Construction appendix for the IRC was created to fulfill this need. It is based on the collective experience of the design, construction, and testing of strawbale buildings over 25 years by architects, engineers, builders, and academics throughout the U.S., Canada, and other countries throughout the world. The testing, research, and comprehensive understanding of the performance of strawbale buildings are summarized in the book *Design of Straw Bale Buildings* (B.King, et al, 2006, Green Building Press). Testing, research reports, and other supporting documentation are available for viewing and download at: http://www.ecobuildnetwork.org/strawbale-construction-code-supporting-documentation

As lead author of the proposed appendix, and as a licensed architect for 26 years, I have been involved in the design, construction, testing, and research of strawbale buildings since 1995. In 2001 I spearheaded legislation and revisions to the current California Guidelines for Straw-Bale Structures. The proposed Strawbale Construction appendix for the IRC has benefited from numerous peer reviews by experienced, licensed design and building professionals over the course of more than five years. It has also received input from other stakeholders including the Structural Engineers Association of California (SEAOC) and the National Association of Home Builders (NAHB). The proposed appendix would serve designers, builders, owners, inhabitants, and building officials alike in the construction and utilization of strawbale buildings.

Supporting Documentation: Selected documents that are available via the above link

<u>Answers to Common Questions Regarding the IRC Strawbale Construction Proposal</u>
Load-Bearing Straw Bale Construction – A summary of worldwide testing and experience, B.King, PE
Testing of Straw Bale Walls with Out-of-Plane Loads – K.Donahue, SE
In-Plane Cyclic Tests of Plastered Straw Bale Wall Assemblies – C.Ash, M.Aschheim, PE, D.Mar, SE
Structural Testing of Plastered Straw Bale Wall Assemblies – K.Lerner, Architect, K.Donahue, SE
Basis for Prescriptive Use of Plastered Strawbale Walls as Braced Panels in the IRC – M. Aschheim, PE
Shake Table Test Video of Full Scale Straw Bale Building Specimen – D.Donovan, PE
Moisture Properties of Plaster and Stucco for Strawbale Buildings – J.Straube, PE
Monitoring of Hygrothermal Performance of Strawbale Walls – J.Sraube, PE, C.Schumacher
ASTM E119 1-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Clay Plaster
ASTM E119 2-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Cement Plaster
ASTM E119 Fire Tests – Video
ASTM E84 Surface Burning Characteristics Test
Thermal Performance of Straw Bale Wall Systems (including Oak Ridge Lab test results) – N.Stone
Support Letters from Licensed Practitioners: Letters from 2 Structural Engineers, 4 Civil Engineers, 1 Professor of Civil Engineering, 7 Architects

Cost Impact: This code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [ASTM C141/C141M – 09, ASTM C1707-11, and EN 459-2010] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RB473-13 **AS**

Code Change No: RB475-13

Original Proposal

Section(s): R703.10.2, Chapter 44

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement* and Self

Revise as follows:

R703.10.2 Lap siding. Fiber-cement lap siding having a maximum width of 12 inches shall comply with the requirements of ASTM C 1186, Type A, minimum Grade II <u>or ISO 8336, Category A, minimum Class 2</u>. Lap siding shall be lapped a minimum of 1¼ inches (32 mm) and lap siding not having tongue-and-groove end joints shall have the ends sealed with caulking, installed with an H-section joint cover, located over a strip of flashing or shall be designed to comply with Section R703.1. Lap siding courses may be installed with the fastener heads exposed or concealed, according to Table R703.4 or *approved* manufacturer's installation instructions.

Add new standard to Chapter 44 as follows:

ISO

<u>8336 – Fibre-Cement Flat Sheets – Product Specification and Test Methods</u>

Reason: Performance requirements of ISO 8336, *Fibre-cement flat sheets – Product specification and test methods*, have been harmonized with the performance requirements of ASTM C1186, *Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets*. Fiber-cement siding producers in Mexico, Central and South America, Europe, Asia, Australia and New Zealand currently manufacture and test their fiber-cement siding products for compliance with ISO 8336. The inclusion of this Standard reference in the IBC will permit manufacturers worldwide to demonstrate product compliance to IBC requirements. The addition of a reference to ISO 8336 in the Code removes a barrier to trade. Additional editorial changes are proposed to clarify the nature of the required vertical and/or horizontal joint protection to include reference to *approved* caulking and the recognition of both vertical or horizontal shiplap joints as a means of protecting the joints as is also common with wood panel siding.

IBC Section 1405.16.2 has, as a result of the IBC Group A Code Hearings, been revised to adopt this additional Standard reference (see attached Committee Action). This proposed revision brings the two building codes (IBC & IRC) and the applicable code sections and standards references into general alignment.

Cost Impact: The code change proposal will not increase the cost of construction because the product is already recognized for use in the Code. Reference to compliance with this alternative standard, an International Standard requiring the same performance as the ASTM Standard, will reduce barriers to trade by allowing foreign products complying with ISO 8336, Category A, minimum Class 2, market access to the United States without the need for additional product compliance documentation.

Staff analysis: A review of the standard proposed for inclusion in the code, ISO 8336, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

The code change is contained in the <u>Updates to the 2013 Proposed Changes</u> posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: Approved as Modified

Modify the proposal as follows:

R703.10.2 Lap siding. Fiber-cement lap siding having a maximum width of 12 inches <u>(305 mm)</u> shall comply with the requirements of ASTM C 1186, Type A, minimum Grade II or ISO 8336, Category A, minimum Class 2. Lap siding shall be lapped a minimum of 1¼ inches (32 mm) and lap siding not having tongue-and-groove end joints shall have the ends ~~sealed~~ <u>protected</u> with caulking, <u>or</u>

~~installed~~ covered with an H-section joint cover, or located over a strip of flashing, or otherwise shall be designed to comply with Section R703.1. Lap siding courses ~~may~~ shall be installed with the fastener heads exposed or concealed, according to Table R703.4 or *approved* manufacturer's installation instructions.

Committee Reason: Brings a new standard for fiber-cement lap siding into the code. The modification brings the text into alignment with the action of FS171-12 from Group A.

Assembly Action: None

Final Hearing Results

RB475-13	**AM**

Code Change No: RB476-13

Original Proposal

Section(s): R302.2.2

Proponent: Marcelo M. Hirschler, GBH International (gbhint@aol.com)

Revise as follows:

R302.2.2 Parapets. Parapets constructed in accordance with Section R302.2.3 shall be constructed for *townhouses* as an extension of exterior walls or common walls in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

   Exception: A parapet is not required in the two cases above when the roof is covered with a roof covering that complies with a minimum Class C rating as tested in accordance with ASTM E 108 or UL 790 ~~minimum class C roof covering~~, and the roof decking or sheathing is of noncombustible materials or *approved* fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of 5/8-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by a minimum of nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a minimum distance of 4 feet (1219 mm) on each side of the wall or walls and there are no openings or penetrations in the roof within 4 feet (1219 mm) of the common walls.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher roof deck shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

Reason: This is basically simple clarification, to clarify the test method for the Class C rating. It adds the same ASTM and UL standards contained in the IBC (and in a later section of the IRC) for the application.

Cost Impact: None

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because it adds clarity by including direct references to standards that ensure proper application of the code.

Assembly Action: **None**

Final Hearing Results

RB476-13	**AS**

Code Change No: RB477-13

Original Proposal

Section(s): R302.10.1, R302.10.2, R302.10.3

Proponent: Marcelo M. Hirschler, GBH International (gbhint@aol.com)

Revise as follows:

R302.10 Flame spread index and smoke-developed index for insulation. Flame spread and smoke-developed index for insulation shall be in accordance with Sections R302.10.1 through R302.10.5.

R302.10.1 Insulation. Insulation materials, including facings, such as vapor retarders and vapor-permeable membranes installed within floor/ceiling assemblies, roof/ceiling assemblies, wall assemblies, crawl spaces and *attics* shall have a flame spread index not to exceed 25 with an accompanying smoke-developed index not to exceed 450 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. When such materials are installed in concealed spaces, the flame spread index and smoke-developed index limitations do not apply to the facings, provided that the facing is installed in substantial contact with the unexposed surface of the ceiling, floor or wall finish.
2. ~~Cellulose~~ Cellulosic fiber loose-fill insulation, which is not spray applied, complying with the requirements of Section R302.10.3, ~~shall only be required to meet the smoke-developed index of not more than 450.~~ shall not be required to meet a flame spread index requirement but shall be required to meet a smoke-developed index of not more than 450 when tested in accordance with CAN/ULC S102.2.
3. Foam plastic insulation shall comply with Section R316.

R302.10.2 Loose-fill insulation. Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Section R302.10.1 when tested in accordance with CAN/ULC S102.2.

Exception: ~~Cellulose~~ Cellulosic fiber loose-fill insulation shall not be required to be tested in accordance with CAN/ULC S102.2, provided such insulation complies with the requirements of Section R302.10.1 and Section R302.10.3.

R302.10.3 Cellulose loose-fill insulation. ~~Cellulose~~ Cellulosic fiber loose-fill insulation shall comply with CPSC 16 CFR, Parts 1209 and 1404. Each package of such insulating material shall be clearly *labeled* in accordance with CPSC 16 CFR, Parts 1209 and 1404.

R302.10.4 Exposed attic insulation. All exposed insulation materials installed on *attic* floors shall have a critical radiant flux not less than 0.12 watt per square centimeter.

R302.10.5 Testing. Tests for critical radiant flux shall be made in accordance with ASTM E 970.

Reason: Recent discussions have shown that cellulose loose fill insulation is actually tested in the ASTM E84 test by using an artificial steel screen with tiny grid openings such that the flame spread index determined is meaningless because of the massive effect of the metal included with the loose fill insulation. Unless that screen is used the cellulose loose fill insulation falls through the grid onto the tunnel floor. The IBC (and the IRC) have long ceased to require that cellulose loose fill insulation meets a flame spread index criterion (if it complies with the CPSC requirements in 16 CFR 1209 and 16 CFR 1404, i.e. smoldering tests) but only that the insulation meets a smoke developed index. There is consensus in the fire test community that if the flame spread index cannot be determined adequately with the ASTM E84 test using that steel screen, neither can the smoke developed index be determined. Therefore, the recommendation is that the tests be conducted in accordance with CAN/ULC S102.2 and not ASTM E84, where no metal screen is needed since the loose fill insulation material is tested on the floor and not on the ceiling. The proposal clarifies this by referencing only CAN/ULC S102.2 for cellulose loose fill insulation.

Usually cellulose loose fill insulation will meet the appropriate smoke developed index values but the appropriate fire test needs to be used.

The change from "cellulose loose-fill" to "cellulosic fiber loose-fill" substitutes the industry used terms. The new wording is consistent with the changes made in the IBC (see FS120 and FS121).

Language in 2015 IBC:

720.2 Concealed installation. *Insulating materials, where concealed as installed in buildings of any type of construction, shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450.*
Exception: *Cellulosic fiber loose-fill insulation complying with the requirements of Section 720.6, shall not be required to meet a flame spread index requirement but shall be required to meet a smoke-developed index of not more than 450 when tested in accordance with CAN/ULC S102.2.*

720.3 Exposed installation. *Insulating materials, where exposed as installed in buildings of any type of construction, shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450.*
Exception: *Cellulosic fiber loose-fill insulation shall not be required to meet a flame spread index requirement but shall be required to meet a smoke-developed index of not more than 450 when tested in accordance with CAN/ULC S102.2.*

720.4 Loose-fill insulation. *Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Sections 720.2 and 720.3 when tested in accordance with CAN/ULC S102.2.*

Exception: *Cellulose loose-fill insulation shall not be required to meet a flame spread index requirement when tested in accordance with CAN/ULC S102.2, provided such insulation complies with the requirements of Section 720.2 or 720.3, as applicable, and Section 720.6.*

Language in ASTM E84:

X1.6.1 Loose-fill insulation shall be placed on galvanized steel screening (Note 11) with approximate 3/64-in. (1.2-mm) openings supported on a test frame 20 in. (508 mm) wide by 2 in. (51 mm) deep, made from 2 by 3 by 3/16-in. (51 by 76 by 5-mm) steel angles (see Fig. X1.2). Three frames are required to cover the full tunnel length. The insulation shall be packed to the density specified by the manufacturer.

Note 11: The use of galvanized steel screening normally lowers the flame spread index values obtained for some materials that are tested in this manner and, therefore, the results do not necessarily relate directly to values obtained for other materials mounted without galvanized steel screening.

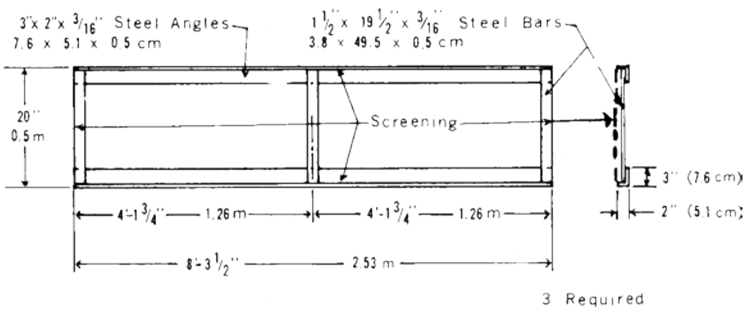


FIG. X1.2 Steel Frame for Loose Fill Materials

Cost Impact: None

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: Approved as Submitted

Committee Reason: The committee approved this code change proposal because they felt that the proposed introduction of two referenced standards in this section clarifies the code.

Assembly Action: None

Final Hearing Results

RB477-13	**AS**

Code Change No: RB478-13

Original Proposal

Section(s): R703.7.2.1, R703.7.2.2

Proponent: J. Daniel Dolan, P.E., Ph.D., Washington State University**,** representing self (jddolan@wsu.edu)

Revise as follows:

R703.7.2.1 Support by steel angle. A minimum 6 inches by 4 inches by 5/16 inch (152 mm by 102 mm by 8 mm) steel angle, with the long leg placed vertically shall be anchored to double 2 inches by 4 inches (51 mm by 102 mm) wood studs <u>or double 350S162 cold-formed steel studs</u> at a maximum on-center spacing of 16 inches (406 mm). Anchorage of the steel angle at every double stud spacing shall be a minimum of two 7/16 inch (11 mm) diameter by 4 inch (102 mm) lag screws <u>for wood construction or two 7/16-inch bolts with washers for cold-formed steel construction</u>. The steel angle shall have a minimum clearance to underlying construction of 1/16 inch (2 mm). A minimum of two-thirds the width of the masonry veneer thickness shall bear on the steel angle. Flashing and weep holes shall be located in the masonry veneer with in accordance with Figure R703.7.2.1. The maximum height of masonry veneer above the steel angle support shall be 12 feet, 8 inches (3861 mm). The air space separating the masonry veneer from the wood backing shall be in accordance with Sections R703.7.4 and R703.7.4.2. The method of support for the masonry veneer ~~on wood construction~~ shall be constructed in accordance with Figure R703.7.2.1

The maximum slope of the roof construction without stops shall be 7:12. Roof construction with slopes greater than 7:12 but not more than 12:12 shall have stops of a minimum 3 inch by 3 inch by 1/4 inch (76 mm by 76 mm by 6 mm) steel plate welded to the angle at 24 inches (610 mm) on center along the angle or as approved by the building official.

R703.7.2.2 Support by roof construction. A steel angle shall be placed directly on top of the roof construction. The roof supporting construction for the steel angle shall consist of a minimum of three 2 inch by 6 inch (51 mm by 152 mm wood members<u> for wood construction or three 550S162 cold-formed steel members for cold-formed steel light frame construction</u>. ~~The~~ <u>A</u> wood member abutting the vertical wall stud construction shall be anchored with a minimum of three 5/8-inch (16 mm) diameter by 5-inch (127 mm) lag screws to every wood stud spacing. Each additional<u> wood</u> roof member~~s~~ shall be anchored by the use of two 10d nails at every wood stud spacing. <u>A cold-formed steel member abutting the vertical wall stud shall be anchored with a minimum of nine #8 screws to every cold-formed steel stud. Each additional cold-formed steel roof member shall be anchored to the adjoining roof member using two #8 screws at every stud spacing.</u> A minimum of two-thirds the width of the masonry veneer thickness shall bear on the steel angle. Flashing and weep holes shall be located in the masonry veneer wythe in accordance with Figure R703.7.2.2. The maximum height of the masonry veneer above the steel angle support shall be 12 feet, 8 inches (38.61 mm). The air space separating the masonry veneer from the wood backing shall be in accordance with Sections R702.7.4 and R703.7.4.2. The support for the masonry veneer ~~on wood construction shall~~ be constructed in accordance with Figure R703.7.2.2.

The maximum slope of the roof construction without stops shall be 7:12. Roof construction with slopes greater than 7:12 but not more than 12:12 shall have stops of a minimum 3 inch by 3 inch by 1/4 inch (76 mm by 76 mm by 6 mm) steel plate welded to the angle at 24 inches (610 mm) on center along the angle or as approved by the building official.

Reason: The original provisions for anchoring masonry chimneys to residential buildings were developed with the concept of anchoring to wood framing. Cold-formed steel framing can function equivalently in this respect to wood framing, except that the connections between the members have to be adjusted for the different types of fasteners used. The framing member sizes are equivalent in this application, and the fastener determination required is was as follows:

Wood construction:

Two 7/16-inch x 4 inch lag screws:
Lateral design load = 1352 lbs.
Withdrawal design load = 1610 lbs.

Three 5/8-inch x 5-inch lag screws:
Lateral design load = 1479 lbs.
Withdrawal design load = 2680 lbs.

Two 10d box nails:
Lateral design load = 158 lbs.
Withdrawal design load = 60 lbs.

Cold-formed steel construction:
Two 7/16 –inch bolt (A307):
Lateral design load = 4512 lbs.
Tensile design load = 9020 lbs.

Nine #8 screws
Lateral design load = 1485 lbs.
Withdrawal design load = 630 lbs.

Two #8 screws:
Lateral design load = 330 lbs.
Withdrawal design load = 140 lbs.

The connections specified in this proposal for cold-formed steel construction are either equal or greater strength than the ones used for wood construction.

Cost Impact: The cost of construction for this change should not change, the cost for the bolts and screws used in the connections are about the same as the cost of fasteners used in wood construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: This change adds cold-formed steel framing as an option for support of masonry veneer.

Assembly Action: **None**

Final Hearing Results

RB478-13 **AS**

Code Change No: RB479-13

Original Proposal

Section(s): R1001.4.1.1 (New), R1003.4.1.1 (New)

Proponent: J. Daniel Dolan, P.E., Ph.D., Washington State University, representing self (jddolan@wsu.edu)

Add new text as follows:

R1001.4.1.1 Cold-formed steel framing. When cold-formed steel framing is used, the location where the ½-inch bolts are used to attach the straps to the framing shall be reinforced with a minimum of a 3"x3"x0.229" steel plate that is screwed to the framing with a minimum of 10-#8 screws for each bolt.

R1003.4.1.1 Cold-formed steel framing. When cold-formed steel framing is used, the location where the ½-inch bolts are used to attach the straps to the framing shall be reinforced with a minimum of a 3"x3"x0.229" steel plate that is screwed to the framing with a minimum of 10-#8 screws for each bolt.

Reason: The original provisions for anchoring masonry chimneys to residential buildings were developed with the concept of anchoring to wood framing. Cold-formed steel framing can function equivalently in this respect to wood framing, except that the bearing area of between the bolt and the cold-formed steel framing is small and therefore needs to be reinforced to prevent the local failure of the steel. The 0.229-inch (essentially ¼-inch) steel plate will provide this reinforcement and spread the load from the bolt to a wider area in the framing to prevent the localized failure of the framing. The minimum of 7-#6 screws (a total shear capacity transfer of 1050 pounds in 33 mil cold-formed steel) provide the transfer mechanism to spread the force in the bolt (a maximum of 933 pounds for a 1/2 –inch A307 bolt in 2-inch nominal Douglas-fir lumber with ¼-inch thick steel side member). The capacity of a ½-inch bolt in a steel strap that is fastened to the wood framing would be less than the 933 calculated.

Cost Impact:

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R1001.4.1.1 Cold-formed steel framing. When cold-formed steel framing is used, the location where the ½-inch bolts are used to attach the straps to the framing shall be reinforced with a minimum of a 3"x3"x0.229" steel plate on top of strap that is screwed to the framing with a minimum of ~~10-#8~~ 7-#6 screws for each bolt.

R1003.4.1.1 Cold-formed steel framing. When cold-formed steel framing is used, the location where the ½-inch bolts are used to attach the straps to the framing shall be reinforced with a minimum of a 3"x3"x0.229" steel plate on top of strap that is screwed to the framing with a minimum of ~~10-#8~~ 7-#6 screws for each bolt.

Committee Reason: This change provides for cold-formed steel framing to support masonry chimneys. The modification corrects an error in the required connection.

Assembly Action: **None**

Final Hearing Results

RB479-13 **AM**

Code Change No: RM2-13

Original Proposal

Section(s): M1305.1

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1305.1 Appliance access for inspection service, repair and replacement. *Appliances* shall be accessible for inspection, service, repair and replacement without removing permanent construction, other *appliances*, or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space at least 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance*. ~~Installation of room heaters shall be permitted with at least an 18-inch (457 mm) working space. A platform shall not be required for room heaters.~~

<u>**Exception:** The installation of room heaters shall comply with manufacturer's instructions.</u>

Reason: This revision is a simple text cleanup to eliminate permissive language and unclear text. The current next to last sentence says that room heaters are allowed to have a working space of 18 inches, but does not actually require that. What is an 18 inch work space? 18" x 18", 18" x 30" ?? The last sentence says that a platform is not required, yet nowhere in this section is a platform ever required. The working space is assumed to be the floor area. In the case of room heaters, it is simple to defer to the manufacturer's instructions for the required service access. This is generally not an issue anyway because room heaters are necessarily out in the open.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Public Comments

Public Comment:

Richard Grace, Fairfax County Government, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1305.1 Appliance access for inspection service, repair and replacement. *Appliances* shall be accessible for inspection, service, repair and replacement without removing permanent construction, other *appliances*, or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space at least 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance*.

~~**Exception:** The installation of room heaters shall comply with manufacturer's instructions.~~

Commenter's Reason: The exception is redundant. M1410.1 already covers this. If we are to make an exception here directing the access for room heaters to meet the manufacturer's instructions, then we will need to do the same for radiant heating systems (M1406.1), duct heaters (M1407.1), vented floor furnaces (M1408.1) and so on and on.

Final Hearing Results

RM2-13 **AMPC**

Code Change No: RM3-13

Original Proposal

Section(s): M1305.1.3.1

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1305.1.3.1 Electrical requirements. A luminaire controlled by a switch located at the required passageway opening and a receptacle outlet shall be installed at or near the *appliance* location in accordance with Chapter 39. <u>Exposed lamps shall be protected from damage by location or lamp guards.</u>

Reason: The typical lamp holder (fixture) used for attics and crawl spaces is a porcelain lamp holder with a naked incandescent lamp in it. It is often placed such that service personnel can impact it with their body, tools or materials. The result is broken glass, falling hot metal lamp filaments, possible lacerations, a shock hazard and sudden darkness to top it all off. The use of simple lamp cages/guards or locating the lamp holders out of harm's way will protect service personnel, which is the intent of this entire code section.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. No additional cost is involved to simply locate the lamp where impact is unlikely.

Assembly Action: **None**

Final Hearing Results

RM3-13 **AS**

Code Change No: RM4-13

Original Proposal

Section(s): M1305.1.4.3

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1305.1.4.3 Electrical requirements. A luminaire controlled by a switch located at the required passageway opening and a receptacle outlet shall be installed at or near the *appliance* location in accordance with Chapter 39. <u>Exposed lamps shall be protected from damage by location or lamp guards.</u>

Reason: The typical lamp holder (fixture) used for attics and crawl spaces is a porcelain lamp holder with a naked incandescent lamp in it. It is often placed such that service personnel can impact it with their body, tools or materials. The result is broken glass, falling hot metal lamp filaments, possible lacerations, a shock hazard and sudden darkness to top it all off. The use of simple lamp cages/guards or locating the lamp holders out of harm's way will protect service personnel, which is the intent of this entire code section.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Same reason as RM3-13

Assembly Action: **None**

Final Hearing Results

RM4-13 **AS**

Code Change No: RM5-13

Original Proposal

Section(s): M1306.2, M1306.2.1, M1306.2.2

Proponent: Bob Eugene, representing UL LLC (Robert.Eugene@ul.com)

Revise as follows:

M1306.2 Clearance reduction. The reduction of required clearances to combustible assemblies or combustible materials shall be based on Section M1306.2.1 or Section M1306.2.2.

M1306.2.1 Labeled assemblies. The allowable clearance shall be based on an approved reduced clearance protective assembly that is listed and labeled in accordance with UL 1618.

M1306.2.2 Reduction table. ~~**M1306.2 Clearance Reduction.**~~ Reduction of clearances shall be in accordance with the *appliance* manufacturer's instructions and Table M1306.2. Forms of protection with ventilated air space shall conform to the following requirements:

1. Not less than 1-inch (25 mm) air space shall be provided between the protection and combustible wall surface.
2. Air circulation shall be provided by having edges of the wall protection open at least 1 inch (25 mm).
3. If the wall protection is mounted on a single flat wall away from corners, air circulation shall be provided by having the bottom and top edges, or the side and top edges open at least 1 inch (25 mm).
4. Wall protection covering two walls in a corner shall be open at the bottom and top edges at least 1 inch (25 mm).

Reason: This provides an additional means of reduced clearances consistent with IMC 308.5.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM5-13	**AS**

Code Change No: RM6-13

Original Proposal

Section(s): M1307.2, P2801.7

Proponent: Stephen Kerr, S.E., representing Josephson Werdowatz and Associates, Inc.

Revise as follows:

M1307.2 Anchorage of appliances. *Appliances* designed to be fixed in position shall be fastened or anchored in an *approved* manner. In Seismic Design Categories D_0, D_1 and D_2, and in townhouses in Seismic Design Category C, water heaters shall be anchored or strapped to resist horizontal displacement caused by earthquake motion in accordance with one of the following:

1. Anchorage and strapping shall be designed to resist a horizontal force equal to one-third of the operating weight of the water heater storage tank, acting in any horizontal direction. Strapping shall be at points within the upper one-third and lover one-third of the appliance's vertical dimensions. At the lower point, the strapping shall maintain a minimum distance of 4 inches (102mm) above the controls.
2. The anchorage strapping shall be in accordance with the appliance manufacturer's recommendations.

Revise as follows:

P2801.7 Water heater seismic bracing. In Seismic Design Categories D_0, D_1 and D_2 and in townhouses in Seismic Design Category C, water heaters shall be anchored or strapped in accordance with Section M1307.2.~~the upper one-third and in the lower one third of the appliance to resist a horizontal force equal to one-third of the operating weight of the water heater storage tank, acting in any horizontal direction, or in accordance with the appliance manufacturer's recommendations.~~

Reason: In the 2006 IRC water heater bracing was added to section P2801.7; however, section M1307.2 already addressed the anchorage of water heaters. The intent of this proposal is to condense the seismic bracing requirements to one location. The seismic requirements from both sections were combined and placed in section M1307.2 with a cross reference from P2801.7.

Cost Impact: The proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM6-13 **AS**

Code Change No: RM7-13

Original Proposal

Section(s): M1307.2, M2301.2, M2301.2.10 (New)

Proponent: Stephen Kerr, S.E., Josephson Werdowatz and Associates, Inc., representing self

Revise as follows:

M1307.2 Anchorage of appliances. *Appliances* designed to be fixed in position shall be fastened or anchored in an *approved* manner. In Seismic Design Categories D_1 and D_2, water heaters and thermal storage units shall be anchored or strapped to resist horizontal displacement caused by earthquake motion. Strapping shall be at points within the upper one-third and lower one-third of the appliance's vertical dimensions. At the lower point, the strapping shall maintain a minimum distance of 4 inches (102mm) above the controls.

M2301.2 Installation. Installation of thermal solar energy systems shall comply with Sections M2301.2.1 through M2301.2.~~9~~10.

M2301.2.10 Thermal storage unit seismic bracing. In Seismic Design Categories D_0, D_1 and D_2 and in townhouses in Seismic Design Category C, thermal storage units shall be anchored in accordance with Section M1307.2.

Reason: Thermal storage tanks are similar in size and shape to water heaters, with typical residential tank sizes between 50 and 120 gallons. During past earthquakes, water storage tanks (water heaters and thermal storage tanks) have moved or tipped over if they were not securely anchored to adjacent walls or floors. This movement has resulted in water line leaks which can cause significant and costly property damage. The seismic bracing requirements for water heaters should be extended to these appliances.

Cost Impact: The cost of construction will slightly increase for the installation of thermal storage tanks.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM7-13	**AS**

Code Change No: RM9-13

Original Proposal

Section(s): M1401.3

Proponent: Richard Grace, Fairfax County VA, representing The Virginia Plumbing and Mechanical Inspectors Association and the Virginia Building and Code Officials Association

Revise as follows:

M1401.3 Equipment/appliance Sizing. Heating and cooling equipment and appliances shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies.

Exception: Heating and cooling equipment and appliances shall not be limited to the capacities determined in accordance with Manual S where any of the following conditions apply:

1. The specified equipment or appliance utilizes multi-stage technology or variable refrigerant flow technology and the loads calculated in accordance with Manual J fall within the range of the manufacturer's published capacities for that equipment or appliance.
2. The specified equipment or appliance manufacturer's published capacities cannot satisfy both the total and sensible heat gains calculated in accordance with Manual J and the manufacturer's next larger standard size unit is specified.
3. The specified equipment or appliance is the lowest capacity unit available from the specified manufacturer.

Reason: Item 1 - Current technology is widely available that incorporates multi-stage or VRF systems for increased efficiency. Some of these appliances have such a wide span of functionality that they extend beyond the allowable requirements outlined in Manual S. However, this technology allows the appliance to operate between minimum and maximum capacities, based on loads imposed, thus eliminating the problems associated with single-stage, oversized appliances. Additionally, the appliance will operate efficiently during times where outdoor air temperatures exceed those used to calculate the loads in Manual J.

Item 2 - Often times, the appliance manufacturer's published total and sensible capacities are at odds with the requirements of Manual S. There are many cases where the total capacity of the appliance will fall within the parameters of Manual S in relation to the calculated total gain, however the sensible capacity of the appliance may fall short of the calculated sensible gain, thus unable to provide efficient sensible cooling for the space. When the manufacturer's next standard size larger is chosen to meet the sensible gain, the total capacity of the appliance may then exceed the requirements of Manual S. Choosing the larger appliance will enable a more efficient and effective system.

Item 3 - The current code language does not have provisions for sizing appliances for minimal dwelling unit or dwelling addition loads, other than forcing owners and contractors to change appliances to less desirable systems. For example; a 2 story townhouse, in climate zone 4, with 600 square feet per floor wants to utilize a two-zone system, or a separate heat pump system for each floor. A 1.5 ton unit per floor would exceed the requirements of Manual S, however a 1.5 ton unit could be the smallest available appliance made by the desired manufacturer. Current language would require a complete design change, such as utilizing a single appliance to serve the entire dwelling rather than the more desirable two-zone system, or requiring a system that utilizes electric baseboard heating and window-mounted air conditioning units. This is absurd, and an unfair to an owner that desires to reduce energy costs.

Cost Impact: none

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The text should be better defined with some calculations. The concept should be adapted for regional differences. The proposal should be reworked in a public comment.

Assembly Action: **None**

Public Comments

Public Comment 1:

Richard Grace, Fairfax County Government, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1401.3 Equipment/appliance Sizing. Heating and cooling equipment and appliances shall be sized in accordance with ACCA Manual S or other approved sizing methodologies, based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies.

> **Exception:** Heating and cooling equipment and appliance~~s~~ sizing shall not be limited to the capacities determined in accordance with Manual S or other approved sizing methodologies, where either of the following conditions apply:
>
> 1. The specified equipment or appliance utilizes multi-stage technology or variable refrigerant flow technology and the loads calculated in accordance with ~~Manual J~~ the approved heating and cooling calculation methodology are within the range of the manufacturer's published capacities for that equipment or appliance.
> 2. The specified equipment or appliance manufacturer's published capacities cannot satisfy both the total and sensible heat gains calculated in accordance with ~~Manual J~~ the approved heating and cooling calculation methodology and the ~~manufacturer's~~ next larger standard size unit is specified.
> 3. ~~The specified equipment or appliance is the lowest capacity unit available from the specified manufacturer.~~

Commenter's Reason: After listening to the discussions presented during the Committee Action Hearings, we have incorporated those concerns within this modification. The first being the addition of "other approved sizing methodologies". ACCA's Manual S is not the ***only*** approved, appropriate sizing methodology available to size residential HVAC equipment. The current language would not permit other sizing methodologies such as ASHRAE's Handbook series. The second modification was to reword the language to provide clarity to the text. The third modification was to remove the third exception based on concerns voiced during testimony about the broad aspects that such an exception would permit.

The following is from the original reason statement:

Item 1 - Current technology is widely available that incorporates multi-stage or VRF systems for increased efficiency. Some of these appliances have such a wide span of functionality that they extend beyond the allowable requirements outlined in Manual S. However, this technology allows the appliance to operate between minimum and maximum capacities, based on loads imposed, thus eliminating the problems associated with single-stage, oversized appliances. Additionally, the appliance will operate efficiently during times where outdoor air temperatures exceed those used to calculate the loads in Manual J.

Item 2 - Often times, the appliance manufacturer's published total and sensible capacities are at odds with the requirements of Manual S. There are many cases where the total capacity of the appliance will fall within the parameters of Manual S in relation to the calculated total gain, however the sensible capacity of the appliance may fall short of the calculated sensible gain, thus unable to provide efficient sensible cooling for the space. When the manufacturer's next standard size larger is chosen to meet the sensible gain, the total capacity of the appliance may then exceed the requirements of Manual S. Choosing the larger appliance will enable a more efficient and effective system.

Public Comment 2:

Luis Romeo Escobar, representing ACCA (Air Conditioning Contractors of America), requests Disapproval.

Commenter's Reason: The proposed exceptions to ACCA Manual S should be disapproved for the following reasons:

1. Variable refrigerant flow (VRF) technology is addressed in the revised Manual S. The committee that led the revision effort included representatives of VRF manufacturers. The new Manual S over size limits have been vetted by these committee members and is based on the available OEM expanded performance data. ACCA is following ICC procedures to ensure that the updated Manual S is the one referenced in the 2015 IRC and IECC.
2. Exceptions #2 and #3 are not based on sound technical grounds, but instead are contrived to benefit sales of a particular product class. This is specifically against the entire intent of Manual S and exactly what the industry needs to get away from.
3. The cost impact of this proposed change is not "none" as indicated by the proponents. Larger-than-necessary equipment will generally have higher initial costs (longer pay-back), higher energy costs due to constant cycling on-and-off of the equipment, shortened equipment lifespan (again, due to the wear-and-tear of constant cycling), and will have higher maintenance costs if the proponents' example of two oversized units for one house is the case (homeowners are generally charged based on the number of units being serviced).

4. In the reasoning for item 3 the proponents state that a homeowner will see reduced energy costs by installing two oversized units as opposed to one properly sized unit – this patently absurd and unsubstantiated. The proponents, unfortunately not unlike many design practitioners, seem to think that installing two units is the only way to properly zone a home, which is not the case.
5. The main reason why the industry has a standard to avoid oversizing is in order to ensure that there is proper humidity control in the home. Severely oversized equipment does not stay on long enough for the coil to reach a low enough temperature for adequate moisture removal. This can result in the presence of mold and mildew, not to mention lead to an uncomfortable interior ambience (the dry-bulb temperature will be low, but the humidity high so it will feel clammy to the occupant). Clearly, this proposal would in no way makes a home safer, but instead puts the occupants in greater risk of developing serious health issues from the presence of moisture.
6. Manual S is not a suggestion, as the proponents erroneously purport. It is an industry developed, ANSI recognized standard that sets clear oversize limits that must be adhered to. While the old Manual S did have permissive language that may not have been adequately addressed by the directions on the inside cover, great care has been taken to ensure that the normative sections of the new Manual S are written in mandatory, enforceable language that is acceptable for the i-codes. It will undergo a second ANSI public review, during which anyone (proponents included) may submit a comment to correct any deficiencies.
7. Any exceptions to Manual S should be based on industry research, and not on personal anecdote. To date, no credible research has been produced that supports the claim that hugely oversized HVAC equipment is desirable or leads to a safer, more sustainable, more affordable, or more resilient home.
8. For situations in which the OEM expanded performance data is not available, the new Manual S provides a path for compliance in which the manufacturer certifies that the equipment meets the home's physical requirements.
9. Manual S already has procedures that allow for regional differences (the comparison of heating degree days to cooling degree days for qualification of different heat pump sizing limits).
10. One common problem that is used as justification for gross oversizing is that the specified OEM doesn't offer equipment with small enough capacity for the load requirements. Unfortunately, this will continue to be that case as long as the Manual S requirements are not enforced. This proposal is effectively asks code officials to compensate for a lack of OEM product offerings, which is not the purpose of the building codes (in fact, it will serve as a catch 22 that will prolong the same problem).

Final Hearing Results

RM9-13 **AMPC**

Code Change No: RM11-13

Original Proposal

Section(s): M1403.1, M1601.1, Chapter 44

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1403.1 Heat pumps. ~~The minimum unobstructed total area of the outdoor and return air ducts or openings to a heat pump shall be not less than 6 square inches per 1,000 Btu/h (13 208 mm2/kW) output rating or as indicated by the conditions of listing of the heat pump.~~ Electric heat pumps shall be ~~conform to~~ listed and labeled in accordance with UL 1995 or UL/CSA/ANCE 60335-2-40.

M1601.1 Duct design. *Duct systems* serving heating, cooling and *ventilation equipment* shall be installed in accordance with the provisions of this section and ACCA Manual D, the appliance manufacturer's installation instructions or other *approved* methods.

Add new standard to Chapter 44 as follows:

UL/CSA/ANCE
60335-2-40-2012 Household and Similar Electrical Appliances, Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers……..R1403.1.

Reason: With the exception of adding UL/CSA/ANCE 60335-2-40, this revised language was approved for the 2015 IMC. This is outdated legacy code language and is not consistent with current practice. It is up to the design professional, or the requirements from Manual D or the manufacturer of the appliances to determine minimum sizes of ducts and transfer openings, not the code. If these numbers where to be applied, then the code could be condoning an undersized system. There are too many variables and different situations for just one minimum to work for everything.

UL/CSA/ANCE 60335-2-40 Household and Similar Electrical Appliances, Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers is a new harmonized standard which is an alternate to UL 1995.

Cost Impact: None listed.

Analysis: A review of the standard proposed for inclusion in the code, [UL/CSA/ANCE 60335-2-40-2012] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. The arbitrary sizing requirements should be deleted.

Assembly Action: **None**

Final Hearing Results

RM11-13 **AS**

Code Change No: RM12-13

Original Proposal

Section(s): M1403.1, M1601.1

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1403.1 Heat pumps. ~~The minimum unobstructed total area of the outdoor and return air ducts or openings to a heat pump shall be not less than 6 square inches per 1,000 Btu/h (13 208 mm2/kW) output rating or as indicated by the conditions of listing of the heat pump.~~ Electric heat pumps shall be tested in accordance with UL 1995.

M1601.1 Duct design. *Duct systems* serving heating, cooling and *ventilation equipment* shall be installed in accordance with the provisions of this section and ACCA Manual D, <u>the appliance manufacturer's installation instructions</u> or other *approved* methods.

Reason: This language deletion was approved for the 2015 IMC. This is outdated legacy code language and is not consistent with current practice. It is up to the design professional, or the requirements from Manual D or the manufacturer of the appliances to determine minimum sizes of ducts and transfer openings, not the code. If these numbers where to be applied, then the code could be condoning an undersized system. There are too many variables and different situations for just one minimum to work for everything.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Same reason as RM11-13

Assembly Action: **None**

Final Hearing Results

RM12-13	**AS**

Code Change No: RM13-13

Original Proposal

Section(s): M1403.1, Chapter 44

Proponent: Bob Eugene, representing UL LLC.
(Robert.Eugene@ul.com)

Revise as follows:

M1403.1 Heat pumps. The minimum unobstructed total area of the outside and return air ducts or openings to a heat pump shall be not less than 6 square inches per 1,000 Btu/h (13 208 mm2/kW) output rating or as indicated by the conditions of the listing of the heat pump. Electric heat pumps shall conform to UL 1995 or UL/CSA/ANCE 60335-2-40.

Add new standard to Chapter 44 as follows:

UL/CSA/ANCE 60335-2-40--2012

Reason: Through AHRI, manufactures requested that UL publish a harmonized IEC based 60335-2-40, to replace UL 1995 for equipment within the scope of 60335-2-40 rated 600 volts and less. UL60335-2-40 will be effective upon publication, however UL 1995 will not sunset for new equipment until November 2020 and existing equipment by 2022. UL/CSA/ANCE 60335-2-40 is a new tri-national standard that provides a comprehensive set of construction and performance requirements that are used to evaluate and list heat pumps.

Cost Impact: None

Analysis: A review of the standard proposed for inclusion in the code, [UL/CSA/ANCE 60335-2-40-2012] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is consistent with the action on RM11-13.

Assembly Action: **None**

Final Hearing Results

RM13-13 **AS**

Code Change No: RM14-13

Original Proposal

Section(s): **M1403.2**

Proponent: Guy McMann, MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Delete as follows:

~~**M1403.2 Foundations and supports.** Supports and foundations for the outdoor unit of a heat pump shall be raised at least 3 inches (76 mm) above the ground to permit free drainage of defrost water, and shall conform to the manufacturer's installation instructions.~~

Reason: This subject is already covered in M-1305.1.4.1 and covers all appliances. There is no need to duplicate it here.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM14-13	**AS**

Code Change No: RM15-13

Original Proposal

Section(s): M1410.1

Proponent: Bob Eugene, representing UL LLC (Robert.Eugene@ul.com)

Revise as follows:

M1410.1 General. Vented room heaters shall be tested in accordance with ASTM E 1509 for pellet-fuel burning, UL 896 for oil-fired or UL 1482 for solid fuel-fired and installed in accordance with their *listing*, the manufacturer's installation instructions and the requirements of this code.

Reason: Clarify application of ASTM E 1509.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM15-13	**AS**

Code Change No: RM16-13

Original Proposal

Section(s): M1410.2

Proponent: Bob Eugene, UL LLC (Robert.Eugene@ul.com)

Revise as follows:

M1410.2 Floor mounting. Room heaters shall be installed on noncombustible floors or *approved* assemblies constructed of noncombustible materials that extend at least 18 inches (457 mm) beyond the *appliance* on all sides.

Exceptions:

1. *Listed* room heaters shall be installed on noncombustible floors, assemblies constructed of noncombustible materials or ~~*listed*~~ floor protectors listed and *labeled* in accordance with UL 1618. The ~~with~~ materials and dimensions shall be in accordance with the *appliance* manufacturer's instructions.
2. Room heaters *listed* for installation on combustible floors without floor protection shall be installed in accordance with the *appliance* manufacturer's instructions.

Reason: Add the referenced standard for listing of floor protectors.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM16-13	**AS**

Code Change No: RM19-13

Original Proposal

Section(s): M1411.3.2

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association, representing Plastic Pipe and Fittings Association (mikec@cmservnet.com)

Revise as follows:

M1411.3.2 Drain pipe materials and sizes. Components of the condensate disposal system shall be ABS, cast iron, copper, cross-linked polyethylene, CPVC, galvanized steel, ~~copper~~, ~~polybutylene~~, PE-RT, polyethylene, ~~ABS, CPVC~~, polypropylene or PVC, pipe or tubing. All components shall be selected for the pressure and temperature rating of the installation. Joints and connections shall be made in accordance with the applicable provisions of Chapter 30. Condensate waste and drain line size shall not be less than ¾-inch (19 mm) internal diameter and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an *approved* method.

Reason: Delete PB material, as it is no longer available or used in this application, and add raised temperature polyethylene, and polypropylene materials that are available and could be used in this application. Also, alphabetize the list of names.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM19-13	**AS**

Code Change No: RM20-13

Original Proposal

Section(s): M1411.3.2

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association, representing Plastic Pipe and Fittings Association (mikec@cmservnet.com)

Revise as follows:

M1411.3.2 Drain pipe materials and sizes. Components of the condensate disposal system shall be cast iron, galvanized steel, copper, polybutylene, polyethylene, ABS, CPVC or PVC pipe or tubing. All components shall be selected for the pressure and temperature rating of the installation. All components shall be selected for the pressure and temperature rating of the installation. Joints and connections shall be made in accordance with the applicable provisions of Chapter 30. Condensate waste and drain line size shall be not less than ¾-inch (19 mm) <u>nominal</u> ~~internal~~ diameter ~~and shall not decrease in size~~ from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an *approved* method.

Reason: This second proposal on this section would attempt to clarify that the pipe used is ¾" as a minimum, which seems to already be the field practice, and not ¾" ID pipe. There appeared to be some confusion on the application of the language in the field.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM20-13	**AS**

Code Change No: RM21-13

Original Proposal

Section(s): M1411.3.3 (New)

Proponents: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org); Andrew Scott Jones, President, A Better Deal Heating and Air Conditioning, Inc., a Texas Corporation, representing himself.

Add new text as follows:

M1411.3.3 Drain Line Maintenance. Condensate drain lines shall be configured to permit the clearing of blockages and performance of maintenance without requiring the drain line to be cut.

Reason:
(Hall-PMGCAC): This new language was approved for the 2015 IMC. Drain line stoppages in evaporative coils drain pan drain lines are unavoidable and common occurrences requiring clearing the drain line. Clearing these lines almost always involves cutting the drain line itself, causing water to leak into the attic, crawlspace, closet, etc. The cut must be repaired by reconnecting the drain line with a PVC coupling and solvent cement.

This process exposes the surrounding area to water leakage and spilling with the risk of damage and mold, as well as the extra time and effort of carrying extra equipment, parts and flammable solvent. The repair process takes extra time and costs the homeowner more money.

(Jones): This language is identical to the language of M32-12 which was recently adopted in Portland, Oregon. We are advised by JB Engineering that this language will be in the IMC and IPC for 2015. There appears to be no reason not to accept this identical language in the IRC. Drain line stoppages in evaporative coils drain pan drain lines are unavoidable and common occurrences requiring clearing the drain line. Clearing these lines almost always involves cutting the drain line itself, causing water to leak into the attic or closet where the drain is located, possibly collected in a bucket or soaked up with rags or paper towels. Then the technician blows compressed air through the drain line in both directions from the cut. The cut must be repaired by resealing the drain line with a PVC coupling and solvent.

This process exposes the surrounding area to water leakage and spilling with the risk of damage, mold, spilling, as well as the extra time and effort of carrying extra equipment, parts and flammable solvent. The process takes extra time and costs the homeowner more money.

With a device that permits the introduction of compressed air or nitrogen directly into the drain system permitting clearing in both directions, there is no spillage of water, no cost for the couplings or solvent and no risk of water damage or mold. The entire process requires less than ten minutes.

Typically the cost of clearing a drain equipped with such a device is at least 50% less to the homeowner than the cost of clearing a blockage through the common method of cutting the pipe, attempting to collect the condensate water and repairing the cut in the drain line.

Each time a drain line is cleared though the cutting/repair process, the repair could be accomplished by installing a $15.00 line clearing device rather than a simple coupling. Drain lines can also be plumbed without installing a device at the time of installation.

Also, if clearing the drain lines were part of regular maintenance, line blockages could largely be prevented in the first place.

Cost Impact:
(Hall-PMGCAC): The code change will increase the cost of construction.

(Jones): The code change will increase the cost of construction, totaling an estimated $15.00 per unit.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal will increase the cost of construction and goes beyond the minimum code threshold. It is not costly to cut and repair the drain pipe. Cleanouts should be optional. Such drains can be cleaned from the terminal outlet end.

Assembly Action: **None**

Final Hearing Results

RM21-13 **AS**

Code Change No: RM22-13

Original Proposal

Section(s): M1411.4 (New)

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org); Guy McMann, Jefferson County Co., representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Add new text as follows:

M1411.4 Condensate pumps. Condensate pumps located in uninhabitable spaces, such as attics and crawl spaces, shall be connected to the appliance or equipment served such that when the pump fails, the appliance or equipment will be prevented from operating. Pumps shall be installed in accordance with the manufacturer's instructions.

Reason:
(Hall-PMGCAC): Most condensate pumps are factory equipped with float switch controls for this purpose. This new text simply requires the switch to be utilized. Spaces such as attics and crawls are out of sight and out of mind, therefore condensate overflow will not be noticed until damage occurs. The overflow kill switch will shut off the equipment that produces the condensate before water damage can occur.

(McMann): This was approved in the Fuel Gas Code and the IMC. Pumps that are not connected in this fashion will permit the appliances to keep operating, spilling waste water where ever the appliance is located. When this condition continues over time, it could result in damage to building components or other property. This overflow condition may result in mold issues among other things. Most pump manufacturers already have this feature incorporated into the pump but the code does not require it to be connected. Damage as a result of not connecting this feature could prove to be very costly. This is not as much of a concern when appliances are readily accessible to occupants where leakage may be noticed in a timely manner.

Cost Impact: None

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal could cause a heating system to shut off in freezing weather resulting in freeze damage to piping.

Assembly Action: **None**

Public Comment

Public Comment 1:

Vickie Lovell, INTERCODE, INC. representing Rectorseal requests Approval as Submitted.

Commenter's Reason: The reason for disapproval from the RM Committee is not satisfactory. They stated that the approval of this "proposal could cause a heating system to shut off in freezing weather resulting in freeze damage to piping."

In reality, freeze damage to piping in the winter can occur for numerous reasons unrelated to condensation overflow. So, to NOT connect a condensate pump to an appliance, including those appliances that come with a condensate pump as part of the original equipment, for a reason that may not even occur seems very short-sighted, especially in climates where a hard freeze is not likely or even impossible to occur.

Most of the content of the codes is intended to be proactive to specifically prevent all kinds of unsafe conditions or costly problems. Condensation overflow can result in both unsafe and costly problems. It is a solvable problem that equipment and component manufacturers have recognized and provided homeowners with a solution. To not address this in the code is puzzling.

This proposal already approved during the Group A hearings and final action for the 2015 International Mechanical and Fuel Gas Codes, should also be approved in the 2015 residential mechanical requirements.

Public Comment 2:

Shawn Strausbaugh of Arlington County, Virginia representing the ICC PMG Code Action Committee requests Approval as Submitted.

Commenter's Reason: This change is needed for consistency with the IMC and IFGC which will both contain this text in the 2015 editions. The committee recommended disapproval because of the concern that a failed pump might turn off a condensing furnace or boiler and cause the house to freeze if the occupants were away for extended periods. This section would apply only to appliances located in out of sight spaces where condensate spillage would go unnoticed. A condensate pump safety shutoff switch is just one of many controls that can shut down a heating system and therefore adds little additional risk. Section M1411.4 would apply to electric and oil fired appliances only because Chapter 24 covers gas appliances and Chapter 24 will duplicate the same provision that will be in the 2015 IFGC.

Final Hearing Results

RM22-13	**AS**

Code Change No: RM23-13

Original Proposal

Section(s): M1411.6 (New)

Proponent: Guy McMann, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Add text as follows:

M1411.6 Location and protection of refrigerant piping. Refrigerant piping installed within 3 inches of the underside of roof decks shall be protected from damage caused by nails and other fasteners.

Reason: In many instances piping has been punctured or damaged as a result of being located too close to roof decks, discharging into attics or ceiling spaces and posing health risks. Roofing or re-roofing operations are usually the case for this type of damage. This is very apparent in hail prone locations. Keeping the pipe away from the roof deck will prevent this from occurring reducing repair costs and yet still providing flexibility in the installation.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

M1411.6 Location and protection of refrigerant piping. Refrigerant piping installed within 11/2 ~~3~~ inches of the underside of roof decks shall be protected from damage caused by nails and other fasteners.

Committee Reason: Approval was based upon the proponent's published reason. The modification is consistent with the distance required by the text in proposal RM8-13. One and one half inches works for walls and should work for roof decks as well.

Assembly Action: **None**

Final Hearing Results

RM23-13	**AM**

Code Change No: RM25-13

Original Proposal

Section(s): M1412.1, Chapter 44

Proponent: Bob Eugene, representing UL LLC.(Robert.Eugene@ul.com)

Revise as follows:

M1412.1 Approval of equipment. Absorption systems shall be installed in accordance with the manufacturer's installation instructions. Absorption equipment shall comply with UL 1995 or UL/CSA/ANCE 60335-2-40.

.

Add new standard to Chapter 44 as follows:

UL/CSA/ANCE 60335-2-40--2012

Reason: Through AHRI, manufactures requested that UL publish a harmonized IEC based 60335-2-40, to replace UL 1995 for equipment within the scope of 60335-2-40 rated 600 volts and less. UL60335-2-40 will be effective upon publication, however UL 1995 will not sunset for new equipment until November 2020 and existing equipment by 2022. UL/CSA/ANCE 60335-2-40 is a new tri-national standard that provides a comprehensive set of construction and performance requirements that are used to evaluate and list absorption systems.

Cost Impact: None

Analysis: A review of the standard proposed for inclusion in the code, [UL/CSA/ANCE 60335-2-40--2012] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason and the action on RM11-13.

Assembly Action: **None**

Final Hearing Results

RM25-13	**AS**

Code Change No: RM26-13

Original Proposal

Section(s): M1413.1, Chapter 44

Proponent: Bob Eugene, representing UL LLC.(Robert.Eugene@ul.com)

Revise as follows:

M1413.1 General. Evaporative cooling equipment and appliances shall comply with UL 1995 <u>or UL/CSA/ANCE 60335-2-40</u> and shall be installed:

1. According to the manufacturer's instructions.
2. On level platforms in accordance with Section M1305.1.4.1.
3. So that openings in exterior walls are flashed in accordance with Section R703.8.
4. So as to protect the potable water supply in accordance with Section P2902.
5. So that air intake opening locations are in accordance with Section R303.5.1.

Add new standard to Chapter 44 as follows:

<u>UL/CSA/ANCE 60335-2-40-2012</u>

Reason: Through AHRI, manufactures requested that UL publish a harmonized IEC based 60335-2-40, to replace UL 1995 for equipment within the scope of 60335-2-40 rated 600 volts and less. UL60335-2-40 will be effective upon publication, however UL 1995 will not sunset for new equipment until November 2020 and existing equipment by 2022. UL/CSA/ANCE 60335-2-40 is a new tri-national standard that provides a comprehensive set of construction and performance requirements that are used to evaluate and list evaporative cooling equipment and appliances.

Cost Impact: None

Analysis: A review of the standard proposed for inclusion in the code, [UL/CSA/ANCE 60335-2-40-2012] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM26-13 **AS**

Code Change No: RM27-13

Original Proposal

Section(s): M1501.2 (New)

Proponent: Dan Buuck, representing National Association of Home Builders (NAHB) (dbuuck@nahb.org)

Add text as follows:

M1501.2 Transfer air. Air transferred from occupiable spaces, other than kitchens, bathrooms and toilet rooms, shall not be prohibited from serving as makeup air for exhaust systems. Transfer openings between spaces shall be of the same cross-sectional area as the free area of the makeup air openings. Where louvers and grilles are installed, the required size of openings shall be based on the net free area of each opening. Where the design and free area of louvers and grilles are not known, it shall be assumed that wood louvers have 25-percent free area and metal louvers and grilles have 75-percent free area.

Reason: The IMC contains language allowing makeup air to be provided from areas other than the room where the exhaust system is located (transfer air). It is just as important to clarify the allowable use of transfer air for exhaust systems in the IRC as it is in the IMC. Without this provision, Section M1503.4 can be interpreted that the total amount of makeup air is required to be introduced in the direct vicinity of the exhaust. This is not required in commercial construction, and so the IRC should be brought into alignment with the IMC in this area.

Most of the language is taken from existing sections of the code. They include: Transfer air: IMC Section 403; Transfer openings: Section M1602 Item 6; and Louvers and grilles: Section G2407.10.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text is difficult to comprehend. Calculations should have been submitted to illustrate. The intent to state that outdoor air can be delivered to other than the kitchen is not clear.

Assembly Action: **None**

Public Comments

Public Comment:

Dan Buuck, CBO, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**M1501.2 Transfer air.** Air transferred from occupiable spaces, other than kitchens, bathrooms and toilet rooms, shall not be prohibited from serving as makeup air for exhaust systems. Transfer openings between spaces shall be of the same cross-sectional area as the free area of the makeup air openings. Where louvers and grilles are installed, the required size of openings shall be based on the net free area of each opening. Where the design and free area of louvers and grilles are not known, it shall be assumed that wood louvers have 25-percent free area and metal louvers and grilles have 75-percent free area.~~

M1503.4.1 Location Kitchen exhaust makeup air shall be discharged into the same room in which the exhaust system is located or into rooms or *duct systems* that communicate through one or more permanent openings with the room in which such exhaust system is located. Such permanent openings shall have a net cross-sectional area not less than the required area of the makeup air supply openings.

Commenter's Reason: The reason proposal RM27 on Transfer Air was disapproved by the committee in Dallas was that it felt the text was too complicated. This public comment would accomplish the same thing with language that better fits the IRC. The provision is also being relocated to the range hood section, because it is meant to deal solely with kitchen exhaust makeup air.

The concern driving this code change is that kitchen exhaust makeup air has only been a commercial concept until fairly recently. Makeup air in a commercial kitchen has very specific requirements which are not necessary in a residential setting. For example, the makeup air opening in a commercial kitchen needs to be located in the direct vicinity of the draft hood. Homeowners, however, have valid reasons for not wanting the opening in the kitchen, including comfort, practicality, and aesthetics. Locating the opening in another room or bringing the makeup air in through the duct system allows the unconditioned air to mix and temper which is vital in harsher climates. When these openings are required in the kitchen, there is a much greater possibility that they will be covered or otherwise disabled.

Final Hearing Results

RM27-13	**AMPC**

Code Change No: RM29-13

Original Proposal

Section(s): M1502.4.5

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org); Richard Grace, Fairfax County Government, representing The Virginia Plumbing and Mechanical Inspectors Association, The Virginia Building Code Officials Association

Revise as follows:

M1502.4.5 Length identification. Where the exhaust duct <u>equivalent length exceeds 35 feet</u> ~~is concealed within the building construction~~, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet (1829 mm) of the exhaust duct connection.

Reason:
(Hall-PMGCAC): This revised language was approved for the 2015 IMC. If the equivalent length does not exceed 35', signage provides no benefit, whether or not the duct is concealed. It does not matter if the duct is concealed. The purpose of the signage is to notify the owners and installers that the dryer duct length is exceptional and any installed dryer must be compatible with that duct of exceptional length.

Grace): If the equivalent length is code compliant, there is no need for extra signage. This puts the code official in a position of recording each installation in order to verify at time of final that the stated length is accurate. This is over the top for code officials and installers to keep track of in a world of increasing duties and fewer resources. It should not matter if the duct is concealed or not as this is a benefit for the building owner or user.

Cost Impact: None.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM29-13	**AS**

Code Change No: RM30-13

Original Proposal

Section(s): M1503.1, M1503.2

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1503.1 General. Range hoods shall discharge to the outdoors through a ~~single-wall~~ duct. The duct serving the hood shall have a smooth interior surface, shall be air tight, shall be equipped with a back-draft damper, and shall be independent of all other exhaust systems. Ducts serving range hoods shall not terminate in an attic or crawl space or areas inside the building.

Exception: Where installed in accordance with the manufacturer's installation instructions, and where mechanical or natural *ventilation* is otherwise provided, *listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors.

M1503.2 Duct material. ~~Single-wall~~ Ducts serving range hoods shall be constructed of galvanized steel, stainless steel
or copper.

Exception: Ducts for domestic kitchen cooking *appliances* equipped with down-draft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

1. The duct is installed under a concrete slab poured on grade*; and*
2. The underfloor trench in which the duct is installed is completely backfilled with sand or gravel; and
3. The PVC duct extends not more than 1 inch (25 mm) above the indoor concrete floor surface; and
4. The PVC duct extends not more than 1 inch (25 mm) above grade *outside of the building; and*
5. The PVC ducts are solvent cemented.

Reason: Stating "single- wall" is unnecessary and makes code users wonder if there is some hidden meaning or intent. It is assumed that the duct will be single-wall, but there is no technical reason to require only single-wall.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM30-13	**AS**

Code Change No: RM34-13

Original Proposal

Section(s): **M1503.4**

Proponent: Dan Buuck, National Association of Home Builders (NAHB); David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee
(dave.hall@georgetown.org)

Revise as follows:

M1503.4 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m^3/s) shall be mechanically or naturally provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with ~~a~~ not less than one damper. Each damper shall be a gravity damper or an electrically operated damper that automatically opens when the exhaust system operates ~~means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.~~ Dampers shall be accessible for inspection, service, repair and replacement without removing permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced.

Reason: The first change adds the words 'mechanically or naturally'. It is important to explicitly state that both mechanical ventilation (i.e. a fan) and natural ventilation (i.e. a passive opening) is allowed by this provision for the following reasons. First of all, It is not being interpreted the same in all jurisdictions. Secondly, there is no precedence for mechanical makeup air in the IRC.
The second change deals with the type of damper that is allowed. The only reason to require a 'means of closure' to the makeup air system is to limit the amount of conditioned air that leaves the building when the exhaust is not running. Both electrically-operated and gravity dampers achieve this goal, and it is important to clarify that both are allowed. Again, it is not being interpreted the same in all jurisdictions. (Some are allowing gravity dampers, but not all.) Secondly, allowing a gravity damper is in keeping with similar applications within the IRC—nowhere are automatic (motorized) dampers required for makeup or ventilation air. Finally, a gravity damper has the added benefit of equalizing depressurization in the house for any other reason (e.g. bath fans and clothes dryers).
The last sentence was taken and modified from Section M1305.1 on appliance access. It emphasizes that both types of dampers, gravity and motorized, require maintenance and may need to be replaced at some time.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. Running the exhaust fan at less than full speed will allow the gravity damper to open partially, thereby limiting the entry of outdoor air.

Assembly Action: **None**

Final Hearing Results

RM34-13 **AS**

Code Change No: RM36-13

Original Proposal

Section(s): M1506, M1507, and Chapter 44

Proponent: Mike Moore, P.E., Newport Ventures, representing Broan-NuTone (mmoore@newportventures.net)

Revise as follows:

M1506.1 Duct~~s~~ construction. Where exhaust duct construction is not specified in this chapter, construction shall comply with Chapter 16.

M1506.2. Duct length. The length of exhaust and supply ducts used for ventilating equipment shall not exceed the maximum lengths determined in accordance with Table M1506.2.

> **Exception:** Duct length shall not be limited where the duct system complies with the manufacturer's design criteria or where the flow rate of the installed ventilating equipment is verified by the installer or approved third party using a flow hood, flow grid, or other airflow measuring device.

M1506.~~2~~3 Exhaust openings. Air exhaust openings shall terminate not less than 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable and nonoperable openings into the building and 10 feet (3048 mm) from mechanical air intakes except where the opening is located 3 feet (914 mm) above the air intake. Openings shall comply with Sections R303.5.2 and R303.6.

TABLE M1506.2
DUCT LENGTH

Duct Type	**Flex Duct**								**Smooth-Wall Duct**							
Fan Airflow Rating CFM @ 0.25 in. wc[1]	50	80	100	125	150	200	250	300	50	80	100	125	150	200	250	300
Diameter[2] in.	Maximum Length[3,4,5] ft.															
3	X	X	X	X	X	X	X	X	5	X	X	X	X	X	X	X
4	56	4	X	X	X	X	X	X	114	31	10	X	X	X	X	X
5	NL	81	42	16	2	X	X	X	NL	152	91	51	28	4	X	X
6	NL	NL	158	91	55	18	1	X	NL	NL	NL	168	112	53	25	9
7	NL	NL	NL	NL	161	78	40	19	NL	NL	NL	NL	NL	148	88	54

Duct Type	Flex Duct								Smooth-Wall Duct							
8 and above	NL	NL	NL	NL	NL	189	111	69	NL	NL	NL	NL	NL	NL	198	133

1. Fan airflow rating shall be in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.
2. For non-circular ducts, calculate the diameter as four times the cross-sectional area divided by the perimeter.
3. This table assumes that elbows are not used. Fifteen feet (5 m) of allowable duct length shall be deducted for each elbow installed in the duct run.
4. NL = no limit on duct length of this size.
5. X = not allowed, Any length of duct of this size with assumed turns and fittings will exceed the rated pressure drop.

M1507.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the equipment shall be designed in accordance with this section.

M1507.2 Flow Rate Verification. The flow rate for ventilating equipment shall be verified in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51 or the flow rate shall be verified by the installer or approved third party using a flow hood, flow grid, or other airflow measuring device.

Add new standard to Chapter 44 as follows:

ANSI/AMCA 210-ANSI/ASHRAE 51-07, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

Reason: Section M1507 establishes the minimum design flow rates required for local exhaust and whole house mechanical ventilation (WHMV) fans. However, field tests of ventilating fans often show that actual flow rates fall short of design. Failure of fans to meet design rates can generally be attributed to one of two reasons: either the ductwork is poorly matched to the fan, or the fan's actual airflow does not match its label (i.e., has not been verified via a standardized laboratory test). By providing a prescriptive duct sizing table, this proposal takes the guess work out of whether a fan should operate per the design rate. By requiring that either the fan flow rate be verified by the manufacturer in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51 or be field verified by the installer or approved third party, this proposal provides a minimum level of quality assurance and control to the installation of ventilation fans.

The proposed table is taken directly from ASHRAE 62.2-2010, addendum F. Confirmation that a ventilation fan's flow rate is in compliance with ANSI/AMCA 210-ANSI/ASHRAE 51 is as simple as looking for an HVI sticker in the fan housing. Ventilating fans exceeding the maximum CFM in Table M1506.2 would comply with Section M1506.2 by using the exception (i.e., installing ducts in accordance with the manufacturer's design criteria or by field confirmation of the flow rate).

Cost Impact: Incremental costs associated with this proposal are expected to be minimal to zero, since this proposal reflects the minimum design practice needed to ensure that installed rates match design rates.

Analysis: A review of the standard proposed for inclusion in the code, [ANSI/AMCA 210-ANSI/ASHRAE 51-07] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The table is confusing as it appears that smooth-wall ducts are not allowed to be longer than flex ducts. Verification of flow rates will be difficult for code officials.

Assembly Action: **None**

Public Comments

Public Comment 2:

Shawn Strausbaugh of Arlington County, Virginia representing the ICC PMG Code Action Committee requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1506.1 Duct construction. Where exhaust duct construction is not specified in this chapter, construction shall comply with Chapter 16.

M1506.2. Duct length. The length of exhaust and supply ducts used for ventilating equipment shall not exceed the maximum lengths determined in accordance with Table M1506.2.

> **Exception:** Duct length shall not be limited where the duct system complies with the manufacturer's design criteria or where the flow rate of the installed ventilating equipment is verified by the installer or approved third party using a flow hood, flow grid, or other airflow measuring device.

M1506.3 Exhaust openings. Air exhaust openings shall terminate not less than 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable and nonoperable openings into the building and 10 feet (3048 mm) from mechanical air intakes except where the opening is located 3 feet (914 mm) above the air intake. Openings shall comply with Sections R303.5.2 and R303.6.

TABLE M1506.2
DUCT LENGTH

Duct Type	**Flex Duct**								**Smooth-Wall Duct**							
Fan Airflow Rating CFM @ 0.25 in. wc[1]	50	80	100	125	150	200	250	300	50	80	100	125	150	200	250	300
Diameter[2] in.	Maximum Length[3,4,5] ft.															
3	X	X	X	X	X	X	X	X	5	X	X	X	X	X	X	X
4	56	4	X	X	X	X	X	X	114	31	10	X	X	X	X	X
5	NL	81	42	16	2	X	X	X	NL	152	91	51	28	4	X	X
6	NL	NL	158	91	55	18	1	X	NL	NL	NL	168	112	53	25	9
7	NL	NL	NL	NL	161	78	40	19	NL	NL	NL	NL	NL	148	88	54
8 and above	NL	NL	NL	NL	NL	189	111	69	NL	NL	NL	NL	NL	NL	198	133

1. Fan airflow rating shall be in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.
2. For non-circular ducts, calculate the diameter as four times the cross-sectional area divided by the perimeter.
3. This table assumes that elbows are not used. Fifteen feet (5 m) of allowable duct length shall be deducted for each elbow installed in the duct run.
4. NL = no limit on duct length of this size.
5. X = not allowed, Any length of duct of this size with assumed turns and fittings will exceed the rated pressure drop.

M1507.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the equipment shall be designed in accordance with this section.

~~**M1507.2 Flow Rate Verification**. The flow rate for ventilating equipment shall be verified in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51 or the flow rate shall be verified by the installer or approved third party using a flow hood, flow grid, or other airflow measuring device.~~

ANSI/AMCA 210-ANSI/ASHRAE 51-07, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

Commenter's Reason: The committee felt that verifying the flow rate would be difficult for code enforcement personnel. The only other concern was with the table which was printed such that it was hard to read in the original proposal.

The committee reason for recommending disapproval was based on the fact that the proposed table was printed with some numbers offset such that it was difficult to read. They also felt that the code official would not be able to verify the fan flow rates. Fans are labeled by HVI which demonstrates that the fan flow rate specified by the manufacturer is accurate. The offset numbers in the table have been corrected as shown in this public comment. Without this text, exhaust fans will continue to be installed with ducts that will not allow the fan to reach its intended flow rate. A 50 cfm fan with high resistance ductwork might exhaust only a small fraction of the 50 cfm. Installing the proper size fan is pointless if the proper size and length of ductwork is not connected to it.

Final Hearing Results

RM36-13 **AMPC2**

Code Change No: RM46-13

Original Proposal

Section(s): M1601.1.1, Table M1601.1(1), M1601.2

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to a maximum of 250ºF (121ºC).
2. ~~Factory-made air ducts shall be constructed of Class 0 or Class 1 materials as designated in Table M1601.1.1(1).~~ Factory made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
4. Factory-made, field–fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC Duct Construction Standard, Metal and Flexible. The minimum thicknesses of metal duct material used in field -fabricated and shop-fabricated duct constructions shall be as listed in Table M1601.1.1(2). Galvanized steel shall conform to ASTM A 653. ~~Metallic ducts shall be fabricated in accordance with SMACNA Duct Construction Standards Metal and Flexible.~~
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a flame spread index not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
   7.1. These cavities or spaces shall not be used as a plenum for supply air.
   7.2. These cavities or spaces shall not be part of required fire-resistance-rated assembly.
   7.3. Stud wall cavities shall not convey air from more than one floor level.
   7.4. Stud wall cavities and joist-space plenum shall be isolated from adjacent concealed spaces by tight-fitting fire blocking in accordance with Section R602.8.
   7. 5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

~~Table M1601.1(1)~~
~~CLASSIFICATION OF FACTORY-MADE AIR DUCTS~~

~~**M1601.2 Factory-made ducts.** Factory-made air ducts or duct material shall be *approved* for the use intended, and shall be installed in accordance with the manufacturer's installation instructions. Each portion of a factory-made air *duct system* shall bear a *listing* and *label* indicating compliance with UL 181 and UL 181A or UL 181B.~~

Reason: Item #2 can be simplified by stating what is already required by Current Section M1601.2. There is no need to state the burning classifications of 0 and 1 and there is no need for Table M1601.1.1(1) because this is already covered in UL 181. Current Section M1601.2 is redundant with the proposed revision to Item #2 of Section M1601.1.1 and should be deleted. Item #4 is simplified and refers to ducts that are fabricated anywhere.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International

Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to a maximum of 250ºF (121ºC).
2. Factory made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
4. ~~Factory-made~~, Field–fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC Duct Construction Standard, Metal and Flexible. The minimum thicknesses of metal duct material used in field - fabricated and shop-fabricated duct constructions shall be as listed in Table M1601.1.1(2). Galvanized steel shall conform to ASTM A 653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a flame spread index not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
   - 7.1. These cavities or spaces shall not be used as a plenum for supply air.
   - 7.2. These cavities or spaces shall not be part of required fire-resistance-rated assembly.
   - 7.3. Stud wall cavities shall not convey air from more than one floor level.
   - 7.4. Stud wall cavities and joist-space plenum shall be isolated from adjacent concealed spaces by tight-fitting fire blocking in accordance with Section R602.8.
   - 7. 5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

Committee Reason: Approval was based upon the proponent's published reason. The modification addresses the fact that factory-made ducts are already covered in item # 2 and they are not required to be in accordance with the SMACNA standard.

Assembly Action: **None**

Final Hearing Results

RM46-13 **AM**

Code Change No: RM47-13

Original Proposal

Section(s): Table M1601.1.1(2)

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Delete table and substitute as follows:

~~TABLE M1601.1.1(2)~~
~~DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESSES FOR SINGLE DWELLING UNITS~~

~~DUCT SIZE~~	~~GALVANIZED~~		~~ALUMINUM MINIMUM THICKNESS (in.)~~
	~~Minimum thickness (in.)~~	~~Equivalent galvanized gauge gage no.~~	
~~Round ducts and enclosed rectangular ducts~~			
~~14 inches or less~~	~~0.0157~~	~~28~~	~~0.0145~~
~~16 and 18 inches~~	~~0.0187~~	~~26~~	~~0.018~~
~~20 inches and over~~	~~0.0236~~	~~24~~	~~0.023~~
~~Exposed rectangular ducts~~			
~~14 inches or less~~	~~0.0157~~	~~28~~	~~0.0145~~
~~Over 14[a] inches~~	~~0.0187~~	~~26~~	~~0.018~~

~~For SI: 1 inch = 25.4 mm, 1 inch water gage = 249 Pa.~~

~~a. For duct gages and reinforcement requirements at static pressures of ½-inch, 1-inch and 2-inch w.g., SMACNA *HVAC Duct Construction Standards*, Tables 2-1, 2-2, and 2-3, shall apply.~~

TABLE M1601.1.1(2)
DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESS FOR SINGLE DWELLING UNITS[a]

ROUND DUCT DIAMETER (inches)	STATIC PRESSURE			
	½ INCH WATER GAGE		1 INCH WATER GAGE	
	THICKNESS (inches)		THICKNESS (inches)	
	GALVANIZED	ALUMINUM	GALVANIZED	ALUMINUM
≤ 12	0.013	0.018	0.013	0.018
12 to14	0.013	0.018	0.016	0.023
15 to 17	0.016	0.023	0.019	0.027
18	0.016	0.023	0.024	0.034
19 to 20	0.019	0.027	0.024	0.034
RECTANGULAR DUCT DIMENSION (inches)				
≤ 8	0.013	0.018	0.013	0.018
9 to10	0.013	0.018	0.016	0.023
11 to 12	0.016	0.023	0.019	0.027
13 to16	0.019	0.027	0.019	0.027
17 to 18	0.019	0.027	0.024	0.034
19 to 20	0.024	0.034	0.024	0.034

For SI: 1 inch = 25.4 mm, 1 inch water gage = 249 Pa.

a. Ductwork that exceeds 20 inches by dimension or exceeds a pressure of 1 inch gage (250 Pa) shall be constructed in accordance with *SMACNA HVAC Duct Construction Standards Metal and Flexible*.

Reason: This revised table was approved for the 2015 IMC. The change that was previously made in the 2009 IRC (and carried forward to the 2012 IRC) unnecessarily increased the material thickness required for round sheet metal ducts.

This proposed change seeks to return to the requirements of 2006 and previous IRC editions which have historically recognized 30 gauge sheet metal as being appropriate for round ducts 14 inches or less diameter in “Single Dwelling Units”.

The changes to M1601.1.1(2) in the 2009 IRC (and carried forward to the 2012 IRC):

1. Increased cost for round sheet metal ducts
2. Did not improve safety
3. Did not improve energy performance

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent’s published reason and the action taken on RM48-13.

Assembly Action: **None**

Final Hearing Results

RM47-13 **AS**

Code Change No: RM48-13

Original Proposal

Section(s): M1601.1.1

Proponent: Mark Terzigni, Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA)

Revise as follows:

M1601.1.1 Above ground duct systems. Above-ground duct systems shall conform to the following:

1 through 3 *(No changes to current text)*
4. ~~Minimum thickness of metal duct material shall be as listed in Table M1601.1.1(2).~~ Galvanized steel shall conform to ASTM A 653. Rigid metallic ducts shall be fabricated in accordance with SMACNA Duct Construction Standards Metal and Flexible except as allowed by Table M1601.1.1(2).
5 through 7 *(No changes to current text)*

~~TABLE M1601.1.1(2)~~
~~GAGES OF METAL DUCTS AND PLENUMS USED FOR HEATING OR COOLING~~

~~DUCT SIZE~~	~~GALVANIZED~~		~~ALUMINUM~~
	~~Minimum Thickness (inches)~~	~~Equivalent Galvanized Gage No.~~	~~Minimum Thickness (inches)~~
~~Round ducts and enclosed~~			
~~rectangular ducts~~	~~0.0157~~	~~28~~	~~0.0145~~
~~14 inches or less~~	~~0.0187~~	~~26~~	~~0.018~~
~~16 and 18 inches~~	~~0.0236~~	~~24~~	~~0.023~~
~~20 inches and over~~			
~~Exposed rectangular ducts~~	~~0.0157~~	~~28~~	~~0.0145~~
~~14 inches or~~	~~0.0187~~	~~26~~	~~0.018~~
~~Over 14[a] inches~~			

~~For SI: 1 inch = 25.4 mm.~~
~~a. For duct gages and reinforcement requirements at static pressures of 1/2 inch, 1 inch and 2 inches w.g., SMACNA *Duct Construction Standard*, Tables 2-1; 2-2 and 2-3 shall apply.~~

TABLE M1601.1.1(2)
DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESSES

Duct Shape and Size[a]		1/2 inch Water Gage (125 Pa)[a]					1 inch water gage (250 Pa)[a]				
ROUND diameter		Galvanized			Aluminum		Galvanized			Aluminum	
inches	mm	gage	inches	mm	inches	mm	gage	inches	mm	inches	mm
0-11	0-280	30	0.013	0.323	0.018	0.465	30	0.013	0.323	0.018	0.465
12-14	281-350	30	0.013	0.323	0.018	0.465	28	0.016	0.399	0.023	0.574
15-17	351-430	28	0.016	0.399	0.023	0.574	26	0.019	0.475	0.027	0.684
18	431-450	28	0.016	0.399	0.023	0.574	24	0.024	0.599	0.034	0.863
19-20	451-500	26	0.019	0.475	0.027	0.684	24	0.024	0.599	0.034	0.863
-	-	-	-	-	-	-	-	-	-	-	-
RECTANGULAR		Galvanized			Aluminum		Galvanized			Aluminum	
inches	mm	gage	inches	mm	inches	mm	gage	inches	mm	inches	mm
0-8	0-200	30	0.013	0.323	0.018	0.465	30	0.013	0.323	0.018	0.465
9-10	201-250	30	0.013	0.323	0.018	0.465	28	0.016	0.399	0.023	0.574
11-12	251-300	28	0.016	0.399	0.023	0.574	26	0.019	0.475	0.027	0.684
13-16	301-400	26	0.019	0.475	0.027	0.684	26	0.019	0.475	0.027	0.684
17-18	401-450	26	0.019	0.475	0.027	0.684	24	0.024	0.599	0.034	0.863
19-20	451-500	24	0.024	0.599	0.034	0.863	24	0.024	0.599	0.034	0.863

a. Ductwork that exceeds 20 inches by dimension or exceeds a static pressure of 1 inch water column (250 Pa) shall be constructed in accordance with ANSI/SMACNA *HVAC Duct Construction Standards Metal and flexible*

Reason: The above proposed change would provide consistency with the changes adopted in the 2015 IMC (M143-12)

The proposed change M143-12 wanted to return 14 inch round duct to its previous gage (prior to the code change adopted in 2009). SMACNA, the developer of the duct construction standard referenced in section 603 (IMC) evaluated the request with consideration of limiting the application to single dwelling units. The above table permits the use of 30 gage (0.013 in) for dimensions up to 14 inch round if the static pressure is at or below ½ in. w.g. The table also provides options for 1 inch water gage. This should address all but the largest single dwelling units in which case the ductwork should be constructed as required by the ANSI/SMACNA HVAC Duct Construction Standard. The above modification:

1. Addresses the concern of the original proponent of M143-12
2. Complies with methods used by SMACNA (ANSI Standard Developer)
3. Provides upper limits for size and pressure
4. Provides valid options for “low” and “high” pressure single dwelling systems
5. Encourages the use of resource efficient material.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent’s published reason.

Assembly Action: **None**

Final Hearing Results

RM48-13 **AS**

Code Change No: RM51-13

Original Proposal

Section(s): R202, M1601.3, Chapter 44

Proponent: Vickie Lovell, InterCode Incorporated, representing the Reflective Insulation Manufacturers Association International (Vickie@InterCodeinc.com)

Add new definition as follows:

SECTION R202
DEFINITIONS

REFLECTIVE DUCT INSULATION. A thermal insulation assembly consisting of one or more surfaces that have an emittance of 0.1 or less, and that bound an enclosed air space or spaces.

Revise as follows:

SECTION M1601
DUCT CONSTRUCTION

M1601.3 Duct insulation materials. Duct insulation materials shall conform to the following requirements:

1. Duct coverings and linings, including adhesives where used, shall have a flame spread index not higher than 25, and a smoke-developed index not over 50 when tested in accordance with ASTM E 84 or UL 723, using the specimen preparation and mounting procedures of ASTM E 2231.

   Exception: Spray application of polyurethane foam to the exterior of ducts in *attics* and crawl spaces shall be permitted subject to all of the following:

   1. The flame spread index is not greater than 25 and the smoke-developed index is not greater than 450 at the specified installed thickness.
   2. The foam plastic is protected in accordance with the ignition barrier requirements of Sections R316.5.3 and R316.5.4.
   3. The foam plastic complies with the requirements of Section R316.

2. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C 411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings and linings shall be listed and labeled.
3. External reflective duct insulation shall be legibly printed or identified at intervals not greater than 36 inches (914 mm) with the name of the manufacturer, the product R-value at the specified installed thickness and the flame spread and smoke-developed indices. The installed thickness of the external duct insulation shall include the enclosed air space(s). The product R-value for external reflective duct insulation shall be determined in accordance with ASTM C1668.

4~~3.~~ External duct insulation and factory-insulated flexible ducts shall be legibly printed or identified at intervals not longer than 36 inches (914 mm) with the name of the manufacturer, the thermal resistance R-value at the specified installed thickness and the flame spread and smoke-developed indexes of the composite materials. Spray polyurethane foam manufacturers shall provide the same product information and properties, at the nominal installed thickness, to the customer in writing at the time of foam application. All non-reflective duct insulation product R-values shall be based on insulation only, excluding air films, vapor retarders or other duct components, and shall be based on tested C-values at 75°F (24°C) mean temperature at the installed thickness, in accordance with recognized industry procedures. The installed thickness of duct insulation used to determine its R-value shall be determined as follows:

4.1 ~~3.1~~. For duct board, duct liner and factory-made rigid ducts not normally subjected to compression, the nominal insulation thickness shall be used.

4.2 ~~3.2~~. For ductwrap, the installed thickness shall be assumed to be 75 percent (25-percent compression) of nominal thickness.

4.3 ~~3.3~~. For factory-made flexible air ducts, the installed thickness shall be determined by dividing the difference between the actual outside diameter and nominal inside diameter by two.

4.4 ~~3.4~~. For spray polyurethane foam, the aged R-value per inch measured in accordance with recognized industry standards shall be provided to the customer in writing at the time of foam application. In addition, the total R-value for the nominal application thickness shall be provided.

Add new standard to Chapter 44 as follows:

ASTM

C1668-12 Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems

Reason: The goal of this proposal is to define an existing commonly installed insulation that should be properly included in the ICC Codes. This proposal will provide clear requirements for a duct insulation that has been in the market for many years and has nationwide distribution and installation. This proposal includes the specific requirements for reflective duct insulation.

This proposal improves the codes by providing installers and officials with a clear path on the specifications that pertain to this product, the appropriate definitions and an ASTM reference.

Reflective duct insulation is a well-established type of material/system and it has an ASTM standard specification, namely ASTM C1668 Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems. This standard can be viewed at: http://reflectixinc.com/literature/securedpdfs/C1668.pdf

It is the intent of this proposal to provide installers and officials with specific requirements and definitions as they pertain to reflective duct insulation products.

Cost Impact: This proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [ASTM C1668-12] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM51-13 **AS**

Code Change No: RM52-13

Original Proposal

Section(s): M1601.4.1

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1601.4.1 Joints, seams and connections. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC Duct Construction Standards—Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards. All joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. Tapes and mastics used to seal fibrous glass ductwork shall be *listed* and *labeled* in accordance with UL 181A and shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. ~~Closure systems~~ Tapes and mastics used to seal metallic and flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked “181 B-FX” for pressure sensitive tape or “181 BM” for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Crimp joints for round metallic ducts shall have a contact lap of not less than 1 inch (25.4 mm) and shall be mechanically fastened by means of not less than three sheet-metal screws or rivets equally spaced around the joint. Closure systems used to seal ~~metal~~ all ductwork shall be installed in accordance with the manufacturers’ instructions. ~~Round metallic ducts shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint.~~ ~~Unlisted duct tape shall not be permitted as a sealant on any duct.~~

Exceptions:

1. Spray polyurethane foam shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. Continuously welded and locking type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Reason: This proposal simplifies this section by stating what is meant by “closure systems.” Tapes and mastics are addressed in UL181A. There is no closure system listed specifically for metal ducts, but it is appropriate to require sealing products used for metal ducts to be listed to UL181A because if the sealing product is good enough for fibrous glass ducts it is good enough for metal ducts. This is the case in the field, as fibrous glass duct tapes are commonly used with metal ducts. The manufacturer’s instructions should apply for all closure systems, not just those for metal ducts. The last sentence is unnecessary because this proposal requires all tapes to be listed, including those used with metal ducts.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Sealants and tapes should be listed. The proposal provides specific guidance on what can be used for specific duct materials**.**

Assembly Action: **None**

Final Hearing Results

RM52-13	**AS**

Code Change No: RM53-13

Original Proposal

Section(s): M1601.4.1

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org); Vickie Lovell, InterCode Inc., representing DuctMate Industries (Vickie@intercodeinc.com)

Revise as follows:

M1601.4.1 Joints, seams and connections. All longitudal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC Duct Construction Standards—Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards. All joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes. Closure systems used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked “181 B-FX” for pressure sensitive tape or “181 BM” for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Crimp joints for round metallic ducts shall have a contact lap of not less than 1 inch (25.4 mm) and shall be mechanically fastened by means of not less than three sheet-metal screws or rivets equally spaced around the joint. Closure systems used to seal metal ductwork shall be installed in accordance with the manufacturers’ instructions. Round metallic ducts shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint. Unlisted duct tape shall not be permitted as a sealant on any duct.

Exceptions:

1. Spray polyurethane foam shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. ~~Continuously welded and locking type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~ <u>For ducts having a static pressure classification of less than 2 inches of water column (500Pa), additional closure systems shall not be required for continuously welded joints and seams and locking-type joints and seams of other than the snap-lock and button-lock types.</u>

Reason:
(Hall-PMGCAC): Unless sealant or a gasket is used, snap-lock and button-lock type seams will leak significantly. The current exception attempted to prevent unnecessary sealing for joints and seams that leak very little or not at all, but it went too far by including all locking type joints and seams. Some locking joints are leakproof such as mechanically folded seams used for spiral seam duct, but this cannot be said for all locking joints. This text was approved for the 2015 IMC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Lovell): This proposed text is derived from a revision to the International Mechanical Code that was proposed by the PMG Code Action Committee in M151-12 and was approved by the voting membership in Portland for the 2015 IMC. That reason statement is supplied below:

Unless sealant or a gasket is used, snap-lock and button-lock type seams will leak significantly. The current exception attempted to prevent unnecessary sealing for joints and seams that leak very little or not at all, but it went too far by including all locking type joints and seams. Some locking joints are leakproof such as mechanically folded seams used for spiral seam duct, but this cannot be said for all locking joints.

The identical proposal that was approved As Submitted in the Mechanical Code hearings in Portland is being submitted to the 2015 IECC residential requirements for consistency.

Cost Impact:
(Hall-PMGCAC): The code change proposal will not increase the cost of construction.

(Lovell): This proposal reduces the cost of installation.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal increases the cost of construction and provides insufficient benefit for the added cost. Duct leakage within the thermal envelope is not a problem.

Assembly Action: **None**

Final Hearing Results

Public Comment 1:

Vickie Lovell, INTERCODE, INC., representing Rectorseal, requests Approval as Submitted.

Commenter's Reason: We respectfully disagree with the committee's reason for disapproval. Leakage in ducts with snap-lock and button type seam <u>IS</u> a problem unless a sealant or gasket is used. The small increase in cost provides a realized cost-benefit from the optimum performance of the HVAC system to cool and heat the house.

The IMC code development committee and the voting audience agreed and voted for <u>approval</u> of this code change proposal for the 2015 IMC. The ICC PMG Code Action Committee and the IECC Code Development Committee also recommended <u>approval</u> of this proposal**.**

Public Comment 2:

Shawn Strausbaugh of Arlington County, Virginia representing the ICC PMG Code Action Committee requests Approval as Submitted.

Commenter's Reason: The committee believed that ducts should be able to leak into the conditioned spaces, however, this section addresses ducts in all locations including those outside of the conditioned space. Duct leakage is detrimental even within the conditioned space because the system will not deliver air to the intended spaces if the ducts leak air into unintended locations. The system will result in overheated or over cooled spaces and under heated or under cooled spaces which causes thermostat adjustments to overcome the thermal discomfort of the occupants. This results in poor energy performance.

Final Hearing Results

RM53-13 **AS**

Code Change No: RM55-13

Original Proposal

Section(s): M1601.4.2 (New)

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Add new text as follows:

M1601.4.2 Duct lap. Crimp joints for round and oval metal ducts shall be lapped not less than one inch and the male end of the duct shall extend into the adjoining duct in the direction of airflow.

Reason: Section M1601.4.1 states the number of fasteners to be used for the fastening of metal ducts but is silent on the direction of the lap relative to airflow. The current code is also silent on oval ducts which are commonly installed in dwellings. The code should specifically state how much lap there must be for round and oval ducts prior to securing them as stated in Section M1601.4.1.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM55-13 **AS**

Code Change No: RM56-13

Original Proposal

Section(s): M1601.4.3

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M1601.4.3 Support. ~~Metal ducts shall be supported by 1/2-inch (13 mm) wide 18-gage metal straps or 12-gage galvanized wire at intervals not exceeding 10 feet (3048 mm) or other *approved* means. Nonmetallic ducts shall be supported in accordance with the manufacturer's installation instructions.~~ Ducts shall be supported in accordance with SMACNA *HVAC Duct Construction Standards—Metal and Flexible*.

Reason: This section should just reference the SMACNA standards as opposed to specifying a support interval. The 10 foot interval requirement is too broad and is inappropriate for many sizes and types of ducts . Many ducts require closer supports. This text could be easily interpreted as allowing 10 feet maximum support intervals for all ducts. This section is not being enforced since nobody installs 18 gage metal straps to support residential ducts.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Multiple attempts to modify the proposal indicate that it needs to be reworked in a public comment.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh of Arlington County, Virginia representing the ICC PMG Code Action Committee requests Approval as Modified by this Public Comment.

Replace proposal as follows:

M1601.4.3 Support. ~~Metal ducts shall be supported by 1/2-inch (13 mm) wide 18-gage metal straps or 12-gage galvanized wire at intervals not exceeding 10 feet (3048 mm) or other *approved* means. Nonmetallic ducts shall be supported in accordance with the manufacturer's installation instructions.~~ Factory made ducts listed in accordance with UL181 shall be supported in accordance with the manufacturer's installation instructions. Field- and shop-fabricated fibrous glass ducts shall be supported in accordance the SMACNA *Fibrous Glass Duct Construction Standards* or the NAIMA *Fibrous Glass Duct Construction Standards*. Field- and shop-fabricated metal and flexible ducts shall be supported in accordance with the SMACNA *HVAC Duct Construction Standards—Metal and Flexible*.

Reason: The 10 foot interval requirement is too broad and is inappropriate for many sizes and types of ducts . Many ducts require closer supports. This text could be easily interpreted as allowing 10 feet maximum support intervals for all ducts. This section should just reference the appropriate support requirements as specified in the applicable manual or listing. Definitions are added to clarify intent of terminology for the different type of ducts

Final Hearing Results

RM56-13	AMPC

Code Change No: RM57-13

Original Proposal

Section(s): M1602

Proponent: Guy McMann MCP, Jefferson County Colorado representing Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

~~**M1602.1 Return air** Return air shall be taken from inside the dwelling . Dilution of return air with outdoor air shall be permitted.~~

~~**M1602.2 Prohibited sources.** Outdoor and return air for a forced-air heating or cooling system shall not be taken from the following locations:~~

1. ~~Closer than 10 feet (3048 mm) to an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.~~
2. ~~Where flammable vapors are present; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.~~
3. ~~A room or space, the volume of which is less than 25 percent of the entire volume served by the system. Where connected by a permanent opening having an area sized in accordance with ACCA Manual D, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of the rooms or spaces.~~

   ~~**Exception:** The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to the room or space.~~

4. ~~A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room, unconditioned attic or other dwelling unit .~~

   ~~**Exception:** Dedicated forced-air systems serving only a garage shall not be prohibited from obtaining return air from the garage.~~

5. ~~A room or space containing a fuel-burning appliance where such room or space serves as the sole source of return air.~~

   ~~**Exceptions:**~~

   1. ~~The fuel-burning appliance is a direct-vent appliance or an appliance not requiring a vent in accordance with Section M1801.1 or Chapter 24.~~
   2. ~~The room or space complies with the following requirements:~~
      - ~~2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.~~
      - ~~2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.~~

~~2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.~~

~~3. Rooms or spaces containing solid-fuel burning appliances , if return-air inlets are located not less than 10 feet (3048 mm) from the firebox of those appliances .~~

~~6. An unconditioned crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.~~

~~**M1602.3 Inlet opening protection.** Outdoor air inlets shall be covered with screens having openings that are not less than 1/4 inch (6.4 mm) and not greater than 1/2 inch (12.7 mm).~~

M1602.1 Outdoor air openings. Outdoor intake openings shall be located in accordance with Section R303.4.1. Opening protection shall be in accordance with Section R303.5

M1602.2. Return air openings. Return air openings for heating, ventilation and air conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the *registered design professional*.
4. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet from the cooking appliances.

   2. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

5. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
6. Return air from one dwelling unit shall not be discharged into another dwelling unit.

Reason: This was approved by the IMC committee and will be published. This is an attempt to reorganize and delete language in this section that contains outdated legacy code language. This Section is much more complicated than it needs to be as the foremost concern regarding return air is to keep contaminants out of the openings and air stream. This section is long over-due for an overhaul the intent in which is to simplify the matter.

- Existing item 1 and 2 deal primarily with outdoor opening which can be referenced in R303.4.1. This Section is addressing return air, not outdoor air.
- Existing item 3 will literally prevent a return air opening in most bedrooms as they are usually less than 25% of the area served. There is no technical justification for this benchmark. What significance would there be between 25% and 26% that will impact the return air system? There is no need for such an arbitrary benchmark. What's really important is not to take too much air out of a room as noted in the new #3.
- The size of any transfer should be according to design, not arbitrary, outdated numbers as in the existing #3
- Language in existing #4 is revised.
- Existing Item 5 and its exceptions have many problems and has been deleted in its entirety. It's a tortured approach as it attempts to describe a furnace in an enclosure with no return air duct along side a water heater all the while using the enclosure as a plenum utilizing louvered doors or openings to bring air back to the unit. This is not current practice and is prohibited. It calls for volume which is twice as much as current combustion requirements and is very difficult to explain the picture it attempts to deliver.
- M1602.3 has been deleted and reference made to R303.5 as the heading of this section is Return air, not inclusive of outdoor air.

All the usual requirements that can affect the quality and installation of return air openings are contained here as there are no new requirements.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

M1602.1 Outdoor air openings. Outdoor intake openings shall be located in accordance with Section R303.4.1. Opening protection shall be in accordance with Section R303.5

M1602.2. Return air openings. Return air openings for heating, ventilation and air conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the *registered design professional*.
4. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet from the cooking appliances.
   2. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

5. Taking return air from an unconditioned ~~a~~ crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
6. Return air from one dwelling unit shall not be discharged into another dwelling unit.

Committee Reason: The proposal is consistent with the IMC. The modification corrects an omission on the part of the proponent.

Assembly Action: **None**

Final Hearing Results

RM57-13	AM

Code Change No: RM59-13

Original Proposal

Section(s): M1804.4 (New)

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Add new text as follows:

M1804.4 Door swing. Appliance and equipment vent terminals shall be located such that doors cannot swing within 12 inches (305 mm) horizontally of the vent terminals. Door stops or closures shall not be installed to obtain this clearance.

Reason: This new language was approved for the 2015 IMC. Any appliance vent can be subject to damage as a result of a door swing even when the vent has been installed in accordance with the manufacturer's instructions. Most manufacturers do not address proximity to doors on a different plane. Even if the door doesn't come in contact with the vent terminal, the door could be left too close to the vent when the appliance is operating and possibly overheating the door and/or interfering with the operation of the vent terminal.

Cost Impact: None

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This text is not needed because it is covered in section G2427.6.

Assembly Action: **None**

Public Comment

Public Comment 1:

Guy McMann, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: This was approved by the Mechanical and Fuel Gas committees and is applicable in this Section. The Committee concern was that this will already be covered in Chapter 24. Chapter 24 will have this exact same text because it was approved in the IFGC. Chapter 24 extracts the IFGC text. Putting this text in Chapter 18 will cover vent terminals from oil and biomass-fired appliances.

Public Comment 2:

Shawn Strausbaugh of Arlington County, Virginia representing the ICC PMG Code Action Committee requests Approval as Submitted.

Commenter's Reason: The committee stated that this proposed text is already provided in Section G2427.6 of the IRC. The venting provisions related to doors and windows found in Chapter 24 have nothing to do with the door swing issue addressed by the proposed new text. Chapter 24 deals with the concern for vent gasses entering the building, not the concern for the door impacting the vent terminal. Neither the codes nor the manufacturer's instructions cover the issue of doors swinging into vent terminals.

Chapter 18 covers other than gas-fired appliance vent terminals. The new text in this proposal will automatically be added to Chapter 24 as it is taken from the IFGC.

Final Hearing Results

RM59-13	**AS**

Code Change No: RM61-13

Original Proposal

Section(s): M1901.3

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Delete without substitution:

~~**M1901.3 Prohibited location.** Cooking appliances designed, tested, listed and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.~~

Reason: Section M1901.3 is redundant with Section M1901.2 and there may be appliances that are listed for both domestic and commercial use and such appliances would be prohibited by current text. Current Section M1901.2 captures the entire intent and is all that is needed. The same deletion was approved for the 2015 IMC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM61-13 **AS**

Code Change No: RM62-13

Original Proposal

Section(s): M2001.1

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M2001.1 Standards. Packaged oil-fired boilers~~ and their control systems shall ~~be listed and labeled in accordance with UL 726. Packaged electric boilers~~ and their control systems ~~shall be listed and labeled in accordance with UL 834. Solid-fuel-fired boilers shall be listed and labeled in accordance with UL 2523. Boilers shall be designed, ~~and~~ constructed and certified in accordance with the requirements of ASME CSD-1 and as applicable, the ASME *Boiler and Pressure Vessel Code*, Section I or IV. Controls and safety devices for boilers with fuel input ratings of 12,500,000 Btu/hr (3 663 388 watts) or less shall meet the requirements of ASME CSD-1. Gas fired boilers shall conform to the requirements listed in Chapter 24.

Reason: This revised language was approved for the 2015 IMC. Current wording is not correct since ASME CSD-1 is not a construction standard. The proposed wording starts with the vessel construction requirements and continues with the acceptable standards for complete appliances. The proposed wording is no change from the intent of the previous wording.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh of Arlington County, Virginia representing the ICC PMG Code Action Committee requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M2001.1 Standards. Packaged oil-fired boilers be listed and labeled in accordance with UL 726. Packaged electric boilers shall be listed and labeled in accordance with UL 834. Solid-fuel-fired boilers shall be listed and labeled in accordance with UL 2523. Boilers shall be designed, constructed and certified in accordance with the ~~requirements of ASME CSD-1 and as applicable, the~~ ASME *Boiler and Pressure Vessel Code*, Section I or IV. Controls and safety devices for boilers with fuel input ratings of 12,500,000 Btu/hr (3 663 388 watts) or less shall meet the requirements of ASME CSD-1. Gas fired boilers shall conform to the requirements listed in Chapter 24.

Commenter's Reason: The proposed wording was recommended for approval by the committee but the text does not match the parallel section in the IMC. Boilers are not constructed in accordance with ASME CSD-1. The intent of this proposal was to match the IMC, therefore a slight modification is needed to accomplish this.

Final Hearing Results

RM62-13	**AMPC**

Code Change No: RM63-13

Original Proposal

Section(s): M2002.5, M2002.6 (New)

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M2002.5 Boiler low-water cutoff. ~~All~~ steam and hot water boilers shall be protected with a low-water cutoff control. ~~The low-water cutoff shall automatically stop the combustion operation of the *appliance* when the water level drops below the lowest safe water level as established by the manufacturer.~~

> **Exception:** A low-water cutoff is not required for coil-type and water-tube-type boilers that require forced circulation of water through the boiler and that are protected with a flow sensing control.

M2002.6 Operation. Low-water cutoff controls and flow sensing controls required by Section M2002.5 shall automatically stop the combustion operation of the appliance when the water level drops below the lowest safe water level as established by the manufacturer or when the water circulation flow is less than that required for safe operation of the appliance, respectively.

Reason: There is no exception to Section M2002.5 for coil-type hot water supply boilers that require forced circulation and use flow switches to stop combustion when water flow is lost or reduced. Flow switches that monitor forced circulation through a water tube- or coil-type boiler provide the same function as a low-water cutoff and should be recognized as an alternative to a low-water cutoff. The recognition of flow sensing controls was approved for the 2015 IMC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent’s published reason. The proposed text is consistent with CSD-1 and UL standards.

Assembly Action: **None**

Final Hearing Results

RM63-13 **AS**

Code Change No: RM64-13

Original Proposal

Section(s): M2005.1

Proponent: Bob Eugene, representing UL LLC (Robert.Eugene@ul.com)

Revise as follows:

M2005.1 General. Water heaters shall be installed in accordance with Chapter 28, the manufacturer's instructions and the requirements of this code. Water heaters installed in an *attic* shall comply with the requirements of Section M1305.1.3. Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oiled-fired water heaters shall comply with UL 732. Thermal solar water heaters shall comply with Chapter 23 and UL 174. Solid-fuel-fired water heaters shall comply with UL 2523.

Reason: Chapter 28 provides specific additional details for the installation of water heaters. This also correlates with the reference found in P2801.2.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM64-13	**AS**

Code Change No: RM65-13

Original Proposal

Section(s): TABLE M2101.1, Chapter 44

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association, representing Plastic Pipe and Fittings Association (mikec@cmservnet.com)

Revise as follows:

TABLE M2101.1
HYDRONIC PIPING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
Acrylonitrile butadiene styrene (ABS) plastic pipe	1,5	ASTM D1527; ASTM F2806; ASTM F2969	Solvent cement joints	

(Portions of table not shown remain unchanged)

a. Use code:

1. Above ground.
2. Embedded in radiant systems.
3. Temperatures below 180°F only.
4. Low temperature (below 130°F) applications only.
5. Temperatures below 160°F only.

b. Standards as listed in Chapter 44.

Add new standards to Chapter 44 as follows:

ASTM F2806-10
Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (Metric SDR-PR)

ASTM F2969-12
Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) IPS Dimensioned Pressure Pipe

Reason: There are ASTM standards for pressure rated ABS piping products that could be utilized in hydronic systems. In fact, the IMC already contains ABS pipe in Table 1202.4.

ASTM D1527 - 99(2005) Standard Specification for Acrylonitrile Butadiene Styrene (ABS) Plastic Pipe, Schedules 40 and 80
ASTM F2806 - 10e1 Standard Specification for Acrylonitrile Butadiene Styrene (ABS) Plastic Pipe (Metric SDR PR)
ASTM F2969 - 12 Standard Specification for Acrylonitrile Butadiene Styrene (ABS) IPS Dimensioned Pressure Pipe

Note: ASTM D 2282 was not added as it is a previously withdrawn ABS pipe standard found in earlier versions of the IMC.

Cost Impact: None

Analysis: A review of the standards proposed for inclusion in the code, [ASTM F2806-10 and ASTM F2969-12] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM65-13	**AS**

Code Change No: RM66-13

Original Proposal

Section(s): Table M2101.1, M2101.10, M2104, M2105, M2106 thru M2110 (New), Chapter 44

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association, representing Plastic Pipe and Fittings Association (mikec@cmservnet.com)

Revise as follows:

TABLE M2101.1
HYDRONIC PIPING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
~~Polyethylene (PE) pipe, tubing and fittings (for ground source heat pump loop systems)~~	~~1,2,4~~	~~ASTM D 2513; ASTM D 3035; ASTM D 2447; ASTM D 2683; ASTM F 1055; ASTM D 2837; ASTM D 3350; ASTM D 1693~~	~~Heat-fusion~~	

(Portions of table not shown remain unchanged)

M2101.10 Tests. Hydronic piping systems shall be tested hydrostatically at a pressure of one and one-half times the maximum system design pressure, but not less than 100 psi (689 kPa). The duration of each test shall be not less than 15 minutes, but not more than 20 minutes.

~~**M2104.2.1 Polyethylene plastic pipe and tubing for ground source heat pump loop systems.** Joints between polyethylene plastic pipe and tubing or fittings for ground source heat pump loop systems shall be heat fusion joints conforming to Section M2104.2.1.1, electrofusion joints conforming to Section M2104.2.1.2, or stab-type insertion joints conforming to Section M2104.2.1.3.~~

~~**M2104.2.1.1 Heat-fusion joints.** Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, joined in accordance with ASTM D 2657. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D 2683 or ASTM D 3261.~~

~~**M2104.2.1.2 Electrofusion joints.** Joints shall be of the electrofusion type. Joint surfaces shall be clean and free of moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F 1055.~~

~~**M2104.2.1.3 Stab-type insert fittings.** Joint surfaces shall be clean and free of moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F 1924.~~

SECTION M2105
PLASTIC PIPE GROUND-SOURCE HEAT PUMP LOOP SYSTEMS

~~**M2105.1 Testing.** The assembled loop system shall be tested with water at 100 psi (689 kPa) for 30 minutes with no observed leaks. Flow rates and pressure drops shall be compared to calculated values. If actual flow rate or pressure drop values differ from calculated design values by more than 10 percent, the problem shall be identified and corrected.~~

M2105.1 Plastic Ground-Source Heat Pump-Loop Water Piping. Plastic ground-source heat pump ground loop-piping and tubing material for water-based systems shall conform to the standards cited in this section.

M2105.2 Used materials. Reused pipe, fittings, valves, and other materials shall not be permitted in ground-source heat pump loop systems.

M2105.3 Material rating. Pipe and tubing shall be rated for the operating temperature and pressure of the ground source heat pump-loop system. Fittings shall be suitable for the pressure applications and recommended by the manufacturer for installation with the pipe and tubing material installed. Where used underground, materials shall be suitable for burial.

M2105.4 Piping and tubing materials standards. Ground-source heat pump ground-loop pipe and tubing shall conform to the standards listed in Table M2105.4.

TABLE M2105.4
GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F441; ASTM F442; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F877 CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9; AWWA C903
High Density Polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241; CSA 137.3
Raised temperature polyethylene (PE-RT)	ASTM F2623

M2105.5 Fittings. Ground-source heat pump pipe fittings shall be approved for installation with the piping materials to be installed, shall conform to the standards listed in Table M2105.5 and if installed underground, shall be suitable for burial.

TABLE M2105.5
GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F1970 CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F 877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F2434; ASTM F1282, CSA B137.9
High Density Polyethylene (HDPE~~)~~	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448, NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; ASTM F1970 CSA B137.3

PIPE MATERIAL	STANDARD
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2159; B137.1

SECTION M2106
JOINTS AND CONNECTIONS

M2106.1 Approval. Joints and connections shall be of an approved type. Joints and connections shall be tight for the pressure of the ground-source loop system. Joints used underground shall be approved for buried applications.

M2106.1.1 Joints between different piping materials. Joints between different piping materials shall be made with approved transition fittings.

M2106.2 Preparation of pipe ends. Pipe shall be cut square, reamed, and shall be free of burrs and obstructions. CPVC, PE, and PVC pipe shall be chamfered. Pipe ends shall have full-bore openings and shall not be undercut.

M2106.3 Joint preparation and installation. Where required by Sections M2106.4 through M2106.6, the preparation and installation of mechanical and thermoplastic-welded joints shall comply with Sections M2106.3.1 and M2016.3.2.

M2106.3.1 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

M2106.3.2 Thermoplastic-welded joints. Joint surfaces for thermo plastic-welded joints shall be cleaned by an approved procedure. Joints shall be welded in accordance with the manufacturer's instructions.

M2106.4 CPVC plastic pipe. Joints between CPVC plastic pipe or fittings shall be solvent-cemented in accordance with Section P2905.9.1.2. Threaded joints between fittings and CPVC plastic pipe shall be in accordance with Section M2106.4.1.

M1206.4.1 Threaded joints. Threads shall conform to ASME B1.20.1. Schedule 80 or heavier plastic pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant, pipe-joint compound or tape shall be applied on the male threads only and shall be *approved* for application on the piping material.

M2106.5 Cross-linked polyethylene (PEX) plastic tubing. Joints between cross-linked polyethylene plastic tubing and fittings shall comply with Sections M2106.5.1 and M2106.5.2. Mechanical joints shall comply with Section M2106.3.1.

M2106.5.1 Compression-type fittings. Where compression- type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

M2106.5.2 Plastic-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches of a transition from such metal pipe to plastic pipe or tubing.

M2106.6 Polyethylene plastic pipe and tubing for ground source heat pump loop systems. Joints between polyethylene plastic pipe and tubing or fittings for ground source heat pump loop systems shall be heat fusion joints complying with Section M2106.6.1, electrofusion joints complying with Section M2106.6.2, or stab-type insertion joints complying with Section M2106.6.3.

M2106.6.1 Heat-fusion joints. Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, joined in accordance with ASTM D 2657. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D 2683 or ASTM D 3261.

M2106.6.2 Electrofusion joints. Joints shall be of the electrofusion type. Joint surfaces shall be clean and free of moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F 1055.

M2106.6.3 Stab-type insert fittings. Joint surfaces shall be clean and free of moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F 1924.

M2106.7 Polypropylene (PP) plastic. Joints between PP plastic pipe and fittings shall comply with Sections M2106.7.1 and M2106.7.2.

M2106.7.1 Heat-fusion joints. Heat-fusion joints for polypropylene (PP) pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings, electrofusion polypropylene fittings or by butt fusion. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F 2389.

M2106.7.2 Mechanical and compression sleeve joints. Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's instructions.

M2106.8 Raised temperature polyethylene (PE-RT) plastic tubing. Joints between raised temperature polyethylene tubing and fittings shall complying with Sections M2016.8.1 and M2106.8.2. Mechanical joints shall comply with Section M2106.3.1.

M2106.8.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

M2106.8.2 PE-RT-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition from such metal pipe to PE-RT pipe.

M2106.9 PVC plastic pipe. Joints between PVC plastic pipe or fittings shall be solvent-cemented in accordance with Section P2905.9.1.3. Threaded joints between fittings and PVC plastic pipe shall be in accordance with Section M2106.4.1.

SECTION M2107
VALVES

M2107.1 Where required. Shutoff valves shall be installed in ground source-loop piping systems in the locations indicated in Sections M2107.1.1 through M2107.1.6.

M2107.1.1 Heat exchangers. Shutoff valves shall be installed on the supply and return side of a heat exchanger.

> **Exception:** Shutoff valves shall not be required where heat exchangers are integral with a boiler or are a component of a manufacturer's boiler and heat exchanger packaged unit and are capable of being isolated from the hydronic system by the supply and return valves required by Section M2001.3.

M2107.1.2 Central systems. Shutoff valves shall be installed on the building supply and return of a central utility system.

M2107.1.3 Pressure vessels. Shutoff valves shall be installed on the connection to any pressure vessel.

M2107.1.4 Pressure-reducing valves. Shutoff valves shall be installed on both sides of a pressure-reducing valve.

M2107.1.5 Equipment and appliances. Shutoff valves shall be installed on connections to mechanical *equipment* and appliances. This requirement does not apply to components of a ground-source loop system such as pumps, air separators, metering devices, and similar *equipment*.

M2107.1.6 Expansion tanks. Shutoff valves shall be installed at connections to nondiaphragm-type expansion tanks.

M2107.2 Reduced pressure. A pressure relief valve shall be installed on the low-pressure side of a hydronic piping system that has been reduced in pressure. The relief valve shall be set at the maximum pressure of the system design. The valve shall be installed in accordance with Section M2002.

SECTION M2108
PIPING INSTALLATION

M2108.1 General. Piping, valves, fittings, and connections shall be installed in accordance with the manufacturer's instructions.

M2108.3 Protection of potable water. Where ground-source heat pump ground loop systems have a connection to a potable water supply, the potable water system shall be protected from backflow in accordance with Section P2902.

M2108.4 Pipe penetrations. Openings for pipe penetrations in walls, floors and ceilings shall be larger than the penetrating pipe. Openings through concrete or masonry building elements shall be sleeved. The annular space surrounding pipe penetrations shall be protected in accordance with Section P2606.1.

M2108.5 Clearance from combustibles. A pipe in a ground source heat pump piping system having an exterior surface temperature exceeding 250°F (121°C) shall have a *clearance* of not less than 1 inch (25 mm) from combustible materials.

M2108.6 Contact with building material. A ground-source heat pump ground-loop piping system shall not be in direct contact with building materials that cause the piping or fitting material to degrade or corrode, or that interfere with the operation of the system.

M2108.7 Strains and stresses. Piping shall be installed so as to prevent detrimental strains and stresses in the pipe. Provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement. Piping shall be installed so as to avoid structural stresses or strains within building components.

M2108.7.1 Flood hazard. Piping located in a flood hazard area shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the *design flood elevation*.

M2108.8 Pipe support. Pipe shall be supported in accordance with Section M2101.9.

M2108.9 Velocities. Ground-source heat pump ground-loop systems shall be designed so that the flow velocities do not exceed the maximum flow velocity recommended by the pipe and fittings manufacturer. Flow velocities shall be controlled to reduce the possibility of water hammer.

M2108.10 Labeling and Marking. Ground-source heat pump ground-loop system piping shall be marked with tape, metal tags or other methods where it enters a building. The marking shall indicate the following words: "GROUND SOURCE HEAT PUMP-LOOP SYSTEM". The marking shall indicate any antifreeze used in the system by name and concentration.

M2108.11 Chemical Compatibility. Antifreeze and other materials used in the system shall be chemically compatible with the pipe, tubing, fittings, and mechanical systems.

SECTION M2109
WORKING FLUID

M2109.1 Makeup water. The transfer fluid shall be compatible with the makeup water supplied to the system.

SECTION M2109
TESTS

M2109.1 Ground-source heat pump loop systems. Before connection header trenches are backfilled, the assembled loop system shall be pressure tested with water at 100 psi (689 kPa) for 15 minutes with no observed leaks. Flow and pressure loss testing shall be performed and the actual flow rates and pressure drops shall be compared to the calculated design values. If actual flow rate or pressure drop values differ from calculated design values by more than 10 percent, the cause shall be identified and corrective action taken.

SECTION M2110
EMBEDDED PIPING

M2110.1 Pressurizing during installation. Ground-source heat pump ground loop piping to be embedded in concrete shall be pressure tested prior to pouring concrete. During pouring, the pipe shall be maintained at the proposed operating pressure.

Add new standards to Chapter 44 as follows:

ASTM

D3261-03 Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

F1970-12 Standard Specifcation for Special Engineered Fittings, Appurtenances or Valves for Use in Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Systems

AWWA

C903-05 Polyethylene-Aluminum- Polyethylene & Crosslinked Polyethylene Composite Pressure Pipes, ½ in (12mm) through 2 in (50mm), for Water Service

CSA

CSA C448 SERIES-02-CAN/CSA-2002
Design and Installation of Earth Energy Systems - First Edition; Update 2: October 2009; Consolidated Reprint 10/2009

NSF

NSF 358-1 2011
Polyethylene Pipe and Fittings for Water-Based Ground-Source ‘Geothermal’ Heat Pump Systems

Reason: This revised language, new sections and standards were approved for the 2015 IMC.
Water based geothermal PE piping is currently listed in the hydronics section where it doesn’t quite fit. This special and growing application should have its own section, and it should cover other materials that could potentially be used. Green building rating systems are promoting geothermal ground loop heating and cooling systems, in both commercial and residential construction, and the IRC should also have more information. While HDPE dominates the water based technology with an expected 95% of the

systems, other piping materials can be utilized. Copper is used in direct expansion systems that do not run on water, but use refrigerants directly. The only minor modifications from the IMC language are in the following sections:

M2108.1 General. Piping, valves, fittings, and connections shall be installed in accordance with ***the manufacturer's instructions***., as some were concerned by *the language, "**conditions of the approval.**"*

CSA B137.6, AWWA C903, and CSA B137.3 were added where appropriate to Table M2105.4

ASTM F1970 Standard Specification for Special Engineered Fittings, Appurtenances or valves for PVC and CPVC was added to table M2105.5.

Cost Impact: None

Analysis: A review of the standards proposed for inclusion in the code, [ASTM D3261-03, ASTM F1970-12; AWWA C903-05; CSA C448 Series-02-CAN/CSA-2002; NSF 358-1 2011] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

TABLE M2105.4
GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F441; ASTM F442; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F877 CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9; AWWA C903
High Density Polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241; CSA 137.3
Raised temperature polyethylene (PE-RT)	ASTM F2623; <u>F2769</u>

TABLE M2105.5
GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F1970 CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F 877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F2434; ASTM F1282, CSA B137.9
High Density Polyethylene (HDPE~~)~~	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448, NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; ASTM F1970 CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2159; <u>F2769;</u> B137.1

(Portions of code change proposal not shown remain unchanged)

Committee Reason: Approval was based upon the proponent's published reason. The modification added the same standard that was added in RP111-13.

Assembly Action: None

Final Hearing Results

RM66-13	**AM**

Code Change No: RM67-13

Original Proposal

Section(s): Table M2101.1, M2104.2.1 thru M2104.2.1.3, M2101.10, M2105, M2106 (New), M2107 (New), M2108 (New), M2109 (New), M2110 (New), Chapter 44

Proponent: Jeremy Brown, representing NSF International

Revise as follows:

TABLE M2101.1
HYDRONIC PIPING MATERIALS

MATERIAL	USE CODE [a]	STANDARD [b]	JOINTS	NOTES
~~Polyethylene (PE) pipe, tubing and fittings (for ground source heat pump loop systems)~~	~~1,2,4~~	~~ASTM D 2513; ASTM D 3035; ASTM D 2447; ASTM D 2683; ASTM F 1055; ASTM D 2837; ASTM D 3350; ASTM D 1693~~	~~Heat-fusion~~	

(Portions of table not shown remain unchanged)

M2101.10 Tests. Hydronic piping systems shall be tested hydrostatically at a pressure of one and one-half times the maximum system design pressure, but not less than 100 psi(689kPa). ~~For a duration of not less than 75 minutes.~~ The duration of each test shall be not less than 15 minutes, and not more than 20 minutes.

~~**M2104.2.1 Polyethylene plastic pipe and tubing for ground source heat pump loop systems.** Joints between polyethylene plastic pipe and tubing or fittings for ground source heat pump loop systems shall be heat fusion joints conforming to Section M2104.2.1.1, electrofusion joints conforming to Section M2104.2.1.2 or stab-type insertion joints conforming to Section M2104.2.1.3.~~

~~**M2104.2.1.1 Heat-fusion joints.** Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, fabricated in accordance with the piping manufacturer's instructions. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D 2683.~~

~~**M2104.2.1.2 Electrofusion joints.** Joint surfaces shall be clean and free of moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F 1055.~~

~~**M2104.2.1.3 Stab-type insert fittings.** Joint surfaces shall be clean and free of moisture. Pipe ends shall be chamfered and inserted into the fitting to full depth. Fittings shall be manufactured in accordance with ASTM D 2513.~~

SECTION M2105
PLASTIC PIPE GROUND-SOURCE HEAT PUMP LOOP SYSTEMS

~~**M2105.1 Testing.** The assembled loop system shall be pressure tested with water at 100 psi (690 kPa) for 30 minutes with no observed leaks before connection (header) trenches are backfilled. Flow rates and~~

~~pressure drops shall be compared to calculated values. If actual flow rate or pressure drop figures differ from calculated values by more than 10 percent, the problem shall be identified and corrected.~~

M2105.1 Plastic Ground-Source Heat Pump-Loop Water Piping. Plastic ground-source heat pump ground- loop piping and tubing material for water-based systems shall conform to the standards specified in this section.

M2105.2 Used materials. Reused pipe, fittings, valves, and other materials shall not be used in ground-source heat pump loop systems.

M2105.3 Material rating. Pipe and tubing shall be rated for the operating temperature and pressure of the ground source heat pump loop system. Fittings shall be suitable for the pressure applications and recommended by the manufacturer for installation with the pipe and tubing material installed. Where used underground, materials shall be suitable for burial.

M2105.4 Piping and tubing materials standards. Ground-source heat pump ground-loop pipe and tubing shall conform to the standards listed in Table M2105.4.

M2105.5 Fittings. Ground-source heat pump pipe fittings shall be approved for installation with the piping materials to be installed, shall conform to the standards listed in Table M2105.5 and where installed underground shall be suitable for burial.

TABLE M2105.5
GROUND SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D 2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F 877; ASTM F1807; ASTM F 1960; ASTM F 2080; ASTM F2159; ASTM F2434; CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F 2434; ASTM F1282, CSA B137.9
High Density Polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448, NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11, NSF 358-2
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2159; B137.1

TABLE M2105.4
GROUND SOURCE LOOP PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F441; ASTM F442
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F877 CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
High Density Polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11, NSF 358-2
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623

SECTION M2106
JOINTS AND CONNECTIONS

M2106.1 Approval. Joints and connections shall be of an approved type. Joints and connections shall be tight for the pressure of the ground-source loop system. Joints used underground shall be approved for such applications.

M2106.1.1 Joints between different piping materials. Joints between different piping materials shall be made with approved transition fittings.

M2106.2 Preparation of pipe ends. Pipe shall be cut square, reamed, and shall be free of burrs and obstructions. CPVC, PE, and PVC pipe shall be chamfered. Pipe ends shall have full-bore openings and shall not be undercut.

M2106.3 Joint preparation and installation. Where required by Sections M2106.4 through M2106.6, the preparation and installation of mechanical and thermoplastic-welded joints shall comply with Sections M2106.3.1 and M2016.3.2.

M2106.3.1 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

M2106.3.2 Thermoplastic-welded joints. Joint surfaces for thermo plastic-welded joints shall be cleaned by an approved procedure. Joints shall be welded in accordance with the manufacturer's instructions.

M2106.4 CPVC plastic pipe. Joints between CPVC plastic pipe or fittings shall be solvent-cemented in accordance with Section P2905.9.1.2. Threaded joints between fittings and CPVC plastic pipe shall be in accordance with Section M2106.4.1.

M1206.4.1 Threaded joints. Threads shall conform to ASME B1.20.1. The pipe shall be Schedule 80 or heavier and shall be threaded with dies specifically designed for plastic pipe. Thread lubricant, pipe-joint compound or tape shall be applied on the male threads only and shall be *approved* for application on the piping material.

M2106.5 Cross-linked polyethylene (PEX) plastic tubing. Joints between cross-linked polyethylene plastic tubing and fittings shall comply with Sections M2106.5.1 and M2106.5.2. Mechanical joints shall comply with Section M2106.3.1.

M2106.5.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

M2106.5.2 Plastic-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches of a transition from such metal pipe to plastic pipe or tubing.

M2106.6 Polyethylene plastic pipe and tubing for ground source heat pump loop systems. Joints between polyethylene plastic pipe and tubing or fittings for ground-source heat pump loop systems shall be heat fusion joints complying with Section M2106.6.1, electrofusion joints complying with Section M2106.6.2, or stab-type insertion joints complying with Section M2106.6.3.

M2106.6.1 Heat-fusion joints. Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, and joined in accordance with ASTM D 2657. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D 2683 or ASTM D 3261.

M2106.6.2 Electrofusion joints. Joints shall be of the electrofusion type. Joint surfaces shall be clean and free of moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F 1055.

M2106.6.3 Stab-type insert fittings. Joint surfaces shall be clean and free of moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F 1924.

M2106.7 Polypropylene (PP) plastic. Joints between PP plastic pipe and fittings shall comply with Sections M2106.7.1 and M2106.7.2.

M2106.7.1 Heat-fusion joints. Heat-fusion joints for polypropylene (PP) pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings, electrofusion polypropylene fittings or by butt fusion. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F 2389.

M2106.7.2 Mechanical and compression sleeve joints. Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's instructions.

M2106.8 Raised temperature polyethylene (PE-RT) plastic tubing. Joints between raised temperature polyethylene tubing and fittings shall complying with Sections M2016.8.1 and M2106.8.2. Mechanical joints shall comply with Section M2106.3.1.

M2106.8.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

M2106.8.2 PE-RT-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches of a transition from such metal pipe to plastic pipe or tubing.

M2106.9 PVC plastic pipe. Joints between PVC plastic pipe or fittings shall be solvent-cemented in accordance with Section P2905.9.1.3. Threaded joints between fittings and PVC plastic pipe shall be in accordance with Section M2106.4.1.

SECTION M2107
VALVES

M2107.1 Where required. Shutoff valves shall be installed in ground-source loop piping systems in the locations indicated in Sections M2107.1.1 through M2107.1.6.

M2107.1.1 Heat exchangers. Shutoff valves shall be installed on the supply and return side of a heat exchanger.

> **Exception:** Shutoff valves shall not be required where heat exchangers are integral with a boiler or are a component of a manufacturer's boiler and heat exchanger packaged unit and are capable of being isolated from the hydronic system by the supply and return valves required by Section M2001.3.

M2107.1.2 Central systems. Shutoff valves shall be installed on the building supply and return of a central utility system.

M2107.1.3 Pressure vessels. Shutoff valves shall be installed on the connection to any pressure vessel.

M2107.1.4 Pressure-reducing valves. Shutoff valves shall be installed on both sides of a pressure-reducing valve.

M2107.1.5 Equipment and appliances. Shutoff valves shall be installed on connections to mechanical *equipment* and appliances. This requirement does not apply to components of a ground-source loop system such as pumps, air separators, metering devices, and similar *equipment*.

M2107.1.6 Expansion tanks. Shutoff valves shall be installed at connections to nondiaphragm-type expansion tanks.

M2107.2 Reduced pressure. A pressure relief valve shall be installed on the low-pressure side of a hydronic piping system that has been reduced in pressure. The relief valve shall be set at the maximum pressure of the system design. The valve shall be installed in accordance with Section M2002.

SECTION M2108
PIPING INSTALLATION

M2108.1 General. Piping, valves, fittings, and connections shall be installed in accordance with the manufacturer's instructions.

M2108.3 Protection of potable water. Where ground-source heat pump ground-loop systems have a connection to a potable water supply, the potable water system shall be protected from backflow in accordance with Section P2902.

M2108.4 Pipe penetrations. Openings for pipe penetrations in walls, floors and ceilings shall be larger than the penetrating pipe. Openings through concrete and masonry building elements shall be sleeved. The annular space surrounding pipe penetrations shall be protected in accordance with Section P2606.1.

M2108.5 Clearance from combustibles. A pipe in a ground source heat pump piping system having an exterior surface temperature exceeding 250°F (121°C) shall have a *clearance* of not less than 1 inch (25 mm) from combustible materials.

M2108.6 Contact with building material. A ground-source heat pump ground-loop piping system shall not be in direct contact with building materials that cause the piping or fitting material to degrade or corrode, or that interfere with the operation of the system.

M2108.7 Strains and stresses. Piping shall be installed so as to prevent detrimental strains and stresses in the pipe. Provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement. Piping shall be installed so as to avoid structural stresses or strains within building components.

M2108.7.1 Flood hazard. Piping located in a flood hazard area shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the *design flood elevation*.

M2108.8 Pipe support. Pipe shall be supported in accordance with Section M2101.9.

M2108.9 Velocities. Ground-source heat pump ground-loop systems shall be designed so that the flow velocities do not exceed the maximum flow velocity recommended by the pipe and fittings manufacturer. Flow velocities shall be controlled to reduce the possibility of water hammer.

M2108.10 Labeling and Marking. Ground-source heat pump ground-loop system piping shall be marked with tape, metal tags or other methods where it enters a building. The marking shall state the following words: "GROUND-SOURCE HEAT PUMP LOOP SYSTEM". The marking shall indicate if antifreezes used in the system and shall indicate the chemicals by name and concentration.

M2108.11 Chemical Compatibility. Antifreeze and other materials used in the system shall be chemically compatible with the pipe, tubing, fittings, and mechanical systems.

SECTION M2109
WORKING FLUID

M2109.1 Makeup water. The transfer fluid in ground-source heat pump systems shall be compatible with the makeup water supplied to the system.

SECTION M2110
TESTS

M2109.1 Testing. Before connection header trenches are backfilled, the assembled loop system shall be pressure tested with water at 100 psi (689 kPa) for 15 minutes with no observed leaks. Flow and pressure loss testing shall be performed and the actual flow rates and pressure drops shall be compared to the calculated design values. If actual flow rate or pressure drop values differ from calculated design values by more than 10 percent, the cause shall be identified and corrective action taken.

SECTION M2111
EMBEDDED PIPING

M2110.1 Pressurizing during installation. Ground-source heat pump ground-loop piping to be embedded in concrete shall be pressure tested prior to pouring concrete. During pouring, the pipe shall be maintained at the proposed operating pressure.

Add new standards to Chapter 44 as follows:

ASTM
ASTM D3261 -03 Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

ASTM F1924-05 Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing

CSA
CSA C448 SERIES-02-CAN/CSA-2002 Design and Installation of Earth Energy Systems -First Edition; Update 2: October 2009; Consolidated Reprint 10/2009

NSF
NSF 358-1 2011 Polyethylene Pipe and Fittings for Water-Based Ground-Source 'Geothermal' Heat Pump Systems

NSF 358-2 2012 Polypropylene Pipe and Fittings for Water-Based Ground-Source 'Geothermal' Heat Pump Systems.

Reason: This revised language, new sections and standards were approved for the 2015 IMC. A companion Code change has been submitted by PPFA. My only change to their proposal is to add one additional standard NSF 358-2, which at the time of submittal of this code change was not published yet. This standard is expected to be published in February 2013 and made available for free by contacting the proponent at brown@nsf.org for consideration of this code change.

Cost Impact: This will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, [ASTM D3261-03, F1924-05; CSA C448 Series-02-CAN/CSA-2002; NSF 358-1 2011, and 358-2 2012] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28, will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. The proposal picks up NSF standards that were not included in RM66-13.

Assembly Action: **None**

Final Hearing Results

RM67-13 **AS**

Code Change No: RM68-13

Original Proposal

Section(s): Table M2101.9

Proponent: Larry Gill, P. Eng. IPEX USA LLC (larry.gill@ipexna.com)

Revise as follows:

TABLE M2101.9
HANGAR SPACING INTERVALS

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
PE-RT ≤ 1”	2.67	4
PE-RT ≥ 1¼	4	4

(Portions of table not shown remain unchanged)

Reason: Add support dimensions for polyethylene of raised temperature (PE-RT). PE-RT is already in the International Codes and adding the support spacing will provide additional information for installation. All other dimensions in the table remain unchanged.

Cost Impact: The proposed change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE M2101.9
HANGAR SPACING INTERVALS

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
PE-RT ≤ 1”	2.67	10
PE-RT ≥ 1¼	4	10

(Portions of table not shown remain unchanged)

Committee Reason: Approval was based upon the proponent’s published reason. The modification makes the table consistent with the IMC.

Assembly Action: **None**

Final Hearing Results

RM68-13 **AM**

Code Change No: RM69-13

Original Proposal

Section(s): Table M2101.9

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

TABLE M2101.9
HANGER SPACING INTERVAL

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
ABS	4	10[a]
CPVC ≤ 1 inch pipe or tubing	3	5[a]
CPVC ≥ 1 ¼ inches	4	10[a]
PE-RT ≤ 1 inch	2 ⅔ (32 inches)	10[a]
PE-RT ≥ 1¼ inches	4	10[a]
PP ≥ 1 ¼ inches	4	10[a]
PVC	4	10[a]

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm

a. For sizes 2 inches and smaller, a guide shall be installed midway between required vertical supports. Such guides shall prevent pipe movement in a direction perpendicular to the axis of the pipe.

(Portions of table not shown remain unchanged.)

Reason: The addition of the PE-RT information to the table was approved for the 2015 IMC. Footnote "a" is added to the table to be in coordination with the same requirement found in IMC Table 305.4. Support dimensions for polyethylene of raised temperature (PE-RT) are added. PE-RT is already in the International Codes and adding the support spacing will provide additional information for installation. All other dimensions in the table remain unchanged.

Cost Impact: The proposed change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM69-13	**AS**

Code Change No: RM70-13

Original Proposal

Section(s): M2103.1

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting, representing Copper Development Association (penniefeehan@me.com)

Revise as follows:

M2103.1 Piping materials. Piping for embedment in concrete or gypsum materials shall be standard-weight steel pipe, copper <u>and copper alloy pipe and</u> tubing, cross-linked polyethylene/aluminum/crosslinked polyethylene (PEX-AL-PEX) pressure pipe, chlorinated polyvinyl chloride (CPVC), polybutylene, cross-linked polyethylene (PEX) tubing or polypropylene (PP) with a minimum rating of 100 psi at 180°F (690 kPa at 82°C).

Reason: Brass and Bronze are copper alloys and by adding copper alloys this proposal provides the appropriate terminology and correct information to the end user.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM70-13	**AS**

Code Change No: RM71-13

Original Proposal

Section(s): M2103.1

Proponent: Larry Gill, P. Eng. IPEX USA LLC (larry.gill@ipexna.com)

Revise as follows:

M2103.1 Piping materials. Piping for embedment in concrete or gypsum materials shall be standard weight steel pipe, copper tubing, cross linked polyethylene aluminum polyethylene (PEX-AL-PEX) pressure pipe, chlorinated polyvinyl chloride (CPVC), polybutylene, cross-linked polyethylene (PEX) tubing, <u>polyethylene of raised temperature (PE-RT)</u> or polypropylene (PP) with a minimum rating of 100psi at 180°F (690kPa at 82°C).

Reason: Add polyethylene of raised temperature (PE-RT) to the piping materials section. PE-RT meets all of the requirements of Chapter 21.

Cost Impact: The proposed change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM71-13	**AS**

Code Change No: RM72-13

Original Proposal

Section(s): M2103.3, Chapter 44

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting, representing Copper Development Association (penniefeehan@me.com)

Revise as follows:

M2103.3 Piping joints. Copper and copper alloys systems shall be soldered in accordance with ASTM B828. Fluxes for soldering shall be in accordance with ASTM B813 and shall become noncorrosive and non-toxic after soldering. Brazing fluxes shall be in accordance with AWS A5.31. Piping joints that are embedded shall be installed in accordance with the following requirements:

Add new standard to Chapter 44 as follows:

ANSI/AWS A5.31M/A5.31:2012 Specification for Fluxes for Brazing and Braze Welding Edition: 2nd

Reason: Because hydronic systems are not potable system, inspectors and installers are not following the proper methods of installing copper pipe and tubing. Fluxes used for soldering copper tube and fittings must meet the requirements of ASTM B813.

Cost Impact: None

Analysis: A review of the standard proposed for inclusion in the code, [ANSI/AWS A5.31M/A5.31-2012] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal will improve joint quality.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing & Mechanical Inspectors Association (VPMIA) & VA Building Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M2103.3 Piping joints. Copper and copper alloys systems shall be soldered in accordance with ASTM B828. Fluxes for soldering shall be in accordance with ASTM B813 ~~and shall become noncorrosive and non-toxic after soldering~~. Brazing fluxes shall be in accordance with AWS A5.31. Piping joints that are embedded shall be installed in accordance with the following requirements:

Items 1 through 6 *(no change to current text)*

Commenter's Reason: The additional language shown struck out is not needed in the code text as fluxes are required to be non corrosive and non toxic per ASTMB813. The field inspector must rely on the standard to specify this and will not be able to test for the non corrosiveness or toxicity in the field.

Final Hearing Results

RM72-13 **AMPC**

Code Change No: RM73-13

Original Proposal

Section(s): M2103.3, Chapter 44

Proponent: Larry Gill, P. Eng. IPEX USA LLC (larry.gill@ipexna.com)

Revise as follows:

M2103.3 Piping joints. Piping joints that are embedded shall be installed in accordance with the following requirements:

1. Steel pipe joints shall be welded.
2. Copper tubing shall be joined with brazing material having a melting point exceeding 1,000°F (538°C).
3. Polybutylene pipe and tubing joints shall be installed with socket-type heat-fused polybutylene fittings.
4. CPVC tubing shall be joined using solvent cement joints.
5. Polypropylene pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings.
6. Cross-linked polyethylene (PEX) tubing shall be joined using cold expansion, insert or compression fittings.
7. Raised temperature polyethylene (PE-RT) tubing shall be joined using insert or compression fittings.

TABLE M2101.1
HYDRONIC PIPING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
Raised Temperature Polyethylene (PE-RT)	1,2,3	ASTM F 2623 ASTM F 2769	Copper crimp/insert fitting stainless steel clamp, insert fittings	
Raised Temperature Polyethylene (PE-RT) fittings	1,2,3	ASTM F1807 ASTM F2159 ASTM F2735 ASTM F2769 ASTM F2098	Copper crimp/insert fitting stainless steel clamp, insert fittings	

Reason: Revise clause M2103.3 to include provisions for Raised Temperature Polyethylene (PE-RT) tubing. Revise Table M2101.1 to add PE-RT system standard ASTM F2769 (ASTM F2769 is a standard for hot and cold water tubing and distribution systems and includes provisions for tubing, fittings, valves and manifolds) for hydronic piping materials. Add the ASTM standards for fittings to be used with PE-RT. All of these standards are consensus based ASTM standards.

Cost Impact: The proposed change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM73-13	**AS**

Code Change No: RM74-13

Original Proposal

Section(s): M2103.3

Proponent: David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (dave.hall@georgetown.org)

Revise as follows:

M2103.3 Piping joints. Piping joints that are embedded shall be installed in accordance with the following requirements:

1. Steel pipe joints shall be welded.
2. Copper tubing shall be joined ~~with~~ <u>by</u> brazing <u>complying with Section P3003.5.1.</u> ~~material having a melting point exceeding 1,000°F (538°C).~~
3. Polybutylene pipe and tubing joints shall be installed with socket-type heat-fused polybutylene fittings.
4. CPVC tubing shall be joined using solvent cement joints.
5. Polypropylene pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings.
6. Cross-linked polyethylene (PEX) tubing shall be joined using cold expansion, insert or compression fittings.

Reason: This revised language was approved for the 2015 IMC. The proposed language refers the end user to the appropriate code section with important language from the applicable standards.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM74-13	**AS**

Code Change No: RM75-13

Original Proposal

Section(s): M2104.2, M2104.3

Proponent: Larry Gill, P.Eng. IPEX USA LLC

Revise as follows:

M2104.2 Piping Joints. Piping joints, other than those in Section M2103.3, that are embedded shall comply with the following requirements:

1. Cross-Linked Polyethylene (PEX) tubing shall be installed in accordance the manufacturer's instructions.
2. Polyethylene tubing shall be installed with heat fusion joints.
3. Polypropylene (PP) shall be installed in accordance with the manufacturer's instructions.
4. Raised temperature polyethylene (PE-RT) shall be installed in accordance with the manufacturer's instructions.

M2104.3 Raised temperature polyethylene (PE-RT) plastic tubing. Joints between raised temperature polyethylene tubing and fittings shall conform to Sections M2104.3.1, ~~and~~ M2104.3.2 and M2104.3.3. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

M2104.3.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O rings the fittings shall be installed without omitting such inserts and ferrules or O-rings.

M2104.3.2 PE-RT to metal connections. Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition of such metal pipe to PE-RT pipe.

M2104.3.3 PE-RT insert fittings. PE-RT insert fittings shall be installed in accordance with the manufacturer's instructions.

Reason: Add Polyethylene of Raised Temperature (PE-RT) to sections M2104.2 and M2104.3 to mandate that manufacturers instructions must be adhered to and that insert fittings must be installed in accordance with manufacturers instructions.

Cost Impact: The proposed change will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM75-13	**AS**

Code Change No: RM76-13

Original Proposal

Section(s): M2202.1, Chapter 44

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing Copper Development Association (penniefeehan@me.com)

Revise as follows:

M2202.1 Materials. Piping shall consist of steel pipe, copper <u>and copper alloys pipe and</u> tubing or steel tubing conforming to ASTM A539. Aluminum tubing shall not be used between the fuel-oil tank and the burner units.

Add new standard to Chapter 44 as follows:

<u>ANSI/AWS A5.31M/A5.31:2012 Specification for Fluxes for Brazing and Braze Welding Edition: 2nd</u>

Reason: Because special piping systems are not potable system, inspectors and installers are not following the proper methods of installing copper pipe and tubing. Fluxes used for soldering copper tube and fittings must meet the requirements of ASTM B813. This proposal provides the appropriate terminology and correct information to the end user.

Cost Impact: None

Analysis: A review of the standard proposed for inclusion in the code, [ANSI/AWS A5.31M/A5.31-2012] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

The code change is contained in the <u>Updates to the 2013 Proposed Changes</u> posted on the ICC website. Please go to <u>http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf</u> for more information.

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason and is consistent with the action on similar proposals on the same subject.

Assembly Action: **None**

Final Hearing Results

RM76-13	**AS**

Code Change No: RM77-13

Original Proposal

Section(s): M2301.2.2 (New), M2301.2.2, M2301.2.2.2 (New), Chapter 44

Proponent: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Revise as follows:

M2301.2.2 Collectors and panels. Solar collectors and panels shall comply with Sections M2301.2.2.1 and M2301.2.2.2.

M2301.2.2.1 **~~M2301.2.2~~** **Roof-mounted collectors.** The roof shall be constructed to support the loads imposed by roof-mounted solar collectors. Roof-mounted solar collectors that serve as a roof covering shall conform to the requirements for roof coverings in Chapter 9 of this code. Where mounted on or above the roof coverings, the collectors and supporting structure shall be constructed of noncombustible materials or fire-retardant-treated wood equivalent to that required for the roof construction.

M2301.2.2.2 Collector sensors. Collector sensor installation, sensor location and the protection of exposed sensor wires from ultraviolet light shall be in accordance with SRCC 300.

Add new standard to Chapter 44 as follows:

SRCC
Solar Rating & Certification Corporation
400 High Point Drive, Suite 400
Cocoa, Florida 32926

SRCC 300-13 Standard 300 For Solar Water Heating Systems

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal revises existing Section M2301.2.2 into a parent section and two subsections. This was done in order to reference requirements related to collector sensors that are contained in SRCC 300. These collector sensor requirements are based on the manner in which the New York State Field Inspection Guidelines for Solar Heating Systems reference the SRCC standards.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [SRCC 300-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text is in the wrong location in the code. SRCC 300 is not appropriate for Solar voltaic systems.

Assembly Action: **None**

Public Comment

Brenda Thompson, CBCO, Manager Building Inspections, Clark County Development Services, ICC Sustainability, Energy and High Performance Code Action Committee (SEHPCAC) Chair requests Approval as Submitted.

Commenter's Reason: The IRC Committee's reason for disapproval of RM77 was that "The proposed text is in the wrong location in the code" and that "SRCC 300 is not appropriate for "solar voltaic systems." However, the proposal was not to portions of the code that addressed "solar voltaic systems." It was to portions of Section M2301 which, in the 2012 IRC, addresses solar thermal systems. It is Section M2302 of the 2012 IRC that addresses "solar voltaic systems." SRCC 300 is a standard that is related to solar thermal systems. Thus the proposal appears to be appropriate as properly evaluated by the committee's evaluation criteria.

This public comment is submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the SEHPCAC has held numerous open meetings and workgroup calls which included members of the SEHPCAC, as well as interested parties, to discuss and debate proposed changes and public comments.

Final Hearing Results

RM77-13 **AS**

Code Change No: RM79-13

Original Proposal

Section(s): M2301.2

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Revise as follows:

M2301.2 <u>Design and</u> installation. <u>The design and</u> installation of <u>thermal</u> solar energy systems shall comply with Sections M2301.2.1 through M2301.2.9.

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal changes existing Section M2301.2 of the 2012 IRC. It is intended to stand alone and is not contingent upon the success of other proposals from the PMGCAC and SEHPCAC related to solar energy

This proposal clarifies that Section M2301.2 also applies to the design of solar energy systems and that this section and its subsections apply specifically to *thermal* solar energy systems (not photovoltaics).

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive.

Cost Impact: This proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM79-13 **AS**

Code Change No: RM82-13

Original Proposal

Section(s): R202, M2301.2.3, Chapter 44

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Add new definitions as follows:

SECTION R202
DEFINITIONS

<u>**DIRECT SYSTEM.** A solar thermal system in which the gas or liquid in the solar collector loop is not separated from the load.</u>

<u>**INDIRECT SYSTEM.** A solar thermal system in which the gas or liquid in the solar collector loop circulates between the solar collector and a heat exchanger and such gas or liquid is not drained from the system or supplied to the load during normal operation.</u>

Revise as follows:

M2301.2.3 Relief <u>valves and system components</u>. System components containing fluids shall be protected with <u>temperature and</u> pressure ~~and temperature~~ relief valves <u>or pressure relief valves</u>. Relief devices shall be installed in sections of the system so that a section cannot be valved off or isolated from a relief device. <u>Direct systems and the potable water portion of indirect systems shall be equipped with a relief valve in accordance with Section P2803, For indirect systems, pressure relief valves in solar loops shall comply with SRCC 300. System components shall have a working pressure rating of not less than the setting of the pressure relief device.</u>

Add new standard to Chapter 44 as follows:

SRCC
Solar Rating & Certification Corporation
400 High Point Drive, Suite 400
Cocoa, Florida 32926

<u>SRCC 300-13 Standard 300 For Solar Water Heating Systems</u>

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal revises existing Section M2301.2.3 or the 2012 IRC based on criteria in the New York State Field Inspection Guidelines for Solar Heating Systems. It clarifies when temperature and pressure relief valves or pressure relief valves are required and refers to Section P2803 and SRCC 300 for additional requirements. It also requires that system components have a pressure rating that is not less than that of the setting of the pressure relief device.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [SRCC 300-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM82-13	**AS**

Code Change No: RM84-13

Original Proposal

Section(s): M2301.2.5 (New)

Proponent: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Add new text as follows:

M2301.2.5 Piping insulation. Piping shall be insulated in accordance with the requirements of Chapter 11. Exterior insulation shall be protected from ultraviolet degradation. The entire solar loop shall be insulated. Where split-style insulation is used, the seam shall be sealed. Fittings shall be fully insulated.

Exceptions:

1. Those portions of the piping that are used to help prevent the system from overheating shall not be required to be insulated.
2. Those portions of piping that are exposed to solar radiation, made of the same material as the solar collector absorber plate and are covered in the same manner as the solar collector absorber, or that are used to collect additional solar energy shall not be required to be insulated
3. Piping in thermal solar systems using unglazed solar collectors to heat a swimming pool shall not be required to be insulated.

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal adds new requirements for piping insulation used in solar systems to the thermal solar provisions of the 2012 IRC. It is based on criteria in the New York State Field Inspection Guidelines for Solar (thermal) Heating Systems.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.
the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM84-13 **AS**

Code Change No: RM85-13

Original Proposal

Section(s): Section R202, M2301.2.6, Chapter 44

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Add new definition as follows:

DRAIN-BACK SYSTEM. A solar thermal system in which the fluid in the solar collector loop is drained from the collector into a holding tank under prescribed circumstances.

Revise as follows:

M2301.2.6 Expansion tanks. Expansion tanks in solar energy systems shall be installed in accordance with Section M2003 in ~~closed fluid~~ solar collector loops that contain pressurized heat transfer fluid. Where expansion tanks are used, the system shall be designed in accordance with SRCC 300 to provide an expansion tank that is sized to withstand the maximum operating pressure of the system.

Exception: Expansion tanks shall not be required in *drain-back systems*.

Add new standard to Chapter 44 as follows:

SRCC
Solar Rating & Certification Corporation
400 High Point Drive, Suite 400
Cocoa, Florida 32926

SRCC 300-13 Standard 300 For Solar Water Heating Systems

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal revises existing Section M2301.2.6 of the 2012 IRC based on criteria in the New York State Field Inspection Guidelines for Solar Heating Systems that reference SRCC 300 and are applicable to solar thermal systems.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [SRCC 300-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM85-13	**AS**

Code Change No: RM86-13

Original Proposal

Section(s): M2301.2.6 (New), Chapter 44

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Add new text as follows:

M2301.2.6 Storage tank sensors. Storage tank sensors shall comply with SRCC 300.

Add new standard to Chapter 44 as follows:

SRCC
Solar Rating & Certification Corporation
400 High Point Drive, Suite 400
Cocoa, Florida 32926

SRCC 300-13 Standard 300 For Solar Water Heating Systems

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal is based on criteria in the New York State Field Inspection Guidelines for Solar Heating Systems that are relative to storage tank sensors.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction

Analysis: A review of the standard proposed for inclusion in the code, [SRCC 300-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM86-13 **AS**

Code Change No: RM87-13

Original Proposal

Section(s): M2301.2.6 (New), M2301.2.7 (New)

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Add new text as follows:

M2301.2.6 Mixing valves. Where heated water is discharged from a solar thermal system to a hot water distribution system, a thermostatic mixing valve complying with ASSE 1017 shall be installed to temper the water to a temperature of not greater than 140°F. Solar thermal systems supplying hot water for both space heating and domestic uses shall comply with Section P2802.2. A temperature indicating device shall be installed to indicate the temperature of the water discharged from the outlet of the mixing valve. The thermostatic mixing valve required by this section shall not be a substitute for water temperature limiting devices required by Chapter 27 for specific fixtures.

M2301.2.7 Isolation valves. Isolation valves shall be provided on the cold water feed to the water heater. Isolation valves and associated piping shall be provided to bypass solar storage tanks where the system contains multiple storage tanks.

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

These proposed new sections address mixing valves and isolation valves in solar thermal systems. They are based on Section P2803.3 of the 2012 IRC and criteria in the New York State Field Inspection Guidelines for Solar (thermal) Heating Systems.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text belongs in the plumbing chapters. Related subject text should be pulled together and placed in the proper location.

Assembly Action: **None**

Public Comments

Public Comment:

Brenda Thompson, CBCO, Manager Building Inspections, Clark County Development Services, ICC Sustainability, Energy and High Performance Code Action Committee (SEHPCAC) Chair requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

Add new text as follows:

SECTION P2802
SOLAR WATER HEATING SYSTEMS

P2802.1 Water temperature control. Where heated water is discharged from a solar thermal system to a hot water distribution system, a thermostatic mixing valve complying with ASSE 1017 shall be installed to temper the water to a temperature of not greater than 140°F. Solar thermal systems supplying hot water for both space heating and domestic uses shall comply with Section P2802.2. A temperature indicating device shall be installed to indicate the temperature of the water discharged from the outlet of the mixing valve. The thermostatic mixing valve required by this section shall not be a substitute for water temperature limiting devices required by Chapter 27 for specific fixtures.

P2802.2 Isolation valves. Isolation valves in accordance with P2903.9.2 shall be provided on the cold water feed to the water heater. Isolation valves and associated piping shall be provided to bypass solar storage tanks where the system contains multiple storage tanks.

Commenter's Reason: The PMGCAC and SEHPCAC agree with the committee's recommendation to place the new information in the plumbing section of the code.

This public comment is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception, the PMGCAC and SEHPCAC have held numerous open meetings and workgroup calls which included members of the PMGCAC and SEHPCAC, as well as interested parties, to discuss and debate proposed changes and public comments.

Final Hearing Results

RM87-13	**AMPC**

Code Change No: RM88-13

Original Proposal

Section(s): M2301.2.8 (New), M2301.2.9 (New), M2301.9.1, M2301.2.9.2 (New), Chapter 44

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Revise as follows:

<u>**M2301.2.8 Description and warning labels.** Solar thermal systems shall comply with description label and warning label requirements of Section M2301.2.9.2 and SRCC 300.</u>

<u>**M2301.2.9 Solar loop.** Solar loops shall be in accordance with Sections M2301.2.8.1 and M2301.2.8.2.</u>

<u>**M2301.9.1**</u> **~~M2301.2.8~~ Solar loop isolation.** Valves shall be installed to allow the solar collectors to be isolated from the remainder of the system. ~~Each isolation valve shall be labeled with the open and closed position.~~

<u>**M2301.2.9.2 Drain and fill valve labels and caps.** Drain and fill valves shall be labeled with a description and warning that identifies the fluid in the solar loop and a warning that the fluid might be discharged at high temperature and pressure. Drain caps shall be installed at drain and fill valves.</u>

Add new standard to Chapter 44 as follows:

SRCC
Solar Rating & Certification Corporation
400 High Point Drive, Suite 400
Cocoa, Florida 32926

<u>SRCC 300-13 Standard 300 For Solar Water Heating Systems</u>

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal expands existing Section M2301.2.8 of the 2012 IRC, which pertains to solar loops, and adds a new section to the solar thermal provisions of the IRC. These changes are based on criteria in the New York State Field Inspection Guidelines for Solar (thermal) Heating Systems.

Proposed new Section M2301.2.8 references SRCC 300 for label, sigh and marking requirements. (These are not listing and labeling requirements that require third party testing. These labels identify system components and provide safety warnings.

SRCC 300 Includes references to labeling requirements under:

6.1.1.2 Solar Systems Isolation
6.1.1.4 Auxiliary Water Heating Equipment
6.2.5 Freeze Protection
6.1.5.2 Control System Override
6.3.7 Fluid Safety Labeling
6.4.3 Tanks

SRCC 300 includes references to warning label requirements:

6.3.17 Heated Components (warning label)
6.6.7 Hazards (warning label)

Section M2309.1, former Section M2301.2.8, is revised to eliminate redundant labeling requirements with the SRCC 300 reference added in proposed new Section M2301.2.8.

Proposed new Section M2301.9.2 specifically addresses drain and fill valve labels and caps.

These changes are based on criteria in the New York State Field Inspection Guidelines for Solar (thermal) Heating Systems and the manner in which it references SRCC 300.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [SRCC 300-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM88-13 **AS**

Code Change No: RM89-13

Original Proposal

Section(s): M2301.3.1, Chapter 44

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee(dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Revise as follows:

M2301.3.1 Collectors <u>and panels</u>. <u>Solar thermal collectors and panels shall be listed and labeled in accordance with SRCC 100 or SRCC 600.</u> Collectors <u>and panels</u> shall be listed and labeled to show the manufacturer's name, model number, serial number, collector weight, collector maximum allowable temperatures and pressures, and the type of heat transfer fluids that are compatible with the collector <u>or panel</u>. The label shall clarify that these specifications apply only to the collector <u>or panel</u>.

Add new standards to Chapter 44 as follows:

SRCC
Solar Rating & Certification Corporation
400 High Point Drive, Suite 400
Cocoa, Florida 32926

<u>SRCC 100-13 Standard 100 For Solar Collectors</u>
<u>SRCC 600-13 Standard 600 For Solar Concentrating Collectors</u>

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal revises existing Section M2301.3.1 of the 2012 IRC to require that solar thermal system collectors and panels be listed and labeled in accordance with the requirements of SRCC 100 or SRCC 600.

These revisions are based on criteria in the New York State Field Inspection Guidelines for Solar Heating Systems and the manner in which it addresses the SRCC standards.

This proposal is intended to stand alone and is not contingent upon the success of other proposals from the PMGCAC and SEHPCAC related to solar energy,

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, [SRCC 100-13 and 600-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM89-13	**AS**

Code Change No: RM90-13

Original Proposal

Section(s): Section M2301.4, Chapter 44

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Revise as follows:

M2301.4 Heat transfer gasses or liquids and heat exchangers. **~~Prohibited heat transfer fluids.~~** Flammable gases and liquids shall not be used as heat transfer fluids. Heat transfer gasses and liquids shall be rated to withstand the system's maximum design temperature under operating conditions without degradation. Heat exchangers used in solar thermal systems shall comply with Section P2902.5.2 and SRCC 300.

Add new standard to Chapter 44 as follows:

SRCC
Solar Rating & Certification Corporation
400 High Point Drive, Suite 400
Cocoa, Florida 32926

SRCC 300-13 Standard 300 For Solar Water Heating Systems

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

This proposal revises existing Section M2301.4 of the 2012 IRC based on criteria in the New York State Field Inspection Guidelines for Solar (thermal) Heating Systems.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [SRCC 300-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM90-13	**AS**

Code Change No: RM91-13

Original Proposal

Section(s): M2301.4, Chapter 44

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Revise as follows:

M2301.4 ~~Prohibited~~ Heat transfer fluids. *Essentially toxic transfer fluids*, ethylene glycol, flammable gases, and flammable liquids shall not be used as heat transfer fluids. Heat transfer fluids shall be in accordance with SRCC 300. The flash point of the heat transfer fluids utilized in solar thermal systems shall be not less than 50°F (28°C) above the design maximum non-operating or no-flow temperature attained by the fluid in the collector.

Add new standard to Chapter 44 as follows:

SRCC
Solar Rating & Certification Corporation
400 High Point Drive, Suite 400
Cocoa, Florida 32926

SRCC 300-13 Standard 300 For Solar Water Heating Systems

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Reasons for this proposal are as follows: The first sentence of this proposal revises existing Section 2301.4 of the 2012 IRC to align with Section 1403, Heat Transfer Fluids, of the 2012 International Mechanical Code. It also specifically prohibits the use of ethylene glycol so as to eliminate any confusion regarding its use. The proposed new second sentence requires heat transfer fluids to be in accordance with SRCC 300. The proposed new last sentence limits the flash point of heat transfer fluids in solar thermal systems.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar systems are provided, this proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [SRCC 300-13] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28), will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM91-13	**AS**

Code Change No: RM92-13

Original Proposal

Section(s): M2301.6 (New)

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Add new text as follows:

M2301.6 Filtering. Air provided to occupied spaces through rock or other dust-producing materials shall be filtered for particulates at the outlet of the heat storage system.

> **Exception:** Filters shall not be required where air movement is by means of natural convection.

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Reasons for this proposal are as follows: This proposed new section is similar to Section 1402.7 of the 2012 International Mechanical Code. It requires filtering in order to remove dust and particulates from mechanically forced air that has passed through a thermal storage area containing materials such as, but not limited to, pebbles or rock. A filter is not required for passive systems because the air velocity is typically not sufficient to carry particulates. Furthermore, a filter in a passive system could greatly impede natural convective airflow.

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where rock based or dust-producing heat storage systems are provided, this proposal may increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The code should refer to the manufacturer's instructions for dust- producing materials. "Dust-producing" is not defined.

Assembly Action: **None**

Public Comments

Public Comment:

Brenda Thompson, CBCO, Manager Building Inspections, Clark County Development Services, ICC Sustainability, Energy and High Performance Code Action Committee (SEHPCAC) Chair requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M2301.6 Filtering. Air provided to occupied spaces <u>that passes through thermal mass storage systems by mechanical means</u> ~~through rock or other dust-producing materials~~ shall be filtered for particulates at the outlet of the ~~heat~~ <u>thermal mass</u> storage system.

~~**Exception:** Filters shall not be required where air movement is by means of natural convection.~~

Commenter's Reason: The committee's reason for disapproval was that "dust-producing materials" was not defined. This public comment revises the proposal to remove that term from the proposal.

This public comment is submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the SEHPCAC has held numerous open meetings and workgroup calls which included members of the SEHPCAC, as well as interested parties, to discuss and debate proposed changes and public comments.

Final Hearing Results

RM92-13	**AMPC**

Code Change No: RM93-13

Original Proposal

Section(s): M2301.6 (New), M2301.6.1 (New), M2301.6.2 (New), P2902.5.5

Proponents: David Hall, Vice Chair, Plumbing/Mechanical/Gas Code Action Committee, (dave.hall@georgetown.org) and Brenda A. Thompson, Clark County Building Department, Las Vegas NV, Chair, Sustainability, Energy & High Performance Code Action Committee (bat@ClarkCountyNV.gov)

Add new text as follows:

M2301.6 Solar systems for heating potable water. Where a solar energy system heats potable water to supply a potable hot water distribution system, the solar energy system shall be in accordance with Sections M2301.6.1, M2301.6.2 and P2902.5.5.

M2301.6.1 Indirect systems. Heat exchangers that are components of indirect heating systems shall comply with Section P2902.5.2.

M2301.6.2 Direct systems. Where potable water is directly heated, the pipe, fittings and valves between the solar collectors and the hot water storage tanks shall comply with NSF 61.

Revise as follows:

P2902.5.5 Solar systems. ~~The potable water supply to a solar system shall be equipped with a backflow preventer with intermediate atmospheric vent complying with ASSE 1012 or a reduced pressure principle backflow preventer complying with ASSE 1013. Where chemicals are used, the potable water supply shall be protected by a reduced pressure principle backflow preventer.~~ Where a potable water supply is connected to the solar collector circulation loop piping of an indirect solar water heating system and chemicals are not used in the circulation loop piping, a backflow preventer in accordance with ASSE 1012 shall be installed between the potable water system and the circulation loop piping. Where chemicals are used in the solar collector circulation loop piping, such backflow preventer shall be in accordance with ASSE 1013.

> ~~**Exception:** Where all solar system piping is a part of the potable water distribution system, in accordance with the requirements of the *International Plumbing Code*, and all components of the piping system are listed for potable water use, cross-connection protection measures shall not be required.~~

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) and the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The PMGCAC and SEHPCAC were established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since their inception in July, 2011, the PMGCAC and SEHPCAC have held multiple open meetings and conference calls and workgroup calls which included members of the PMGCAC and SEHPCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Reasons for this proposal are as follows:

Chapter 23 should include Sections M2301.6, M2301.6.1 and M2301.6.2 in order to address specific requirements for solar energy systems where they are used to heat potable water for supply to a potable hot water distribution system. Section M2301.6.1 is a pointer to a section that covers heat exchangers in the plumbing code section of the IRC:

> **P2902.5.2 Heat exchangers.** Heat exchangers using an essentially toxic transfer fluid shall be separated from the potable water by double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single-wall construction.

This section would apply where potable water was indirectly heated by the solar energy system. Section M2301.6.2 requires NSF 61 compliance for pipe, fittings and valves in a system that directly heats potable water as this is the same requirement for pipe, fittings and valves that the plumbing code requires for the hot water distribution system.

Section P2902.5.5 is modified as the section has been unclear for many cycles. Some have interpreted the existing section to require a backflow preventer on the cold water supply to any water heater that has a solar energy water heating system connected to the water heater. This makes no sense for a system that directly heats the water for distribution to the potable hot water distribution system. The section is modified to make the language address where the backflow preventer is needed (only for connections to solar collector circulation loop piping of indirect heating systems).

Please note that the proponents have also submitted other proposals that are coordinated with this proposal. In the spirit of the IRC as a one stop code for one- and two-family dwellings and townhouses, these proposals enhance, update, clarify and improve the usability of the solar energy provisions of Chapter 23 of the IRC and make it truly comprehensive and much more direct and intuitive. This proposal, however, is intended to stand alone and is not contingent upon the success of other PMGCAC or SEHPCAC proposals.

Cost Impact: Where solar water heating systems are provided, this proposal may increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The subject of backflow protection does not belong in this part of the code.

Assembly Action: **None**

Public Comments

Public Comment 2:

Lorraine A Ross, Intech Consulting Inc, representing The Dow Chemical Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M2301.6 Solar <u>thermal</u> systems for heating potable water. Where a solar <u>thermal</u> ~~energy~~ system heats potable water to supply a potable hot water distribution system, the solar <u>thermal</u> ~~energy~~ system shall be in accordance with Sections M2301.6.1, M2301.6.2 and P2902.5.5.

M2301.6.1 Indirect systems. Heat exchangers that are components of indirect <u>solar thermal</u> heating systems shall comply with Section P2902.5.2.

<u>**M2301.6.2 Direct systems.** Where potable water is directly heated by a solar thermal system. The pipe, fittings, valves and other components that are in contact with the potable water in the solar heating system shall comply with the requirements of Chapter 29.</u>

~~**M2301.6.2 Direct systems.** Where potable water is directly heated, the pipe, fittings and valves between the solar collectors and the hot water storage tanks shall comply with NSF 61.~~

Revise as follows:

<u>**P2902.5.5 Solar thermal systems.** Where a solar thermal system heats potable water to supply a potable hot water distribution or any other type of heating system, the solar thermal system shall be in accordance with Section P2902.5.5.1, P2902.5.5.2 or P2902.5.5.3 as applicable.</u>

~~**P2902.5.5 Solar systems.** Where a potable water supply is connected to the solar collector circulation loop piping of an indirect solar water heating system and chemicals are not used in the circulation loop piping, a backflow preventer in accordance with ASSE 1012 shall be installed between the potable water system and the circulation loop piping. Where chemicals are used in the solar collector circulation loop piping, such backflow preventer shall be in accordance with ASSE 1013.~~

<u>**P2902.5.5.1 Indirect systems.** Water supplies of any type shall not be connected to the solar heating loop of an indirect solar thermal hot water heating system. This requirement shall not prohibit the presence of inlets or outlets on the solar heating loop for the purposes of servicing the fluid in the solar heating loop.</u>

<u>**P2902.5.5.2 Direct systems for potable water distribution systems.** Where a solar thermal system directly heats potable water for a potable water distribution system, the pipe, fittings, valves and other components that are in contact with the potable water in the system shall comply with the requirements of Chapter 29.</u>

<u>**P2902.5.5.3 Direct systems for other than potable water distribution systems.** Where a solar thermal system directly heats water for a system other than a potable water distribution system, a potable water supply connected to such system shall be protected by a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012. Where a solar thermal system directly heats chemically</u>

treated water for a system other than a potable water distribution system, a potable water supply connected to such system shall be protected by a reduced pressure principle backflow preventer complying with ASSE 1013.

Commenter's Reason: This public comment clarifies that these sections pertain specifically to solar **thermal** energy systems. The new sections are added to the IRC Plumbing Chapter to clarify requirements for direct and indirect systems connected to potable or other than potable water distribution systems.

Final Hearing Results

RM93-13	**AMPC2**

Code Change No: RM96-13 Part I

Original Proposal

Section(s): IFC 605.11.3.2

Proponent: Michael E. Dell'Orfano, South Metro Fire Rescue Authority, representing Fire Marshal's Association of Colorado (mike.dellorfano@southmetro.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE; PART II WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR BOTH COMMITTEES.

PART I – INTERNATIONAL FIRE CODE

Revise as follows:

IFC 605.11.3.2 Residential systems for one- and two-family dwellings. Access to residential systems for one- and two-family dwellings shall be provided in accordance with Sections 605.11.3.2.1 through 605.11.3.2.4.

> <u>**Exception:** These requirements shall not apply to structures designed and constructed in accordance with the International Residential Code.</u>

Reason: According to the 2012 IFC Code and Commentary, the requirements of IFC Section 605.11.3.2 are considered construction requirements and, therefore, do not apply to structures built in accordance with the IRC. This has been the source of some confusion, so the exception to Section 605.11.3.2 is proposed to make its applicability clear. Additionally, this proposal adds the language of IFC Section 605.11.3.2 to the IRC so that those structures will also have photovoltaic systems installed with fire department ventilation practices in mind. These requirements are important for effective ventilation techniques as well as firefighter safety.

Cost Impact: The code change proposal will not increase the cost of construction. It only places restrictions on the layout of the rooftop installations.

Public Hearing Results

PART I – IFC
Committee Action: **Approved as Submitted**

Committee reason: The committee agreed with the proponent that the code change further clarifies the applicability of the provisions as being to only Group R-3 one- and two-family dwellings buildings constructed under the IBC as established by the approval of code change F72-13.

Assembly Action: **None**

Final Hearing Results

RM96-13 Part I **AS**

Code Change No: RM97-13 Part II

Original Proposal

Section(s): M2302

Proponents: John Smirnow and Joseph H. Cain P.E. representing Solar Energy Industries Association (SEIA) (jsmirnow@seia.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY IRC-PLUMBING/MECHANICAL COMMITTEE; PART II WILL BE HEARD BY IRC-RESIDENTIAL/BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART II – IRC- BUILDING

Revise as follows:

SECTION M2302
PHOTOVOLTAIC SOLAR ENERGY SYSTEMS

M2302.1 General. This section provides for the design, construction, installation, alteration, and repair of photovoltaic equipment and systems.

M2302.2 General ~~R~~requirements. The installation, inspection, maintenance, repair and replacement of photovoltaic systems and all system components shall comply with the manufacturer's instructions, Sections ~~M2302.2.1~~ M2302.3 through ~~M2302.2.3~~ M2302.8 and NFPA 70.

~~M2302.2.1~~ M2302.3 Roof-mounted ~~panels and modules~~ photovoltaic panel systems. Rooftop-mounted photovoltaic panel systems shall be designed in accordance with this section. ~~The roof shall be constructed to support the loads imposed by roof-mounted solar collectors. Roof-mounted solar collectors that serve as a roof covering shall conform to the requirements for roof coverings in Chapter 9 of this code. Where mounted on or above the roof coverings, the collectors and supporting structure shall be constructed of noncombustible materials or fire-retardant-treated wood equivalent to that required for the roof construction.~~

M2302.3.1 Structural requirements. Rooftop-mounted photovoltaic panel systems shall be designed in accordance with the *International Building Code* to support the system and withstand applicable loads. The roof shall be constructed to support the loads imposed by rooftop-mounted photovoltaic panel systems in accordance with Chapter 8 of this code or the *International Building Code.*

M2302.3.1.1 Wind load. Rooftop-mounted photovoltaic panel systems shall be designed for wind load in accordance with the *International Building Code* and ASCE 7, using an effective wind area in accordance with ASCE 7.

M2302.3.1.2 Roof live load. Roof structures that provide support for photovoltaic panel systems shall be designed for applicable roof live load. The design of roof structures need not include roof live load in the areas covered by photovoltaic panel systems. Portions of roof structures not covered by photovoltaic panels shall be designed for roof live load. Roof structures that provide support for photovoltaic panel systems shall be designed for live load L_R for the load case when the photovoltaic panel system is not present.

M2302.4 Building integrated photovoltaic systems. Building integrated photovoltaic systems that serve as roof coverings shall be designed and installed in accordance with Section R905.16.

~~M2302.2.2~~ M2302.5 Roof and wall penetrations. Roof and wall penetrations shall be flashed and sealed in accordance with Chapter 9. ~~to prevent entry of water, rodents, and insects.~~

~~M2302.2.3~~ M2302.6 Ground-mounted ~~panels and modules.~~ photovoltaic panel systems. Ground-mounted ~~panels and modules~~ photovoltaic panel systems shall be designed in accordance with the *International Building Code* and installed in accordance with the manufacturer's instructions.

~~M2302.3~~ M2302.7 Photovoltaic panels and modules. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703.

~~M2302.4~~ M2302.8 Inverters. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.

Reason: This code change proposal is the result of a consensus process established by the Solar Energy Industries Association's (SEIA) Codes and Standards Working Group. Established in 1974, SEIA is the national trade association of the U.S. solar energy industry. As the voice of the industry, SEIA works with its member companies to make solar a mainstream and significant energy source by expanding markets, removing market barriers, strengthening the industry, and educating the public on the benefits of solar energy.

New definitions are added to provide clarity in requirements for photovoltaic systems.

Sections are re-numbered for better flow.

The sentence that references "roof mounted solar collectors that serve as a roof covering" is relocated into its own section and revised to clarify the requirements for Building Integrated Photovoltaic (BIPV) systems.

The sentence that references "noncombustible materials or fire-retardant treated wood" is deleted, as it is obsolete. Photovoltaic panel systems are constructed entirely of noncombustible components, other than seals between the glass panels and frames.

The first sentence of M2302.3.1 clarifies the system of hardware that becomes the mounting system for rooftop-mounted photovoltaic panel systems must be qualified by methods found in the International Building Code. There are no applicable provisions found in the International Residential Code for these systems of mounting hardware. These mounting systems must be qualified by calculations or physical testing, as prescribed in the IBC. New definitions are needed to provide this clarity.

The second sentence of M2302.3.1 clarifies the roof system must be checked or designed to support the resultant loads imposed on it by the mounting system of the photovoltaic panel system. This check can be accomplished by using appropriate span tables in IRC Chapter 8, or by structural analysis according to IBC provisions.

A new section on wind load is added for guidance to appropriate codes and standards where wind design provisions are found. Effective Wind Area is defined in ASCE 7-10 Section 26.2. Effective Wind Area is also referenced in Footnote a of Table R301.2(2) of this code. Effective Wind Area used in design of photovoltaic systems must be consistent with the definition found in ASCE 7 in order to be compatible with the wind design calculation methods found in ASCE 7.

A new section on roof live load is added to clarify provisions already formalized in Final Action for the 2015 IBC, with some modifications as appropriate for one- and two-family dwellings. In one load case, roof live load need not be modeled in the area(s) of the roof covered by PV panels, as nobody will be walking on top of the panels or on the roof area covered by the panels. In another load case for new construction, the code-prescribed roof live load must be modeled as if the photovoltaic panels are not present.

The section on ground-mounted systems is revised to clarify that design provisions applicable to ground mount installations are found in the IBC and not found within the IRC.

Cost Impact: This proposal will reduce construction costs.

Public Hearing Results

PART II – IRC – Building

Committee Action: **Approved as Modified**

Replace the proposal as follows:

R324.3.1.1 Roof live load. Roof structures that provide support for photovoltaic panel systems shall be designed for applicable roof live load. The design of roof structures need not include roof live load in the areas covered by photovoltaic panel systems. Portions of roof structures not covered by photovoltaic panels shall be designed for roof live load. Roof structures that provide support for photovoltaic panel systems shall be designed for live load L_R for the load case when the photovoltaic panel system is not present.

Committee Reason: Approval was based upon the proponent's published reason and the modification. The modification clarifies how to design the PV system for roof live load and correlates with previous action on RM98-13, Part II.

Assembly Action: **None**

Public Comments

Public Comment:

John Smirnow and Joseph H. Cain, P.E, representing Solar Energy Industries Association (SEIA), request Approval as Modified by this Public Comment.

Modify the proposal as follows:

R324.3.1.1 Roof live load. Roof structures that provide support for photovoltaic panel systems shall be designed for applicable roof live load. The design of roof structures need not include roof live load in the area(s) covered by photovoltaic panel systems. Portions of roof structures not covered by photovoltaic panels shall be designed for roof live load. ~~The exclusion of the roof live load in the area(s) covered by the panels does not preclude the design of building roofs from being designed for roof live load requirements for the loading condition where the photovoltaic panel system may be removed or not installed.~~ Roof structures that provide support for photovoltaic panel systems shall be designed for live load L_R for the load case where the photovoltaic panel system is not present.

Commenter's Reason: The purpose of this proposal is to correct a mistake in the SEIA Floor Modification only.

Proposal RM97-13 Part II was Approved as Modified by unanimous vote of the IRC-Building Committee. The Floor Modification submitted by the Solar Energy Industries Association (SEIA) was to strike out all sections other than the section on Roof live load, with intent to keep the language in the Roof live load section unchanged. SEIA testimony to the IRC-Building Committee included statements that the language in this remaining section was unchanged from the Monograph.

The Floor Modification also revised the section number to correlate with the language approved by the IRC-Building Committee under RM98-13 Part II.

After the committee vote, ICC staff recognized that the SEIA Floor Modification inadvertently and erroneously reintroduced old language in the last sentence that was revised prior to publishing the Group B Monograph. This was never our intent. This proposal strikes out the erroneous last sentence inadvertently reintroduced in the Floor Modification, and replaces it with the correct last sentence as published in the Monograph. This will restore clarity for readers of the IRC.

Further to this correction, note the correct last sentence – as included in this Public Comment – was inadvertently published in the Report on Committee Hearings, even though the last sentence in the Floor Modification was incorrect. An Errata Update is expected that will correct the record by showing the Floor Modification last sentence, even though it was incorrect. This Public Comment will restore the correct last sentence, as shown in the Monograph.

Final Hearing Results

RM97-13 Part II	AMPC

Code Change No: RM98-13 Part I

Original Proposal

Section(s): 202, M2302

Proponent: Lorraine Ross, Intech Consulting Inc., representing The Dow Chemical Company

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE; PART II WILL BE HEARD BY THE IRC-RESIDENTIAL/BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I - IRC- MECHANICAL

Add new definitions as follows:

SECTION 202
DEFINITIONS

BUILDING INTEGRATED PHOTOVOLTAIC PRODUCT. A building product that incorporates photovoltaic modules, and functions as a component of the building envelope.

PHOTOVOLTAIC MODULE. A complete, environmentally protected unit consisting of solar cells, optics and other components, exclusive of a tracker, designed to generate DC power when exposed to sunlight.

PHOTOVOLTAIC PANEL. A collection of photovoltaic modules mechanically fastened together, wired, and designed to provide a field-installable unit.

PHOTOVOLTAIC PANEL SYSTEM. A system that incorporates discrete photovoltaic panels, that convert solar radiation into electricity, including rack support systems.

Revise as follows:

PHOTOVOLTAICMODULES/SHINGLES. A *roof covering* ~~composed of flat-plate photovoltaic modules fabricated into~~ resembles shingles and that incorporates photovoltaic modules.

CHAPTER 23
SOLAR THERMAL ENERGY SYSTEMS

Delete without substitution:

~~**SECTION M2302**~~
~~**PHOTOVOLTAIC SOLAR ENERGY SYSTEMS**~~

~~**SECTION M2302**~~
~~**PHOTOVOLTAIC SOLAR ENERGY SYSTEMS**~~

~~**M2302.1 General.** This section provides for the design, construction,installation, alteration, and repair of photovoltaic equipment and systems.~~

~~**M2302.2 Requirements.** The installation, inspection, maintenance,repair and replacement of photovoltaic systems and all system components shall comply with the manufacturer's instructions, Sections M2302.2.1 through M2302.2.3 and NFPA 70.~~

~~**M2302.2.1 Roof-mounted panels and modules.** Where photovoltaic panels and modules are installed on roofs, the roof shall be constructed to support the loads imposed by such modules. Roof-mounted photovoltaic panels and modules that serve as roof covering shall conform to the requirements for roof coverings in Chapter 9. Where mounted on or above the roof coverings, the photovoltaic panels and modules and supporting structure shall be constructed of noncombustible materials or fire-retardant treated wood equivalent to that required for the roof construction~~

~~**M2302.2.2 Roof and wall penetrations.** Roof and wall penetrations shall be flashed and sealed in accordance with Chapter 9 to prevent entry of water, rodents, and insects.~~

~~**M2302.2.3 Ground-mounted panels and modules.** Ground-mounted panels and modules shall be installed in accordance with the manufacturer's instructions.~~

~~**M2302.3 Photovoltaic panels and modules.** Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703.~~

~~**M2302.4 Inverters.** Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.~~

Reason: Currently, provisions for solar energy systems are sprinkled throughout the International Residential Code. Furthermore, there are also significant gaps, many of which were debated and approved in the 2015 *International Building Code* development process. This proposed change consolidates and organizes these provisions, with necessary section revisions, and section additions, in an easily used format that also sets the stage for easy integration of code requirements for new solar energy technology and applications as they emerge in the market. The following is an explanation of each new and revised section pertinent to the newly proposed Section R324 Solar Energy Systems:

1. **Chapter 2 New Definitions Section R202:**
   Four definitions are added for BUILDING INTEGRATED PHOTOVOLTAIC (BIPV) PRODUCT, PHOTOVOLTAIC MODULE, PHOTOVOLTAIC PANEL and PHOTOVOLTAIC PANEL SYSTEM. All of these definitions are necessary and were approved for inclusion in the 2015 *International Building Code*.
2. **Chapter 2 Revised Definition Section R202:**
   A revised definition for PHOTOVOLTAIC SHINGLES is proposed, which was also approved for inclusion in the 2015 *International Building Code*.
3. **Add new SECTION R324 SOLAR ENERGY SYSTEMS:**
   Chapter 3 is entitled Building Planning and therefore is an appropriate place to list the general provisions for installation of solar energy systems on buildings within the scope of the *International Residential Code.* Newly proposed Section 324 contains general provisions for solar energy systems and then, with subsections, serves as pointers to specific code requirements for solar energy systems based on type and location. This section is based upon requirements generally found in Chapter 23 which this proposal also revises. See below for details.
   Setting up this section will also allow easy inclusion for new solar energy system types and locations. For example, if there are building integrated photovoltaic wall systems, a new subsection can be created, with an appropriate reference to Chapter 7.
4. **Revise Section R902 Roof Classification:**
   This section has been renamed Fire Classification in order to clarify the subject of the section. Two new sections have been added to clearly identify the fire classification requirements for both building integrated photovoltaic products that serve as the roof covering and rooftop mounted photovoltaic panel systems. There is also a change to clarify Section 902.1, where the word "area" was changed to "jurisdiction" because there has been interpretation that the word "area" referred to is a place on the roof itself rather than a geographic area, such as the Urban Wildfire Interface Zone or other jurisdictional requirements for fire classified roofs. Section 902 is in place to prevent fire from spreading from rooftop to rooftop.
5. **Revise Section R902.16 Photovoltaic Shingles:**
   This section, along with the revised definition for photovoltaic shingles, has been editorially revised to match comparable changes approved in the 2015 *International Building Code*.
6. **Add new section R908 ROOFTOP MOUNTED PHOTOVOLTAIC PANEL SYSTEMS:**
   This new section outlines specific requirements for rooftop photovoltaic panel systems installed on or above roof coverings. As shown, material standards, structural requirements and installation details for these systems is detailed.
7. **Revise CHAPTER 23 and delete Section M2302 PHOTOVOLTAIC SOLAR ENERGY SYSTEMS:**
   Chapter 23 is renamed as SOLAR THERMAL ENERGY SYSTEMS which limits the chapter to solar thermal energy systems only as identified in newly proposed R324.

8. **Delete Section M2302 PHOTOVOLTAIC SOLAR ENERGY SYSTEMS:**

As shown in Item 7, Chapter 23 is limited to solar thermal energy systems only. Therefore, Section M2302 PHOTOVOLTAIC SOLAR ENERGY SYSTEMS is deleted. Photovoltaic energy systems are electrical in nature. Placing requirements for these systems in the Mechanical part of the code is illogical and was only added in the 2012 International Residential Code because there was no other available place. This proposal sets up a new section R324 in Chapter 3 Building Planning for all solar energy systems with pointers to the type of system that will be used on the building. Provisions for photovoltaic energy systems currently in Section M2302 have been moved as appropriate to the newly proposed R324 SOLAR ENERGY SYSTEMS.

Cost Impact: This code change does not increase the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

PART I - IRC- MECHANICAL
Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason. PV is not mechanical and does not belong in Chapter 23.

Assembly Action: **None**

Final Hearing Results

RM98-13 Part I **AS**

Code Change No: RM98-13 Part II

Original Proposal

Section(s): R902, R905, R908 (New)

Proponent: Lorraine Ross, Intech Consulting Inc., representing The Dow Chemical Company

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IRC-PLUMBING/MECHANICAL COMMITTEE; PART II WILL BE HEARD BY THE IRC-RESIDENTIAL/BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART II – IRC- BUILDING

SECTION R902
~~ROOF~~ FIRE CLASSIFICATION

Revise as follows:

R902.1 Roofing covering materials. Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in ~~areas~~ jurisdictions designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a lot line. Classes A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E 108.

Exceptions:

1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A roof assemblies include minimum 16 oz/ft^2 copper sheets installed over combustible decks.

R902.3 Building integrated photovoltaic product. Building integrated photovoltaic products installed as the roof covering shall be tested, listed and labeled for fire classification in accordance with Section R902.1.

R902.4 Rooftop mounted photovoltaic panels and modules. Rooftop mounted photovoltaic panels and modules installed on or above the roof covering shall be tested, listed and identified with a fire classification in accordance with UL 1703. Class A, B or C photovoltaic panels and modules shall be installed in jurisdictions designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a lot line.

SECTION R905
REQUIREMENTS FOR ROOF COVERINGS

R905.16 Photovoltaic ~~modules/~~shingles. The installation of photovoltaic ~~modules/~~shingles shall comply with the provisions of this section.
R905.16.1 Material standards. Photovoltaic ~~modules/~~shingles shall be listed and labeled in accordance with UL 1703.

R905.16.2 Attachment. Photovoltaic ~~modules/~~shingles shall be attached in accordance with the manufacturer's installation instructions.

R905.16.3 Wind resistance. Photovoltaic ~~modules/~~shingles shall be tested in accordance with procedures and acceptance criteria in ASTM D 3161. Photovoltaic ~~modules/~~shingles shall comply with the classification requirements of Table R905.2.4.1(2) for the appropriate maximum basic wind speed. Photovoltaic ~~modules/~~shingle packaging shall bear a label to indicate compliance with the procedures in ASTM D 3161 and the required classification from Table R905.2.4.1(2).

SECTION R908
ROOFTOP MOUNTED PHOTOVOLTAIC PANEL SYSTEMS

R908.1 General. The installation of photovoltaic panel systems that are mounted on or above the roof covering shall comply with the provisions of this code, the *International Fire Code* and *NFPA 70*.

R908.1.1 Material standards. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703.

R908.1.2 Structural requirements. Rooftop mounted photovoltaic panel systems shall be designed to structurally support the system and withstand applicable loads in accordance with Chapter 3. The roof upon which these systems are installed shall be constructed to support the loads imposed by such systems in accordance with Chapter 8.

R908.1.3 Installation. Rooftop mounted photovoltaic systems shall be installed in accordance with the manufacturer's instructions. Roof penetrations shall be flashed and sealed in accordance with this chapter.

Add new text as follows:

SECTION 324
SOLAR ENERGY SYSTEMS

R324.1 General. Solar energy systems shall comply with the provisions of this section.

R324.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with Chapter 23 and the International Fire Code.

R324.3 Photovoltaic solar energy systems. Photovoltaic energy systems shall be designed and installed in accordance with this section, the International Fire Code and NFPA 70. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.

R324.3.1 Rooftop mounted photovoltaic systems. Rooftop mounted photovoltaic panel systems installed on or above the roof covering shall be designed and installed in accordance with Section 908.

R324.3.2 Building integrated photovoltaic systems. Building integrated photovoltaic systems that serve as roof coverings shall be designed and installed in accordance with Section 905.

R324.3.2.1 Photovoltaic shingles. Photovoltaic shingles shall comply with Section R905.16.

R324.4 Ground mounted photovoltaic systems. Ground mounted photovoltaic systems shall be designed and installed in accordance with Section R301.

R324.4.1 Fire Separation distances. Ground mounted photovoltaic systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.

Reason: Currently, provisions for solar energy systems are sprinkled throughout the International Residential Code. Furthermore, there are also significant gaps, many of which were debated and approved in the 2015 *International Building Code* development process. This proposed change consolidates and organizes these provisions, with necessary section revisions, and section additions, in an easily used format that also sets the stage for easy integration of code requirements for new solar energy technology and applications as they emerge in the market. The following is an explanation of each new and revised section pertinent to the newly proposed Section R324 Solar Energy Systems:

1. **Chapter 2 New Definitions Section R202:**
   Four definitions are added for BUILDING INTEGRATED PHOTOVOLTAIC (BIPV) PRODUCT, PHOTOVOLTAIC MODULE, PHOTOVOLTAIC PANEL and PHOTOVOLTAIC PANEL SYSTEM. All of these definitions are necessary and were approved for inclusion in the 2015 *International Building Code*.
2. **Chapter 2 Revised Definition Section R202:**
   A revised definition for PHOTOVOLTAIC SHINGLES is proposed, which was also approved for inclusion in the 2015 *International Building Code*.
3. **Add new SECTION R324 SOLAR ENERGY SYSTEMS:**
   Chapter 3 is entitled Building Planning and therefore is an appropriate place to list the general provisions for installation of solar energy systems on buildings within the scope of the *International Residential Code.* Newly proposed Section 324 contains general provisions for solar energy systems and then, with subsections, serves as pointers to specific code requirements for solar energy systems based on type and location. This section is based upon requirements generally found in Chapter 23 which this proposal also revises. See below for details.
   Setting up this section will also allow easy inclusion for new solar energy system types and locations. For example, if there are building integrated photovoltaic wall systems, a new subsection can be created, with an appropriate reference to Chapter 7.
4. **Revise Section R902 Roof Classification:**
   This section has been renamed Fire Classification in order to clarify the subject of the section. Two new sections have been added to clearly identify the fire classification requirements for both building integrated photovoltaic products that serve as the roof covering and rooftop mounted photovoltaic panel systems. There is also a change to clarify Section 902.1, where the word “area” was changed to “jurisdiction” because there has been interpretation that the word “area” referred to is a place on the roof itself rather than a geographic area, such as the Urban Wildfire Interface Zone or other jurisdictional requirements for fire classified roofs. Section 902 is in place to prevent fire from spreading from rooftop to rooftop.
5. **Revise Section R902.16 Photovoltaic Shingles:**
   This section, along with the revised definition for photovoltaic shingles, has been editorially revised to match comparable changes approved in the 2015 *International Building Code*.
6. **Add new section R908 ROOFTOP MOUNTED PHOTOVOLTAIC PANEL SYSTEMS:**
   This new section outlines specific requirements for rooftop photovoltaic panel systems installed on or above roof coverings. As shown, material standards, structural requirements and installation details for these systems is detailed.
7. **Revise CHAPTER 23 and delete Section M2302 PHOTOVOLTAIC SOLAR ENERGY SYSTEMS:**
   Chapter 23 is renamed as SOLAR THERMAL ENERGY SYSTEMS which limits the chapter to solar thermal energy systems only as identified in newly proposed R324.

8. **Delete Section M2302 PHOTOVOLTAIC SOLAR ENERGY SYSTEMS:**
   As shown in Item 7, Chapter 23 is limited to solar thermal energy systems only. Therefore, Section M2302 PHOTOVOLTAIC SOLAR ENERGY SYSTEMS is deleted. Photovoltaic energy systems are electrical in nature. Placing requirements for these systems in the Mechanical part of the code is illogical and was only added in the 2012 International Residential Code because there was no other available place. This proposal sets up a new section R324 in Chapter 3 Building Planning for all solar energy systems with pointers to the type of system that will be used on the building. Provisions for photovoltaic energy systems currently in Section M2302 have been moved as appropriate to the newly proposed R324 SOLAR ENERGY SYSTEMS.

Cost Impact: This code change does not increase the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

PART II – IRC – Building
Committee Action: Approved as Modified

Modify the proposal as follows:

R908.1 General. The installation of photovoltaic panel systems that are mounted on or above the roof covering shall comply with the provisions of this code, ~~the *International Fire Code*~~ and *NFPA 70*.

R908.1.2 Structural requirements. Rooftop mounted photovoltaic panel systems shall be designed to structurally support the system and withstand applicable <u>gravity</u> loads in accordance with Chapter 3. The roof upon which these systems are installed shall be <u>designed and</u> constructed to support the loads imposed by such systems in accordance with Chapter 8.

(Portions of proposal not shown remain unchanged)

Committee Reason: Approval was based upon the proponent's published reason and the modification. The modification deleted reference to the IFC and added the requirement that the PV system must be design for the gravity loads and the roof support system must be designed to support the PV system loads.

Assembly Action: **None**

Public Comments

Public Comment 2:

Kevin Reinertson, Division Chief, Representing the California State Fire Marshal's Office; John Smirnow and Joseph H. Cain P.E. representing Solar Energy Industries Association (SEIA); Adria Smith, Fountain Valley Fire Department, representing the California Fire Chiefs Association; And Adolf Zubia. Chairman IAFC Fire and Life Safety Section, representing ICC Fire Code Action Committee, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION <u>R</u>324
SOLAR ENERGY SYSTEMS

R324.1 General. Solar energy systems shall comply with the provisions of this section.

R324.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with Chapter 23 ~~and the *International Fire Code*~~.

R324.3 Photovoltaic ~~solar energy~~ systems. Photovoltaic ~~energy~~ systems shall be designed and installed in accordance with this section~~, the *International Fire Code*~~ and *NFPA 70*. ~~Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.~~

<u>**R324.3.1 Equipment listings.** Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.</u>

<u>R324.4</u> ~~R324.3.1~~ Rooftop mounted photovoltaic systems. Rooftop mounted photovoltaic panel systems installed on or above the roof covering shall be designed and installed in accordance with Section <u>R908</u> ~~908~~.

<u>R324.5</u> ~~R324.3.2~~ Building integrated photovoltaic systems. Building integrated photovoltaic systems that serve as roof coverings shall be designed and installed in accordance with Section <u>R905</u> ~~905~~.

<u>R324.5.1</u> ~~R324.3.2.1~~ Photovoltaic shingles. Photovoltaic shingles shall comply with Section R905.16.

<u>R324.6</u> ~~R324.4~~ Ground mounted photovoltaic systems. Ground mounted photovoltaic systems shall be designed and installed in accordance with <u>Chapter 3</u> ~~Section R301~~.

<u>R324.6.1</u> ~~R324.4.1~~ Fire Separation distances. Ground mounted photovoltaic systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.

SECTION R908
ROOFTOP MOUNTED PHOTOVOLTAIC PANEL SYSTEMS

R908.1 General. The installation of photovoltaic panel systems that are mounted on or above the roof covering shall comply with ~~the provisions of this code~~ <u>this section, section R324,</u> and *NFPA 70*.

~~**R908.1.1 Material standards.** Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703.~~

<u>R908.2</u> ~~R908.1.2~~ Structural requirements. Rooftop mounted photovoltaic panel systems shall be designed to structurally support the system and withstand applicable gravity loads in accordance with Chapter 3. The roof upon which these systems are installed shall be designed and constructed to support the loads imposed by such systems in accordance with Chapter 8.

__R908.3__ ~~R908.1.3~~ **Installation.** Rooftop mounted photovoltaic systems shall be installed in accordance with the manufacturer's instructions. Roof penetrations shall be flashed and sealed in accordance with this chapter.

Commenter's Reason: This public comment cleans up the proposal as follows.

General – For consistency the term "photovoltaic systems" replaces "photovoltaic energy systems" and "photovoltaic panel systems".
R324.2 – Reference to the IFC was deleted since it does not include specific requirements for solar thermal systems.
R324.3 – Reference to the IFC was deleted to be consistent with R908.1.
R324.3.1 – A title was added to this section, which focuses on listing requirements. The listing requirements for photovoltaic panels and modules was moved from R908.1.1 to here because this is a more logical location, and since listing of these devices is also required for ground mounted systems.
R324.6 – The structural requirements were revised from Section R301.1 to Chapter 3 to be consistent with R908.2.
R908.1 – For the convenience of the code user a reference to Section R324 was added.
R908.1.1 – As previously mentioned, these requirements were moved to R324.3.1.

Final Hearing Results

RM98-13 Part II AMPC2

Code Change No: RM99-13

Original Proposal

Section(s): M1411.3 (New), Chapter 44

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing Mueller Industries (JBEngineer@aol.com)

Add new text as follows:

M1411.3 Refrigeration line sets. Line sets connecting to cooling coils shall comply with ASTM BXXX-13. Fittings for line sets shall comply with ASME B16.22, ASME B16.26, or UL 207 and shall be rated for refrigeration tubing. The joints and connections for line sets shall be brazed, flared, or a type that is listed and labeled for refrigeration tubing. Brazing material shall have a melting point exceeding 1,000°F (538°C).

Renumber subsequent sections

Add new standards to Chapter 44 as follows:

ASTM

BXXX-13 Specification for Seamless Copper Tube for Linesets

UL

207-2009 Refrigerant-containing Components and Accessories, Nonelectrical

Reason: The IRC currently has no requirements for line sets. ASTM will develop a new standard regulating line sets. By the code change deadline, the number of the standard was not issued by ASTM. The standard is currently being balloted. Once the ballot is approved, the number will be announced.

The ASTM standard contains specific test requirements that will verify the performance of tubing material used for line sets. This is important to regulate since modern air conditioning systems operate at higher pressures than older systems. The tubing must be capable of withstanding long term use at high pressures. If an inferior material is installed, leaks can occur in the piping system. This will allow the escape of refrigerant into the atmosphere. Refrigerants are currently regulated to reduce any unwanted escape into the environment. This change is consistent with maintaining a level of protection against the unwanted escape of refrigerants.

The fittings for line sets must comply with either ASME B16.22, ASME B16.26, or UL 207. These standards provide the necessary requirements for listing refrigeration tube fittings.

The joining methods for line sets follow the standard protocol for refrigerant tubing. The most common joining method is brazing. Many coils have a flared connection which is also acceptable. Other mechanical type connections are tested and listed by third party agencies as being acceptable for air conditioning tubing. The text will not restrict any viable joining method for line sets.

Cost Impact: This code change will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ASTM XXX-13, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013. Standard UL 207 is referenced by the 2012 IMC.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Modified**

Modify the proposal as follows:

M1411.3 Refrigeration line sets. ~~Line sets connecting to cooling coils shall comply with ASTM BXXX-13.~~ Fittings for line sets shall comply with ASME B16.22, ASME B16.26, or UL 207 and shall be rated for refrigeration tubing. The joints and connections for line sets shall be brazed, flared, or a type that is listed and labeled for refrigeration tubing. Brazing material shall have a melting point exceeding 1,000°F (538°C).

Committee Reason: Approval was based upon the proponent's published reason. The modification deletes the reference to a standard that is not available yet.

Assembly Action: **None**

Final Hearing Results

RM99-13 **AM**

Code Change No: RM100-13

Original Proposal

Section(s): M1502.4.4, M1502.4.4.3 (New)

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing Self (JBEngineer@aol.com)

Revise as follows:

M1502.4.4 Duct length. The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections M1502.4.4.1~~ or M1502.4.4.2~~. through M1502.4.4.3.

Add new text as follows:

M1502.4.4.3 Dryer exhaust duct power ventilator. The maximum length of the exhaust duct shall be determined in accordance with the manufacturer's instructions for the dryer exhaust duct power ventilator.

Reason: This is a companion change to the change adding reference to UL 705 for dryer exhaust power ventilators. UL 705 has testing requirements that will establish the maximum length permitted for a dryer duct connecting to a dryer exhaust duct power ventilator. The maximum dryer duct length must be included in the manufacturer's installation instructions.

Cost Impact: This will not increase the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM100-13 **AS**

Code Change No: RM101-13

Original Proposal

Section(s): M1502.4.4 (New), Chapter 44

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing Self (JBEngineer@aol.com)

Add new text as follows:

M1502.4.4 Dryer Exhaust Duct Power Ventilators. Domestic dryer exhaust duct power ventilators shall conform to UL 705 for use in dryer exhaust duct systems. The dryer exhaust duct power ventilator shall be installed in accordance with the manufacturer's instructions.

Renumber subsequent sections

Add new standard to Chapter 44 as follows:

UL

705-2004 Revision 5 Standard for Power Ventilators

Reason: This change is consistent with a change to the IMC and will add the requirements for dryer exhaust power ventilators for domestic dryer use. Dryer exhaust duct power ventilators are now regulated by Supplemental requirements to UL 705. These supplemental requirements specify testing for ventilators used in this application. The requirements include many safety provisions for the ventilators. The ventilator manufacturer specifies the maximum length of the dryer exhaust duct. This length is used for testing and listing the ventilator, thus verifying the instructions.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, UL 705, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: s Approval was based upon the proponent's published reason.

Assembly Action: **None**

Final Hearing Results

RM101-13 **AS**

Code Change No: RP1-13

Original Proposal

Section(s): P2502.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2502.1 Existing building sewers and building drains. ~~Existing *building sewers* and drains shall be used in connection with new systems when found by examination and/or test to conform to the requirements prescribed by this document.~~ Where the entire sanitary drainage system of an existing building is replaced, existing building drains under concrete slabs and existing building sewers that will serve the new system shall be internally examined to verify that the piping is sloping in the correct direction, is not broken, is not obstructed and is sized for the drainage load of the new plumbing drainage system to be installed.

Reason: Before the technical reasons for the changes in this section are provided, the PMGCAC wants to readers of PMGCAC proposals to understand that many of our proposals for changing the IRC are focused on language improvements and intent clarity that do not change the meaning of what the 2012 IRC (and earlier editions) have required. Much of the existing language in the plumbing chapters came from the old CABO codes. “Seasoned” code officials knew what this language intended and inspected based upon a wealth of knowledge gathered over the many years of development of those older codes. Our concern is for the newer code officials and inspectors who do not have this experience and more often than not, are being required to enforce the code just as it is written. If the code is not clear, a variety of interpretations result and all users of the code suffer the consequences. The code needs to actually state the intent in clear terms. Even though many people already “know” what is intended by a particular code section and don’t think it necessary to make any changes, the development of the codes needs to consider all people who use the codes whether they are experienced or a newcomer. We hope that the readers of the PMGCAC proposals will carefully consider and approve our “editorial proposals” towards making a better code for the future.

Technical reason for Section P2502.1:

Use of “and/or” and “when” in code text is undesirable code format. What kind of “test”? The phrase “requirements prescribed by this document” is vague. Overall, the application of this section is unclear. The revised language provides clear, prescriptive requirements.

Consider a few situations that happen to houses. 1) A slab-on grade house burns down or is wind damaged such that only the remaining slab foundation will be used to re-construct a new building. Re-use of the building drain would be desirable to avoid extensive slab rework. 2) A house is completely razed or the entire plumbing drainage system of a house needs replaced such that only the building sewer remains. Re-use of the building sewer would be desirable to avoid extensive costs and possible complications for replacing the sewer (such as crossing a public street to connect to the public sewer). Why tear out good, serviceable building drains and building sewers for the sake of replacing with new material? The only way to know if existing building drains and existing building sewers are serviceable is to internally examine the piping for problems.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 11 on the PMGCAC IRC-P list. For PMGCAC member reference, this was item no.1 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The required internal examination would increase the cost of construction that is not justified.

Assembly Action: **None**

Public Comment

Shawn Strausbaugh of Arlington County Virginia representing the ICC PMG Code Action Committee requests Approval as Submitted.

Commenter's Reason: The original code language already required an "examination and/or test" for sewers and drains that are going to be "re-used". Thus, this proposal does not cause additional cost of construction. Because all the piping is below grade, how else could you examine the piping if not by video camera? Testing (assuming pressure testing) of the piping doesn't tell you if the pipe has back slope or obstruction issues. This section was originally put into the code because some code officials were forcing complete replacement of building drains below slabs and building sewers (and even some under concrete driveways and public streets) when a house was completely rebuilt. This section is being revised only to clarify what this section originally intended.

Final Hearing Results

RP1-13	**AS**

Code Change No: RP4-13

Original Proposal

Section(s): P2503.4

Proponent: Gary Kozan, CPD, Ridgeway Plumbing, representing Florida Association of Plumbing Heating Cooling Contractors (garyk@ridgewayplumbing.com)

Revise as follows:

P2503.4 Building sewer testing. The building sewer shall be tested by insertion of a test plug at the point of connection with the public sewer and filling the building sewer with water <u>to the highest point thereof.</u>~~, testing with not less than a 10-foot (3048) head of water and be able to maintain such pressure for 15 minutes.~~ <u>The building sewer shall be watertight at all points. Forced sewer tests shall consist of pressurizing the piping to a pressure of not less than 5 psi (34.5 kPa) greater than the pump rating and maintaining such pressure for not less than 15 minutes. The forced sewer shall be watertight at all points.</u>

Reason: Subjecting a gravity house sewer to a 10-foot head is both unnecessary and impractical. By the time the building sewer is able to be connected, the plumbing fixtures have often already been installed. That means that both ends of the sewer line must be plugged off in order to prevent the house from flooding. Leaks on house sewers are rare, considering that most are constructed with plastic pipe, are typically short, and contain few fittings and joints. Public sewer mains and branch laterals are not similarly tested.

This revised text is identical to that found in the other model plumbing code (UPC). It acknowledges the difficulties associated with pressure testing house sewers. It would be appropriate for the IRC to adopt this proven method.

This proposal also adds language for testing forced sewers, identical to that found in the IPC.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This method of testing is a safer, more logical way to perform the testing.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh of Arlington County Virginia representing the ICC PMG Code Action Committee requests Approval as Modified by this Public Comment.

Further modify proposal as follows:

P2503.4 Building sewer testing. The building sewer shall be tested by insertion of a test plug at the point of connection with the public sewer<u>,</u> ~~and~~ filling the building sewer with water <u>and pressurizing the sewer to not less than 10-foot (3048 mm) head of water.</u> ~~to the highest point thereof.~~ <u>The test pressure shall not decrease during a period of not less than 15 minutes.</u> The building sewer shall be watertight at all points.

Forced sewer tests shall consist of pressurizing the piping to a pressure of not less than 5 psi (34.5 kPa) greater than the pump rating and maintaining such pressure for not less than 15 minutes. The forced sewer shall be watertight at all points.

Commenter's Reason: Certainly, gravity sewer testing with water at practically zero pressure is "safer" (because the house won't flood when testing with a 10 foot stand pipe full of water and a test plug blows out) BUT does the test really prove anything? We understand that in normal service, a gravity building sewer experiences no pressure. However, the 10 foot water head test pressure is necessary to determine *the mechanical integrity of the joints*. For example, the installation might have a joint that is just "stuck together" without a coupling being tightened (hubless) or solvent welded (plastic); or a glued joint that might have squeezed the pipe partially out of the fitting socket before setting up. A little ground movement along with some invasive tree roots are going to eventually cause a root-clogging problem at these weak joints. The purpose of the 10 foot test head is not to necessarily duplicate an actual in-service condition but to ensure a level of quality for the workmanship. The 10-foot test head has been in the code for decades and there is not any technical justification for lowering the test pressure.

Plumbing contractors are usually inventive enough to know how to protect their own, and their customer's interests by making sure that homes and buildings will not be flooded during a building sewer test.

Note, however, we prefer RP3 as modified by our public comment over RP4 because of the following shortcomings of this RP4 proposal:

1) A test pressure for a forced sewer of 5 psi greater than the pump pressure rating is unnecessary. The pump cannot develop any more pressure than its rating so why test at a higher pressure?
2) The proposed language implies that a successful test on the sewer is where no observed leaks are found. How does the code official do that when the trench is muddy or where it might have rained a short time ago? Does the code official need to get down in the trench and look for evidence of leakage?
3) Why shouldn't an air test be acceptable for those piping systems that are not plastic, concrete or vitrified clay? The code allows air tests for drain, waste and vent piping (not plastic) so why not for sewers?
4) The original proposal does not require a period of time for the gravity test.

This public comment is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Final Hearing Results

RP4-13	**AMPC**

Code Change No: RP6-13

Original Proposal

Section(s): P2503.5

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2503.5 ~~DWV~~ Drain, waste and vent systems~~s~~ testing. Rough-in and finished plumbing installation~~s~~ of drain, waste and vent systems shall be tested in accordance with Sections P2503.5.1 and P2503.5.2.

Reason: The use of acronyms in code text is undesirable. The section language needs to state what plumbing system requires testing because the section title is not code language. This is a simple editorial cleanup that doesn't change the intent or meaning of this section.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 11 on the PMGCAC IRC-P list. For PMGCAC member reference, this was item no. 5 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal is not necessary as acronyms are used in other parts of the code.

Assembly Action: **None**

Public Comment

Public Comment:

Shawn Strausbaugh of Arlington County Virginia representing the ICC PMG Code Action Committee requests Approval as Submitted.

Commenter's Reason: This is a simple editorial cleanup of the language. We are perplexed as to why the committee didn't approve this because acronyms are generally problematic in code text.

Final Hearing Results

RP6-13	**AS**

Code Change No: RP8-13

Original Proposal

Section(s): P2503.5.1

Proponent: Gary Kozan, CPD, Ridgeway Plumbing, representing Florida Association of Plumbing Heating Cooling Contractors (garyk@ridgewayplumbing.com)

Revise as follows:

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or for piping systems other than plastic, by air with no evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than ~~10~~ <u>5</u> feet (~~3048~~ <u>1524</u> mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 KPa) or 10 inches of mercury column (34 KPa). This pressure shall be held without introduction of additional air for a period of 15 minutes.

Reason: When testing a DWV system, the actual head pressure is not nearly as critical as the visual nature of the test. 10-foot head tests are commonly verified by the inspector "shaking the stack." If water splashes out, the system is considered to be watertight. Mirrors and ladders are seldom used. Lowering the fill stack to 5 feet enables both the installer and the inspector to put eyeballs on the water level inside the pipe. Seeing is believing.

There is nothing magical about a 10-foot head. The reality is a 10-foot (4.34 psi) head test is unlikely to reveal any leaks or defects that would not be detected by a 5-foot (2.17 psi) head test. Many jurisdictions favor the 5-foot head test as superior overall to a 10-foot head test. Florida, for example, adopted the 5-foot head test statewide more than ten years ago. It is time for the IRC to recognize this common sense approach.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This is a good, common sense change because it is hard for inspectors to see the water level in a 10 foot tall standpipe.

Assembly Action: **None**

Final Hearing Results

RP8-13 **AS**

Code Change No: RP11-13

Original Proposal

Section(s): P2601.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2601.2 Connections to drainage system. Plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code. This section shall not be construed to prevent indirect waste connections where required by the code. ~~waste systems~~.

> **Exception:** Bathtubs, showers, lavatories, clothes washers and laundry trays shall not be required to discharge to the sanitary drainage system where such fixtures discharge to a~~n~~ ~~approved gray water~~ systems complying with Section P3009. ~~for flushing of water closets and urinals or for subsurface landscape irrigation.~~

Reason: It is unclear what an "indirect waste system" is. The intent is to have all connections be direct connections except where the code requires an indirect connection. The last part of the text in the exception is unnecessary – the gray water recycling system section covers what to do with the gray water after it is captured.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 11 on the PMGCAC IRC-P list. For PMGCAC member reference, this was item no. 9 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP11-13	**AS**

Code Change No: RP12-13

Original Proposal

Section(s): P2602.1, P2602.2, Chapter 14

Proponent: Dan Buuck, National Association of Home Builders (NAHB); David Hall CFM, Georgetown Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

SECTION P2602
INDIVIDUAL WATER SUPPLY AND SEWAGE DISPOSAL

P2602.1 General. The water-distribution and drainage system of any building or premises where plumbing fixtures are installed shall be connected to a public water supply or sewer system, respectively, if available. When either a public water supply or sewer system, or both, are not available, or connection to them is not feasible, an individual water supply or individual (private) sewage-disposal system, or both, shall be provided. <u>Individual water supplies shall be constructed in accordance with state and local laws or in accordance with ANSI/NGWA-01-07.</u>

P2602.2 Flood-resistant installation. In flood hazard areas as established by Table R301.2(1):

1. Water supply systems shall be designed and constructed to prevent infiltration of floodwaters.
2. Pipes for sewage disposal systems shall be designed and constructed to prevent infiltration of floodwaters into the systems and discharges from the systems into floodwaters.

Add new standard to Chapter 14 as follows:

<u>National Ground Water Association</u>
<u>601 Dempsey Road</u>
<u>Westerville, OH 43081-8978</u>

<u>NGWA</u>

<u>ANSI/NGWA-01-07 Water Well Construction Standard</u>

Reason: The IRC currently refers the user to the IPC for requirements regarding well construction, as it does for all plumbing not addressed in the IRC (P2601.1). Does it make sense to have code language regarding wells when many states and counties have laws that regulate their construction? The provisions for wells in the IPC are also incomplete and spread out through several sections of the code making tracking difficult. This proposal is a simple change that clarifies where to go for well construction requirements—either your local regulations or an ANSI standard.

The Water Well Construction Standard is expected to complete the ANSI process and be published by the end of summer 2013.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

For staff analysis of the content of ANSI/NGWA-01-07 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This proposal fills in the gap where state or local law might not exist for private wells.

Assembly Action: **None**

Public Comments

Public Comment:

Dan Buuck, CBO, National Association of Home Builders (NAHB) representing the National Association of Home Builders (NAHB) (dbuuck@nahb.org) and Shawn Strausbaugh of Arlington County Virginia representing the ICC PMG Code Action Committee requests Approval as Modified by this Public Comment

Modify the proposal as follows:

P2602.1 General. The water-distribution and drainage system of any building or premises where plumbing fixtures are installed shall be connected to a public water supply or sewer system, respectively, if available. When either a public water supply or sewer system, or both, are not available, or connection to them is not feasible, an individual water supply or individual (private) sewage-disposal system, or both, shall be provided. Individual water supplies shall be constructed in accordance with the applicable state and local laws ~~or~~. Where the construction of individual water supplies is not regulated by state or local laws, such individual water supplies shall be constructed in accordance with ANSI/NGWA-01-07.

Commenter's Reason: Although the proposal was approved as submitted at the committee action hearings in Dallas, some committee members felt the section needed additional language to clarify that the ANSI/NGWA standard could not preempt state and local laws. This public comment adjusts the language to require that NGWA-0-07 be the fallback requirement if there are no state or local laws controlling the construction of individual water supplies.

Final Hearing Results

RP12-13 **AMPC**

Code Change No: RP14-13

Original Proposal

Section(s): P2603.2.1

Proponent: Gary Kozan, CPD, Ridgeway Plumbing, representing Florida Association of Plumbing Heating Cooling Contractors (garyk@ridgewayplumbing.com)

Revise as follows:

P2603.2.1 Protection against physical damage. In concealed locations, where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than ~~1-1/2~~ 1-1/4 inches (~~38~~ 31.8 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage). Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

Reason: The safest place to run water piping is in the middle of the wall. But in a typical 3-1/2 inch stud wall, even a ½-inch pipe (5/8-inch o.d.) ends up nearer than the requisite 1-1/2 inch setback from either edge. Inspectors often want to see stud guards on *both* sides of the stud. This makes no sense. By reducing the distance from 1-1/2 inches to 1-1/4 inches, both ½ and ¾-inch water lines can be safely installed in the center of the wall without the need for stud guards on either side. This encourages quality workmanship instead of penalizing it.

This proposal is consistent with the National Electrical Code, which also specifies a 1-1/4-inch setback from the edge of a stud. The Uniform Plumbing Code specifies only a 1-inch setback.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The reduction in the dimension would give the plumber more leeway in locating piping. Reducing the dimension by ¼ inch isn't going to hurt anything.

Assembly Action: **None**

Final Hearing Results

RP14-13	**AS**

Code Change No: RP16-13

Original Proposal

Section(s): P2603.3

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Delete and substitute as follows:

~~**P2603.3 Breakage and corrosion.** Pipes passing through concrete or cinder walls and floors, cold-formed steel framing or other corrosive material shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from lime and acid of concrete, cinder or other corrosive material. Sheathing or wrapping shall allow for movement including expansion and contraction of piping. The wall thickness of material shall be not less than 0.025 inch (0.64 mm).~~

<u>**P2603.3 Protection against corrosion.** Metallic piping, except for cast iron, ductile iron and galvanized steel, shall not be placed in direct contact with steel framing members, concrete or masonry. Metallic piping shall not be placed in direct contact with corrosive soil. Where sheathing is used to prevent direct contact, the sheathing material thickness shall be not less than 0.008 inch (8 mil) (0.203 mm) and shall be made of plastic. Where sheathing protects piping that penetrates concrete or masonry walls or floors, the sheathing shall be installed in a manner that allows movement of the piping within the sheathing.</u>

Reason: One clear intent of this code section is to protect metallic piping from direct contact with concrete, masonry, corrosive soils and cold formed steel framing members as direct contact could cause exterior corrosion of the piping. However, it is not clear exactly what the sentence “Sheathing or wrapping shall allow for movement including expansion and contraction of piping” is intended to mean. Committee comments from the 2012 IPC hearings on a similar proposal seem to indicate that where sheathing or wrapping (presumably with plastic materials) are used to protect a pipe passing through concrete (such as a pipe below a slab coming up through and cast in the slab), the sheathing must allow for some “give” between the pipe and the concrete or masonry.

The wall thickness of the sheathing material is in question. To our knowledge, no one is using this thick of material and jurisdictions are not enforcing the requirement for 0.025 inch (25 mils) thick material. Much thinner plastic sheathing materials are commonly being used across the country for decades without any reported adverse effects. Cast iron and ductile iron manufacturers recommend, for corrosive soil conditions, the use of either 0.008 inch thick low density polyethylene sheathing or 0.004 inch thick, high strength cross laminated polyethylene sheathing for corrosive soil conditions. For small metallic pipes such as copper tubing (1/2” to 1 ¼”) passing through concrete or masonry, plumbing supply houses normally stock 0.004 and .006 inch thick low density “flat tube” plastic sheathing materials and that is what is being used. To make it easy, requiring 0.008 inch thick material for all types of metallic piping is reasonable.

The revised language improves understanding what the code intends.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 11 on the PMGCAC IRC-P list. For PMGCAC member reference, this was item no. 10 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed language is much more clear than the existing and allows thinner sheathing material which has been used without any problems for years.

Assembly Action: **None**

Final Hearing Results

RP16-13	**AS**

Code Change No: RP17-13

Original Proposal

Section(s): P2604.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

P2604.2 ~~Common~~ Water service and building sewer in same trench. Where the water service piping and building sewer piping is installed in same trench, the installation shall be in accordance with ~~See~~ Section P2905.4.2.

Reason: This existing section is poor code format and the current section has no information as to what this section really concerns. The revision makes a complete statement about what is intended.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 11 on the PMGCAC IRC-P list. For PMGCAC member reference, this was item no. 13 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal makes clear what is meant by a common trench.

Assembly Action: **None**

Final Hearing Results

RP17-13	**AS**

Code Change No: RP18-13

Original Proposal

Section(s): P2604.4

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Delete and substitute as follows:

~~**P2604.4 Protection of footings.** Trenching installed parallel to footings shall not extend below the 45-degree (0.79 rad) bearing plane of the footing or wall (See Figure P2604.4)~~.

P2604.4 Protection of footings. Trenching installed parallel to footings and walls shall not extend into the bearing plane of a footing or wall. The upper boundary of the bearing plane is a line that extends downward, at an angle of 45 degrees from horizontal, from the outside bottom edge of the footing or wall.

Reason: The proposed language was approved for the 2015 IPC. The current language is not especially clear and is easily misunderstood. The proposed text is explicit and captures the intent of this provision.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X6 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed language is in line with engineering practices and is sufficiently clear so that the plumber doesn't have to go look at a commentary publication to understand what is meant.

Assembly Action: **None**

Final Hearing Results

RP18-13	**AS**

Code Change No: RP19-13

Original Proposal

Section(s): P2605.1

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association representing the Plastic Pipe and Fittings Association (mikec@cmservnet.com)

Revise as follows:

TABLE P2605.1
PIPING SUPPORT

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Cross-linked polyethylene (PEX) pipe, 1 inch and smaller	2.67 (32 inches)	10b
Cross-linked polyethylene (PEX) pipe, 1 ¼ inch and larger	4	10[b]

(Portions of table and footnotes not shown remain unchanged)

Reason: PEX tubing, like other materials currently in the table, is being made in larger diameters that are stiffer and require less support.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The code currently lacks support information for larger sizes of PEX pipe so this information is needed in the code.

Assembly Action: **None**

Public Comments

Public Comment:

Larry Gill, IPEX USA LLC, requests Approval as Modified by this Public Comment.

TABLE P2605.1
PIPING SUPPORT

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Cross-linked polyethylene (PEX) pipe, 1 inch and smaller	2.67 (32 inches)	10[b]
Cross-linked polyethylene (PEX) pipe, 1 ¼ inch and larger	4	10[b]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Polyethylene of Raised Temperature (PE-RT) pipe, 1 inch and smaller	2.67 (32 inches)	10[b]
Polyethylene of Raised Temperature (PE-RT) pipe, 1 ¼ inch and larger	4	10[b]

Commenter's Reason: Support values for PEX were added to the IRC and approved. PE-RT support spacing is already in the IRC but we need to make the above noted changes to clarify that there are different support spacing's for 1 inch and smaller and 1 ¼ inch and larger. If approved, the values for PEX and PE-RT would match.

Final Hearing Results

RP19-13 **AMPC**

Code Change No: RP20-13

Original Proposal

Section(s): Table P2605.1

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

TABLE P2605.1
PIPING SUPPORT

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING
~~Brass Pipe~~	~~10~~	~~10~~

(Portions of table not shown remain unchanged)

Reason: Brass and Bronze are copper alloys and are covered under the copper and copper alloys listed elsewhere in the table. This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: "Brass" pipe is actually covered by the "copper or copper alloy" entry in the table so the brass pipe entry is not needed.

Assembly Action: **None**

Final Hearing Results

RP20-13	**AS**

Code Change No: RP21-13

Original Proposal

Section(s): Table P2605.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

TABLE P2605.1
PIPING SUPPORT

(Portions of table not shown remain unchanged)

a. The maximum horizontal spacing of cast iron pipe hangers shall be increased to 10 feet where 10 foot lengths of pipe are installed.
b. ~~Mid-story guide~~ For sizes 2 inches and smaller, a guide shall be installed midway between required vertical supports. Such guides shall prevent pipe movement in a direction perpendicular to the axis of the pipe.

Reason: What constitutes a "mid-story guide" and what is supposed to do? The revised language provides the necessary information to make this footnote clear. This same proposal for the 2015 IPC was approved as submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 14 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP21-13 **AS**

Code Change No: RP23-13

Original Proposal

Section(s): P2607.1, P2607.2 (New)

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2607.1 ~~General~~ Pipes penetrating roofs. Where a pipe penetrates a roof, a flashing of lead, copper, galvanized steel or an *approved* elastomeric material shall be installed in manner that prevents water entry into the building. Counterflashing into the opening of pipe serving as a vent terminal shall not ~~restrict~~ reduce the required internal cross-sectional area of the vent pipe to less than the internal cross-sectional area of one pipe size smaller. ~~any vent~~. ~~and exterior wall penetrations shall be made water tight. Joints at the roof, around vent pipes, shall be made water tight by the use of lead, copper or galvanized iron flashings or an *approved* elastomeric material.~~

Add new text as follows:

P2607.2 Pipes penetrating exterior walls. Where a pipe penetrates an exterior wall, a waterproof sealant shall be applied at the joint between the wall and the pipe, on the exterior of the wall.

Reason: The phrase "made water tight" is archaic language. The existing section needs to be broken into two sections for clarity. Additional wording makes the intent clear. Counterflashing will *always* reduce the inside cross-sectional area of the vent pipe so the issue is how much reduction is acceptable. An area that is not less than one pipe smaller seems reasonable.

The new section just separates the wall sealing requirement out of the previous section and makes the language clear.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 15 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed language provides needed clarity on how large an opening is needed when peening over flashing into the vent termination.

Assembly Action: **None**

Public Comments

Public Comment:

Forest Hampton III, Oatey Co., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

P2607.2 Pipes penetrating exterior walls. Where a pipe penetrates an exterior wall, ~~a waterproof sealant shall be applied at the joint between the wall and the pipe, on the exterior of the wall.~~ a waterproof seal shall be made on the exterior of the wall by one of the following methods:

1. A waterproof sealant applied at the joint between the wall and the pipe.
2. A flashing of an approved elastomeric material.

Commenter's Reason: Flat sidewall elastomeric flashings that are made from equivalent materials as elastomeric roof flashing are available in the field for use in sidewall penetrations.

Final Hearing Results

RP23-13	**AMPC**

Code Change No: RP24-13

Original Proposal

Section(s): P2609.1

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

P2609.1 Identification. Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer and any markings required by the applicable referenced standards. <u>Nipples created from the cutting and threading of approved pipe shall not be required to be identified.</u>

Reason: The identification section is restrictive and does not take into consideration nipples created from pipe.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Pipe nipples are not labeled and there is no need for them to be identified with the manufacturer's information.

Assembly Action: **None**

Final Hearing Results

RP24-13	**AS**

Code Change No: RP25-13

Original Proposal

Section(s): P2609.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2609.1 Identification. Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer and any markings required by the applicable referenced standards.

> <u>**Exception:** Where the manufacturer identification cannot be marked on pipe fittings and pipe nipples because of the small size of such fittings, the identification shall be printed on the item packaging or on documentation provided with the item.</u>

Reason: Some items are too small to apply the manufacturer's identification on the item. The exception allows for packaging or provided documentation to verify the identity of the item.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 16 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This exception with help the manufacturers comply with the code requirement in the main paragraph.

Assembly Action: **None**

Final Hearing Results

RP25-13	**AS**

Code Change No: RP27-13

Original Proposal

Section(s): P2609.4

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2609.4 Third-party certification. ~~All~~ Plumbing products and materials required by the code to be in compliance with a referenced standard shall be listed by a third-party certification agency as complying with the referenced standard~~s~~. Products and materials shall be identified in accordance with Section P2609.1.

Reason: The existing language implies that everything must have a standard. However, there are many common items used in the plumbing industry that are not made to a standard or if they are made to a standard, that standard is not referenced by the code. For example, metal hanger strap, thread sealing tape, pipe thread sealant, nails, bolts, nuts, screws, pipe support hangers and pipe clamps. These types of items are not intended to have a listing by a third party certification agency.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 17 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Most small parts are not required to be listed anyhow.

Assembly Action: **None**

Final Hearing Results

RP27-13	**AS**

Code Change No: RP28-13

Original Proposal

Section(s): P2701.1

Proponent: Bob Eugene representing UL LLC (Robert.Eugene@ul.com)

Revise as follows:

P2701.1 Quality of fixtures. Plumbing fixtures, faucets and fixture fittings shall be constructed of *approved* materials, shall have smooth impervious surfaces, shall be free from defects and concealed fouling surfaces, and shall conform to the standards cited in <u>Table P2701.1 and elsewhere in</u> this code. Plumbing fixtures shall be provided with an adequate supply of potable water to flush and keep the fixtures in a clean and sanitary condition without danger of backflow or cross connection.

Reason: Add a clear reference to Table P2701.1. Currently, the only references to this table identify only specific standards: ASTM F 409 (P2702.3); ASME 112.18.1/CSA B125.1 (P2722.1).

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP28-13	**AS**

Code Change No: RP29-13

Original Proposal

Section(s): R202, P2707.1, P2716, P2716.1, P2716.2, P2717.3, TABLE P2903.6, TABLE P3004.1, TABLE P3005.4.2, P3111.1, P3112.1, TABLE P3201.7

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

PLUMBING APPLIANCE. An energized household *appliance* with plumbing connections, such as a dishwasher, food waste ~~grinder~~ disposer, clothes washer or water heater.

P2707.1 Directional fitting required. *Approved* directional-type branch fittings shall be installed in fixture tailpieces receiving the discharge from food waste ~~disposal~~ disposer units or dishwashers.

SECTION P2716
FOOD WASTE ~~GRINDER~~ DISPOSER

P2716.1 Food waste ~~grinder~~ disposer waste outlets. Food waste ~~grinder~~ disposer shall be connected to a drain of not less than 1-1/2 inches (38 mm) in diameter.

P2716.2 Water supply required. Food waste ~~grinder~~ disposer shall be provided with an adequate supply of water at a sufficient flow rate to ensure proper functioning of the unit.

P2717.3 Sink, dishwasher and food-waste ~~grinder~~ disposer. The combined discharge from a sink, dishwasher, and food waste ~~grinder~~ disposer is permitted to discharge through a single 1-1/2 inch (38 mm) trap. The discharge pipe from the dishwasher shall be increased to not less than 3/4 inch (19 mm) in diameter and shall connect with a wye fitting between the discharge of the food-waste ~~grinder~~ disposer and the trap inlet or to the head of the food waste ~~grinder~~ disposer. The dishwasher waste line shall rise and be securely fastened to the underside of the counter before connecting to the sink tail piece or the food waste ~~grinder~~ disposer.

TABLE P2903.6
WATER-SUPPLY FIXTURE-UNIT VALUES FOR VARIOUS PLUMBING FIXTURES AND FIXTURE GROUPS

TYPE OF FIXTURES OR GROUP OF FIXTURES	WATER-SUPPLY FIXTURE-UNIT VALUE (w.s.f.u.)		
Kitchen group (dishwasher and sink with/without ~~garbage grinder~~ food waste disposer)	1.9	1.0	2.5

(Portions of table not shown remain unchanged.)

TABLE P3004.1
DRAINAGE FIXTURE UNIT (d.f.u.) VALUES FOR VARIOUS PLUMBING FIXTURES

TYPE OF FIXTURE OR GROUP OF FIXTURES	DRAINAGE FIXTURE UNIT VALUE (d.f.u.)a
Kitchen group (dishwasher and sink with or without ~~garbage grinder~~ food waste disposer)	2

(Portions of table not shown remain unchanged.)

TABLE P3005.4.2
MAXIMUM NUMBER OF FIXTURE UNITS ALLOWED
TO BE CONNECTED TO THE BUILDING DRAIN,
BUILDING DRAIN BRANCHES OR THE BUILDING SEWER

DIAMETER OF PIPE (inches)	SLOPE PER FOOT		
	1/8 inch	¼ inch	½ inch

(Portions of table not shown remain unchanged.)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. 1-1/2 inch pipe size limited to a building drain branch serving not more than two waste fixtures, or not more than one waste fixture if serving a pumped discharge fixture or ~~garbage grinder~~ food waste disposer discharge.
b. No water closets.

P3111.1 Type of fixtures. A combination waste and vent system shall not serve fixtures other than floor drains, sinks and lavatories. A combination waste and vent system shall not receive the discharge of a food waste ~~grinder~~ disposer.

P3112.1 Limitation. Island fixture venting shall not be permitted for fixtures other than sinks and lavatories. Kitchen sinks with a dishwasher waste connection, a food waste ~~grinder~~ disposer, or both, in combination with the kitchen sink waste, shall be permitted to be vented in accordance with this section.

TABLE P3201.7
SIZE OF TRAPS AND TRAP ARMS FOR PLUMBING FIXTURES

PLUMBING FIXTURE	TRAP SIZE MINIMUM (inches)
Kitchen sink (one or two traps, with or without dishwasher and ~~garbage grinder~~ food waste disposer)	11/2

(Portions of table not shown remain unchanged.)

Reason: The proposed language was approved for the 2015 IPC. The proper term used in the plumbing profession is food waste disposers, not food waste grinders. This will correct the language in the code to the proper terminology for this type of plumbing appliance.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X7 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: Correction of the terminology for a food waste disposal is needed.

Assembly Action: **None**

Final Hearing Results

RP29-13 **AS**

Code Change No: RP30-13

Original Proposal

Section(s): Table P2701.1, Chapter 44

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

TABLE P2701.1
PLUMBING FIXTURES, FAUCETS AND FIXTURE FITTINGS

MATERIAL	STANDARD
Plastic bathtub units	ANSI Z124.1.2, ASME A112.19.2/CSA B45.1
Plastic shower receptors and shower stall	ANSI Z124.1.2,CSA B45.5

(Portions of table not shown remain unchanged)

Add standard to Chapter 43 as follows:

ANSI
Z124.1.2-2005 Plastic Bathtub and Shower Units.

Reason: ANSI standards Z124.1 and Z124.2 were combined into a single standard, ANSI Z124.1.2 in 2005. The code needs to reflect the current standard for these products. The 2012 IPC already reflects this change.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 75 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP30-13	**AS**

Code Change No: RP32-13

Original Proposal

Section(s): R202, P2702.1, P2706.1, P2706.1.1 (New), P2706.2, P2706.2.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee

Add new definition to Chapter 2 as follows:

WASTE RECEPTOR. A floor sink, standpipe, hub drain or a floor drain that receives the discharge of one or more indirect waste pipes.

Revise as follows:

P2702.1 Plumbing fixtures. Plumbing fixtures, other than water closets, shall be provided with *approved* strainers.

> **Exception:** Hub drains receiving only clear water waste and standpipes shall not require strainers.

P2706.1 General. ~~Waste receptors shall be of an *approved* type.~~ ~~Plumbing fixtures or other receptors receiving the discharge of indirect waste pipes shall be shaped and have a capacity to prevent splashing or flooding and shall be readily accessible for inspection and cleaning.~~ ~~Waste receptors and standpipes shall be trapped and vented and shall connect to the building drainage system~~. For other than hub drains that receive only clear-water waste and standpipes, a removable strainer or basket shall cover the waste outlet of waste receptors. Waste receptors shall not be installed in ~~ventilated~~ concealed spaces. Waste receptors shall not be installed in ~~bathrooms,~~ plenums, attics, crawl spaces or interstitial spaces above ceilings and below floors ~~or in any inaccessible or unventilated space such as a closet~~ **.** ~~Ready access shall be provided to~~ Waste receptors shall be *readily accessible*.

> ~~**Exceptions:**~~
>
> 1. ~~Open hub waste receptors shall be permitted in the form of a hub or pipe extending not less than 1 inch (25 mm) above a water-impervious floor, and are not required to have a strainer.~~
> 2. ~~Clothes washer standpipes shall not be prohibited in bathrooms.~~

P2706.1.1 Hub drains. Hub drains shall be in the form of a hub or a pipe that extends not less than 1 inch (25mm) above a water- impervious floor.

P2706.1.2 Standpipes. Standpipes shall extend not less than ~~of~~ 18 inches (457 mm) and ~~but~~ not greater than 42 inches (1067 mm) above the trap weir. ~~Access shall be provided to all standpipe traps and drains for rodding.~~

P2706.1.2.1 Laundry tray connection to standpipe. Where a laundry tray waste line ~~is permitted to~~ connects into a standpipe for ~~the~~ an automatic clothes washer drain~~.~~, the standpipe shall extend not less than 30 inches (762 mm) above the standpipe trap weir and shall extend above the flood level rim of the laundry tray. The outlet of the laundry tray shall be not greater than 30 inches (762 mm) horizontally ~~distance~~ from the standpipe trap.

(Renumber subsequent section)

Reason: A definition for "waste receptor" is needed. The term is found in the code 11 times with no exact description. The definition identifies exactly what constitutes an 'approved type" of waste receptor. The exception of Section P2706.1 was revised to allow the absence of a strainer on hub drains that receive clear water waste as Section P2706.1 is being revised with this allowance. The first 3 sentences of P2706.1 was deleted as they are redundant – Section P2601.2 already covers where waste receptors must be connected and P3201.6 covers the requirement for traps for each fixture. The last line of Section P2601.1 was revised so that the defined term "*readily accessible*" could be used. The IRC does not have a definition for ready access.

The code fails to provide guidance as to what is a ventilated space so the language was changed to prevent waste receptors from being installed in a concealed space. There is no logical reason for waste receptors not to be installed in a bathroom. It is not unusual for a clothes washing machine (requiring a standpipe) to be placed in a bathroom in a residential occupancy. Waste receptors (typically hub drains) are frequently needed in closets or storerooms where appliances discharge condensate or relief discharges. The term "open hub waste receptor" is redundant and unclear and was eliminated in favor of the more common term "hub drain". As a hub drain is a waste receptor, a strainer is required except where the hub drain receives only clear water wastes. Standpipes are waste receptors and should be included as a subsection under the waste receptor section. The sentence " Access shall be provided to standpipe traps and drains for rodding." is unnecessary as P2706.1 already requires waste receptors to be readily accessible.
A similar proposal for the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 19 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: A definition of waste receptor is needed and the revised language makes the IRC consistent with the IPC.

Assembly Action: **None**

Final Hearing Results

RP32-13 **AS**

Code Change No: RP33-13

Original Proposal

Section(s): P2702.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2702.2 Waste fittings. Waste fittings shall conform to ASME A112.18.2/CSA B125.2, ASTM F 409 or shall be made from pipe and pipe fittings complying with any of the standards indicated in Tables P3002.1(1) and P3002.3. ~~to one of the standards listed in Table P3002.1(1) for above-ground drainage and vent pipe and fittings.~~

Reason: There is no need to state the title of the table along with the table number in code text. The added wording improves what is intended by the code which is that waste fittings can be made up from pipe and fittings.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 20 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP33-13	**AS**

Code Change No: RP34-13

Original Proposal

Section(s): P2705.1

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

P2705.1 General. The installation of fixtures shall conform to the following:

1. Floor-outlet or floor-mounted fixtures shall be secured to the drainage connection and to the floor, where so designed, by screws, bolts, washers, nuts and similar fasteners of copper, ~~brass~~ copper alloy or other corrosion-resistant material.

2 through 8 *(No change to current text)*

Reason: This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Changing "brass" to copper alloy is consistent with other proposals doing the same that have been approved.

Assembly Action: **None**

Final Hearing Results

RP34-13	**AS**

Code Change No: RP36-13

Original Proposal

Section(s): P2701.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2701.1 Quality of fixtures. Plumbing fixtures, faucets and fixture fittings ~~shall be constructed of *approved* materials,~~ shall have smooth impervious surfaces~~,~~ shall be free from defects <u>and shall not have</u> concealed fouling surfaces.~~, and shall conform to the standards cited in this code. Plumbing fixtures shall be provided with an adequate supply of potable water to flush and keep the fixtures in a clean and sanitary condition without danger of backflow or cross connection.~~

Reason: The current code text is very old and comes from a time where there were not many standards existed for plumbing fixtures and fittings. According to the first sentence of this section, the code official must approve materials, even those that are in compliance with the standards referenced in the code. The first sentence is revised to make a general statement about the quality of fixtures. The last sentence has nothing to do with quality of fixtures. The subject matter is covered adequately elsewhere in the code so this sentence needs removed.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 18 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh of Arlington County Virginia representing the ICC PMG Code Action Committee requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

P2701.1 Quality of fixtures. Plumbing fixtures, faucets and fixture fittings shall have smooth impervious surfaces, shall be free from defects<u>,</u> ~~and~~ shall not have concealed fouling surfaces <u>and shall conform to the standards cited in this code.</u>

Commenter's Reason: Approved proposals RP36 and RP28 are in conflict with one another because RP36 deletes a section of text that RP28 is modifying. This public comment corrects the problem by making this proposal in agreement with what RP28 accomplishes. The change in RP28 is prudent and we agree with its intent.

Final Hearing Results

RP36-13 **AMPC**

Code Change No: RP39-13

Original Proposal

Section(s): P2710.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2710.1 Bathtub and shower spaces. Walls in shower compartments ~~walls~~ and walls above bathtubs that have wall-mounted showerheads shall be finished in accordance with Section R307.2.

Reason: The title infers that the section is about bathtub and shower spaces but the section only addresses showers. The code intent is to cover walls whether they are in showers or above bathtubs having showerheads.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 23 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal appropriately clarifies what areas of the shower of tub compartments that are required to be in accordance with R307.2

Assembly Action: **None**

Final Hearing Results

RP39-13	**AS**

Code Change No: RP40-13

Original Proposal

Section(s): P2712.1, Chapter 44

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2712.1 Approval. Water closets shall conform to the water consumption requirements of Section P2903.2 and shall conform to Z124.4, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5. Water closets shall conform to the hydraulic performance requirements of ASME A112.19.2/CSA B45.1. Water closet tanks shall conform to ANSI Z124.4, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5. Water closets that have an invisible seal and unventilated space or walls that are not thoroughly washed at each discharge shall be prohibited. Water closets that permit backflow of the contents of the bowl into the flush tank shall be prohibited. Water closets equipped with a dual flushing device shall comply with ASME A112.19.14.

Add new standard to Chapter 44 as follows:

ASME
A112.19.14–2006(R2011) Six-Liter Water Closets Equipped with a Dual Flushing Device

Reason: This revised language and addition of standard was approved for the 2015 IPC. Dual flush water closets which consist of a full flush of 1.6 gpf and a reduce flush of less than 1.1 gpf do exist and should be required to comply with some performance requirements. This is a National standard (ANSI) which covers the performance requirements for these types of systems.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X9 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ASME A112.19.14-2006(R2011) with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1. 2013.

Public Hearing Results

For staff analysis of the content of A112.19.14 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP40-13 **AS**

Code Change No: RP42-13

Original Proposal

Section(s): P2716.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2716.2 Water supply required. A <u>sink equipped with a</u> food waste grinder~~s~~ shall <u>be provided with a faucet.</u> ~~be provided with~~ ~~an adequate~~ ~~supply of water at a sufficient flow rate to ensure proper functioning of the unit.~~

Reason: What is "adequate"? What is a "sufficient flow rate"? What is "proper functioning of the unit"? All these terms are unenforceable code language and need to be removed. Requiring a faucet for the sink with a disposal unit is adequate coverage. It is up to the user to turn the faucet on whenusing the food waste grinder.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 25 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement. This is appropriate for residential construction.

Assembly Action: **None**

Final Hearing Results

RP42-13 **AS**

Code Change No: RP43-13

Original Proposal

Section(s): P2717.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2717.1 Protection of water supply. ~~The water supply for dishwashers shall be protected by an air gap or integral backflow preventer.~~ The water supply to a dishwasher shall be protected against backflow by an *air gap* complying with ASME A112.1.3 or A112.1.2 that is installed integrally within the machine or a backflow preventer in accordance with Section P2902.

Reason: The requirement for dishwashing machines to comply with ASSE 1006 (covering the requirement for an internal air gap on the water supply) was removed from the 2012 code because DW manufacturers are no longer certifying their machines to ASSE 1006. Standards that they do comply with, ASME A112.1.3 or A112.1.2 are being included in this section so that inspectors are able to verify that the DWs have an integral backflow protection. A similar proposal to the 2015 IPC was Approved as Submitted.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 26 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal adds a needed standard to the code.

Assembly Action: **None**

Final Hearing Results

RP43-13	**AS**

Code Change No: RP44-13

Original Proposal

Section(s): P2717.2, P2717.3

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2717.2 Sink and dishwasher. The combined discharge from a sink and dishwasher shall be served by ~~are permitted to discharge through~~ a single trap of not less than 1 1/2 inches (38 mm) in nominal diameter ~~trap~~. The discharge pipe from the dishwasher shall be increased in size to not less than 3/4 inch (19 mm) inside diameter ~~and~~ before shall be connect~~ed~~ing ~~with~~ to a wye fitting in ~~to~~ the sink tailpiece. The waste discharge pipe from the dishwasher ~~waste line~~ shall rise and be ~~securely~~ fastened or held in a position ~~to~~ at the underside of the counter before connecting to the wye ~~sink tailpiece~~.

P2717.3 Sink, dishwasher and food waste grinder. The combined discharge from a sink, dishwasher, and food waste grinder shall be served by a single trap of not less than ~~is permitted to discharge through a single~~ 1 1/2 inch (38 mm) in nominal diameter ~~trap~~. The discharge pipe from the dishwasher shall be increased in size to not less than 3/4 inch (19 mm) inside diameter ~~and shall~~ before connecting ~~with~~ to a wye fitting between the discharge of the food-waste grinder and the trap inlet. Alternatively, the discharge pipe from the dishwasher shall connect ~~or~~ to the head of the food waste grinder. The dishwasher discharge pipe ~~waste line~~ shall rise and be ~~securely~~ fastened or held in a position ~~to~~ at the underside of the counter before connecting to the wye ~~sink tail piece~~ or the head of the food waste grinder.

Reason: The term "is permitted" is not mandatory code language. The proper term for a food grinder is a food waste grinder. The term "securely" is unenforceable. The term "or held in a position" was added primarily because the existing language seems to imply that the discharge pipe *has to be fastened* to the underside of the counter. This is a problem with granite countertops. The intent is that the piping be routed to the underside of the countertop and be held in some manner at that point. A common way to accomplish this is to drill a hole in the cabinet wall between the dishwasher and the sink cabinet, at the top of the cabinet wall (if the cabinet wall goes up to the underside of the countertop. Sometimes, the cabinet wall is not as tall and there a small gap. Then route the dishwasher discharge pipe through the hole or over the top of the cabinet wall. No fastening is needed (as it is very difficult to get into the cabinet and reach up between the sink and the cabinet wall to install a "fastener"). Intelligent routing is all that is necessary. This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 27 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The ¾ inch inside diameter will not match up to the sink tailpiece fitting connection.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh of Arlington County Virginia representing the ICC PMG Code Action Committee requests Approval as Modified by this Public Comment.

Replace proposal as follows:

Revise as follows:

P2717.2 Sink and dishwasher. ~~A sink and dishwasher are permitted to discharge through a single 1 1/2 inches (38 mm) trap. The discharge pipe from the dishwasher shall be increased to not less than 3/4 inch (19 mm) in diameter and shall be connected with a wye fitting to the sink tailpiece. The dishwasher waste line shall rise and be securely fastened to the underside of the counter before connecting to the wye sink tailpiece.~~ The combined discharge from a dishwasher and a one- or two– compartment sink, with or without a food waste disposer, shall be served by a trap of not less than 1 1/2 inches (38 mm) in outside diameter. The dishwasher discharge pipe or tubing shall rise to the underside of the counter and be fastened or otherwise held in that position before connecting to the head of the food waste disposer or to a wye fitting in the sink tailpiece.

~~**P2717.3 Sink, dishwasher and food grinder.** The combined discharge from a sink, dishwasher, and grinder is permitted to discharge through a single 1 1/2 inch (38 mm) trap . The discharge pipe from the dishwasher shall be increased to not less than 3/4 inch (19 mm) in diameter and shall before connect with a wye fitting between the discharge of the food-waste grinder and the trap inlet. or to the head of the food grinder. The dishwasher waste line shall rise and be securely fastened to the underside of the counter before connecting to the sink tail piece or the food grinder.~~

Commenter's Reason: The committee reason for disapproval caused us to dig deeper into what the standards indicate for tubular sink tailpieces with dishwasher connection branches. The code referenced standards are ASME A112.18.2/CSA B125.2 (covering metal and plastic waste fittings) and ASTM F409 (covering only plastic fittings). The ASME/CSA standard does not indicate dimensions for the dishwasher connect branch. The ASTM standard indicates an outside diameter of either 5/8 inch or 7/8 inch. A survey of several manufacturers' product lines of both metallic and plastic tubular sink tailpieces with dishwasher connection branches reveals a number of available configurations, some of which do not comply with ¾ inch diameter (*note that even the ASTM F409 standard doesn't comply with the 3/4 inch diameter!*). Our conclusion is that the size of the dishwasher connection branch should not be indicated in these code sections. The standards for these fittings are already covered by Table P2701.1 (for Plumbing fixture waste fittings). The manufacturers of these fittings are obviously coordinating design of their products to meet the requirements for a variety of dishwasher discharge pipe, hose and tubing connections. The installer simply has to provide the correct fitting for the application or use an adapter/connector to make the connection. The wye's tube size is not critical and does not need to be specified – industry takes care of this. This revised proposal eliminates a size indication conflict in the code that has existed for many editions.

Upon further examination of the original proposal, we determined that the two sections could be easily combined as they are virtually identical. In this public comment, the wording has been greatly simplified. We changed the size of the trap to outside diameter to encompass tubular size traps. Also note that a clarification was added to indicate that the "sink" could have one- or two-compartments. There was some concern expressed within the PMGCAC that "sink" might only mean a single compartment sink when in fact, two compartment sinks, with or without a food waste disposer, and with a dishwasher have been installed in this manner for decades.

Some may object to being so specific about limiting the number of compartments that can be handled by the single trap arrangement. With the trend of higher end residential kitchens using "quasi-commercial" plumbing fixtures in the kitchen, we have concerns that a 1-1/2 inch tubular trap might not be able to pass enough flow if 3 (or more) compartment sinks are discharging at the same time that the dishwasher is discharging (let alone if a disposer is forcing waste into the system). Because we only know that a 2 compartment arrangement work, based on extensive field use, we didn't want to relax the limit to accommodate all multi-compartment sinks. We leave that discussion for future code change proposals.

Final Hearing Results

RP44-13	AMPC

Code Change No: RP47-13

Original Proposal

Section(s): P2725 (New), P2725.1 (New)

Proponent: Jeremy Brown, NSF International (brown@nsf.org)

Add new text as follows:

SECTION P2725
NON-LIQUID SATURATED TREATMENT SYSTEMS

P2725.1 General. Materials, design, construction and performance of non-liquid saturated treatment systems shall comply with NSF 41.

Add new standard to Chapter 44:

NSF
NSF 41-11 Non-Liquid Saturated Treatment Systems

Reason: NSF/ANSI-41 *Non-liquid Saturated Treatment Systems* is the American National Standard for the materials, design, construction and performance of composting toilets treating residential black water. Composting Toilets are a viable alternative are a viable alternative to traditional water closets and offer advantages of low water consumption. NSF/ANSI 41 is currently required in the IGCC.

Cost Impact: This code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, CSA 22.2 No. 130 and UL 515 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1 2013.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Composting toilets should only be in the IgCC, not in the IRC.

Assembly Action: **Approved as Submitted**

Final Hearing Results

RP47-13	**AS**

Code Change No: RP48-13

Original Proposal

Section(s): P2801.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2801.1 Hot water required. ~~Each *dwelling*~~ Hot water shall ~~have an *approved* automatic water heater or other type of domestic water-heating system sufficient to supply hot water to~~ be supplied to plumbing fixtures and appliances intended for bathing, washing or culinary purposes. Hot water shall be supplied by an *approved* automatic water heater or other type of *approved* domestic water-heating system. Storage water heaters and hot water storage tanks shall be constructed of ~~noncorrosive~~ corrosion-resistant metal or shall be lined with ~~noncorrosive~~ corrosion-resistant material.

Reason: The existing language seems to imply that every dwelling unit must have its own water heater. What about a duplex building with a central water heater? We believe that the code only intends for hot water to be supplied to the plumbing fixtures of the dwelling(s) and not that each dwelling unit have a water heater. The existing language also implies that only automatic water heaters are required to be *approved.* Other types of domestic water heating systems do not appear to require approval. The new language corrects this. The word "sufficient" is ambiguous and is not enforceable. The existing text required that storage tanks be noncorrosive. What storage tanks? "Storage water heaters and hot water" was added to "storage tanks" to make the intent clear. Tanks are constructed of (or lined with) corrosion-resistant material, not noncorrosive material.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 30 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2801.1 Hot water required. Hot water shall be supplied to *plumbing fixtures* and plumbing *appliances* intended for bathing, washing or culinary purposes. ~~Hot water shall be supplied by an *approved* automatic water heater or other type of *approved* domestic water-heating system. Storage water heaters and hot water storage tanks shall be constructed of corrosion-resistant metal or shall be lined with corrosion-resistant material.~~

Committee Reason: The modification was made because it is not necessary in this section to specify how the hot water is to be generated. The overall proposal was approved because the language doesn't require a water heater for each dwelling unit thus allowing a duplex to have a single water heater.

Assembly Action: **None**

Final Hearing Results

RP48-13	**AM**

Code Change No: RP49-13

Original Proposal

Section(s): P2801.2 (New)

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Add new text as follows:

P2801.2 Drain valves. Drain valves for emptying shall be installed at the bottom of each tank-type water heater and hot water storage tank. The drain valve inlet shall be a ¾ inch nominal iron pipe size and the outlet shall be provided with a male garden hose thread.

(Renumber subsequent sections)

Reason: The new language proposed provides for minimum requirements for water heater drain valves. Drain valves are necessary for draining water (and sediment) out of the tank. Yes, we know that it would be rare for a storage water heater or hot water storage tank to not be provided with a drain valve BUT if the code doesn't require it, the manufacturers (or installers) could save costs by eliminating the valve (they could claim that the tank could be drained by pumping from the inlet or outlet of the tank.) The IPC has had the valve requirement for a long time. The IRC needs to have the same coverage. A similar proposal to the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 29 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This requirement needs to be stated in the code to back up what water heater manufacturers already provide for tank type water heaters.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing & Mechanical Inspectors Association (VPMIA) & VA Building Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

P2801.2 Drain valves. Drain valves for emptying shall be installed at the bottom of each tank-type water heater and hot water storage tank. The drain valve inlet shall be not less than ¾ inch nominal iron pipe size and the outlet shall be provided with a male ~~garden~~ hose thread.

Commenter's Reason: Additional wording is needed to allow the drain valve to be not less than ¾" so that a larger drain valve could be provided if needed or supplied with the water heater. With the current wording an inspection agency may disapprove a drain valve that is larger than ¾". The term garden is jargon and is struck as the term hose thread is clear enough.

Final Hearing Results

RP49-13	**AMPC**

Code Change No: RP50-13

Original Proposal

Section(s): P2801.5

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2801.5 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a galvanized steel pan having a material thickness of not less than 0.0236 inch (0.6010 mm) (No. 24 gage), or other pans approved for such use. ~~Listed pans shall comply with CSA LC3.~~

Reason: The language was struck because no such product exists that complies with the standard. The product that the standard covered was a thermoplastic combination water heater pan/elevation stand. Although the product met the requirements of the standard, in use it was determined that such products would weaken and cause the water heater to tip or collapse the stand. The product was pulled from the marketplace many years ago. CSA withdrew the standard in November 2011. The standard needs to be deleted from the code.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 31 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The standard no longer exists and needs to be removed from the code.

Assembly Action: **None**

Final Hearing Results

RP50-13	**AS**

Code Change No: RP51-13

Original Proposal

Section(s): P2801.5

Proponent: Jim Whitehead, IPS Corporation.

Revise as follows:

P2801.5 Required pan. Where a storage tank-type water heater or hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed of one of the following:

1. galvanized steel ~~pan having a material thickness~~ of ~~not less than 0.0236 inch (0.6010 mm)~~ (No. 24~~)~~ gage or a lesser gage number,
2. aluminum not less than 0.030 inch (0.8 mm) in thickness,
3. plastic not less than 0.036 inch (0.9 mm) in thickness
4. ~~other pans~~ *approved* materials ~~for such use~~.

~~Listed pans shall comply with CSA LC3.~~ A plastic pan shall not be installed beneath a gas-fired water water.

Reason: Aluminum and plastic water heater pans are frequently and commonly installed all across the United States even though the code doesn't currently include these materials as an option. I know this is a fact because IPS and other manufacturers produce and sell *tens of thousands* of aluminum and plastic water heater pans every year. In most areas, building officials really don't care what material the pan is made of, just as long as there is a pan. So why not make the code match what is current practice for many areas? Let's face it-a galvanized steel pan is ugly. It eventually gets rusty looking. The top edges, if not hemmed, are sharp (a cutting hazard) and the square corners are hard to seal. The top of the square corners can puncture things (like human flesh and the bottoms of jugs). THEN you want to require that galvanized steel pan to be installed in a finished area like a indoor utility room or a laundry room in a home? The home owner just doesn't want it.

Yes, the existing section currently says "or other pans approved for such use". But does the building official really need to be spending the time approving "other pans" for use on a job-by-job basis? In reality, when the building official shows up to inspect, the pan is in place (beneath a water heater that is plumbed and filled with water). Is that the time for the building official to be making a decision about whether the pan material is *approved*? This proposal will eliminate the questions and free up building official time in order to deal with more important issues.

So if aluminum pans and plastic pans are being *approved* (and again we know that they must be as *tens of thousands* of these pans are sold every year), then there needs to be some criteria for these types of pans. The thicknesses indicated for aluminum and plastic materials have been determined to be at least equivalent to the galvanized steel with regard to deflection (of the sides of the pan) and puncture resistance. NOT ALL MANUFACTURERS OF ALUMINUM AND PLASTIC PANS HAVE CONSIDERED THIS IN THEIR SELECTION OF MATERIAL THICKNESSES. And we are positive that some building officials have developed a bad opinion about allowing the use of aluminum and plastic because of their experiences with competitor's products that use lighter weight materials than what is proposed. There are at least a few of us responsible manufacturers who produce quality aluminum and plastic pans that meet the proposed requirements. Based upon our field surveys of our pans in use, these thicknesses provide for a durable product that remains serviceable, corrosion free and good looking for the life of a typical water heater if not two water heater lives.

"Listed pans shall comply with CSA LC3" is being deleted because there is not any pan produced in the United States that complies with that standard. When this standard was introduced into to the code, there was a product, available to the market, that met this standard. The standard was actually developed around this pan/stand design. Furthermore this standard was developed using the stand/pan in combination. Most pans are placed directly on the floor and not elevated on a stand. Also. the product was discontinued because of design problems. (The product was a combination elevation stand and pan assembly). CSA withdrew the standard in November 2011. There is not a need to have this standard in the code any longer and we don't want someone trying to bring a product to the market that meets this standard. Obviously, the standard isn't up to snuff because the products made to the standard didn't work out. The standard needs to be deleted from the code.

The last line about prohibiting the use of a plastic pan under a gas fired water heater is simple common sense. Although we have not heard of any problems with the use of our plastic pans for gas water heaters, the radiant heat coming from the bottom of a gas fired water heater could make a plastic pan more susceptible to puncturing (such as might be caused by the legs of a water heater). The Uniform Plumbing Code has this prohibition so the same prohibition in the I-codes seems appropriate.

Cost Impact: The code change proposal will not increase the cost of construction. In fact, factory-made aluminum and plastic water heater pans are, by far, much more economical than a galvanized steel pan that is made in a local sheet metal shop.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2801.5 Required pan. Where a storage tank-type water heater or hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed of one of the following:

1. galvanized steel <u>or aluminum of not less than 0.0236 inch (0.6010 mm)</u> ~~24 gage or a lesser gage number,~~
~~2. aluminum not less than 0.030 inch (0.8 mm) in thickness,~~
~~3.~~ <u>2.</u> plastic not less than 0.036 inch (0.9 mm) in thickness
~~4.~~ <u>3.</u> <u>other</u> *approved* materials.

A plastic pan shall not be installed beneath a gas-fired water ~~water~~ <u>heater</u>.

Committee Reason: The modification allows for more options for drain pans. The overall reason for approving the proposal is agreement with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP51-13	AM

Code Change No: RP53-13

Original Proposal

Section(s): P2801.5.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2801.5.2 Pan drain termination. The pan drain shall extend full-size and terminate over a suitably located indirect waste receptor or shall extend to the exterior of the building and terminate not less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface. Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation.

Reason: The replacement of an existing water heater must be installed to the current code as if it was a new installation. If the original water heater installation did not require a pan, then in many cases, there is not a suitable disposal point for a pan drain. However, if the installation requires a pan, the current code requires that the pan have a pan drain. Many times, there is not a way to provide for a suitable disposal point for the pan drain. For example, consider a slab-on-grade building where the water heater is located in the center of the building where there is not a floor drain or waste receptor. When that water heater is replaced, the current code requires that the water heater have a pan and that the pan have a pan drain (that runs to a suitable disposal point). How is this to be accomplished in this existing building? There is not a solution. Therefore, the proposed language provides an exception for replacement water heaters to not be required to have a pan drain, if the installation requires a pan. This same proposal to the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 33 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change is common sense. A drain is not required for a replacement water heater that didn't have a drain originally.

Assembly Action: **None**

Final Hearing Results

RP53-13	**AS**

Code Change No: RP55-13

Original Proposal

Section(s): P2803.6.1

Proponent: Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association and Virginia Building and Code Officials Association (Richard.Grace@fairfaxcounty.gov); Roger Harper, Jr, Louisa County VA representing, the Virginia Plumbing and Mechanical Inspectors Association and The Virginia Building Code Officials Association (sharper@louisa.org)

Revise as follows:

2803.6.1 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

(Items 1-9 remain unchanged)

10. ~~Not~~ Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or waste receptor flood level rim.

Reason: This is consistent language proposed to the IPC. A minimum distance is not stated. Typically, the minimum air gap would be two nominal pipe diameters as stated in the IPC Section 802.2.1 for indirect wastes pipe.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal clears up confusion about the termination of T&P discharge pipes.

Assembly Action: **None**

Final Hearing Results

RP55-13	**AS**

Code Change No: RP56-13

Original Proposal

Section(s): P2803.6.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2803.6.1 Requirements for discharge pipe. The discharge piping serving a pressure-relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to a waste receptor or to the pan serving the water heater or storage tank or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of the piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section P2905.5 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is constructed of PEX or PE-RT tubing. The outlet end of such tubing shall be fastened in place.

Reason: PEX and PE-RT tubing use insert fittings for connections. The bore size for a ¾ inch male adapter fitting is very small such that there is concern that the discharge from a T & P valve could be restricted and be a safety concern. The new language requires that PEX and PE-RT tubing used for relief valve discharge piping be one size larger so that the insert fitting has a larger bore and less of a safety concern.

PEX and PE-RT tubing is very flexible and where supplied from a coil, the tubing has a memory to stay in a coil shape. This flexibility and memory to a coil shape can present installation problems of keeping the discharge end of the tubing in its proper location. Therefore, new language is being added to require that the outlet end of the tubing be fastened in place.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 35 on the PMGCAC IRC-P list.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP56-13	**AS**

Code Change No: RP57-13

Original Proposal

Section(s): P2901.1, P2901.2 (New), P2901.2.1 (New), P2901.2.2 (New), P2901.2.3 (New)

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2901.1 Potable water required. Potable water shall be supplied to plumbing fixtures and plumbing appliances ~~in *dwelling units* shall be supplied with potable water~~ in the ~~amounts and pressures specified in this chapter~~ except where treated rainwater, treated gray water or municipal reclaimed water is supplied to water closets, urinals and trap primers. ~~Where a nonpotable water-distribution systems is installed, the nonpotable system shall be identified by color marking, metal tags or other appropriate method. Where color is used for marking, purple shall be used to identify municipally reclaimed water, rainwater and graywater distribution systems. Nonpotable water outlets that could inadvertently be used for drinking or domestic purposes shall be posted.~~

P2901.2 Identification of nonpotable water systems. Where *nonpotable* water systems are installed, the piping conveying the nonpotable water shall be identified either by color marking, metal tags or tape in accordance with Sections P2901.2.1 through P2901.2.2.3.

P2901.2.1 Signage Required. All nonpotable water outlets such as hose connections, open ended pipes, and faucets shall be identified with signage that reads as follows: “Non-potable water is utilized for [application name]. Caution: non-potable water. DO NOT DRINK.”The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches in height and in colors in contrast to the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure P2901.2.1 shall appear on the signage required by this section.

FIGURE P2901.2.1
Pictograph – DO NOT DRINK

P2901.2.2 Distribution Pipe Labeling and Marking. Non-potable distribution piping shall be of the color purple and shall be embossed or integrally stamped or marked with the words: “CAUTION: NONPOTABLE WATER – DO NOT DRINK” or shall be installed with a purple identification tape or wrap. Pipe identification shall include the contents of the piping system and an arrow indicating the direction of flow. Hazardous piping systems shall also contain information addressing the nature of the hazard. Pipe identification shall be repeated at intervals not exceeding 25 feet (7620 mm) and at each point where the piping passes through a wall, floor or roof. Lettering shall be readily observable within the room or space where the piping is located.

P2901.2.2 .1 Color. The color of the pipe identification shall be discernable and consistent throughout the building. The color purple shall be used to identify reclaimed, rain and gray water distribution systems.
P2901.2.2 .2 Lettering Size. The size of the background color field and lettering shall comply with Table P2901.2.2.2.

TABLE P2901.2.2.2
SIZE OF PIPE IDENTIFICATION

PIPE DIAMETER (inches)	LENGTH BACKGROUND COLOR FIELD (inches)	SIZE OF LETTERS (inches)
¾ to 1 ¼	8	0.5
1 ½ to 2	8	0.75
2 ½ to 6	12	1.25
8 to 10	2	2.5
over 10	32	3.5

For SI: 1 inch = 25.4 mm.

P2901.2.2 .3 Identification Tape. Where used, identification tape shall be at least 3 inches wide and have white or black lettering on purple field stating "CAUTION: NON-POTABLE WATER – DO NOT DRINK". Identification tape shall be installed on top of non-potable rainwater distribution pipes, fastened at least every 10 feet to each pipe length and run continuously the entire length of the pipe.

Reason: The phrase "in *dwelling units* shall be supplied with water in the amounts and pressures specified in this chapter" is not necessary because the code already spells out the requirements in other sections.

Water distribution systems of other than potable water are being installed in buildings and the code needs to require marking of the piping and signage for the outlets for safety reasons. The basis for this new language is text from the IgCC and is written to be in alignment with the IgCC requirements. A similar proposal to the 2015 IPC was Approved as Modified by Public Comment.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 36 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will increase the cost of construction

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This is necessary for the safety of the public when nonpotable water is being used in the building.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing & Mechanical Inspectors Association (VPMIA) & VA Building Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

P2901.2.1 Signage Required. All nonpotable water outlets such as hose connections, open ended pipes, and faucets shall be identified with signage that reads as follows: "Non-potable water is utilized for [application name]. Caution: non-potable water. DO NOT DRINK."The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches in height and in colors in contrast to the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure P2901.2.1 shall appear on the signage required by this section. The requirements of this section shall not be construed to require signage for water closets and urinals utilizing nonpotable water for flushing.

Commenter's Reason: The proposed additional language is to make it clear that no signage is required for water closets or urinals that are being supplied with a non potable water source. The existing language could be interpreted that signage is required for water closets and urinals using a non potable water source however we feel that this was not the intent of this language and want to make it clear that such signage is not required specifically for these two fixtures.

Final Hearing Results

RP57-13	**AMPC**

Code Change No: RP58-13

Original Proposal

Section(s): P2902.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2902.1 General. A potable water supply system shall be designed and installed as to prevent contamination from nonpotable liquids, solids or gases being introduced into the potable water supply. Connections shall not be made to a potable water supply in a manner that could contaminate the water supply or provide a cross-connection between the supply and a source of contamination except where approved backflow prevention assemblies, backflow prevention devices or other means or methods are installed to protect the potable water supply. Cross-connections between an individual water supply and a potable public water supply shall be prohibited.

Reason: This same language addition was Approved as Submitted for the 2015 IPC. "Methods" are not defined in the definitions. The term from Chapter 2 is **"**Backflow Preventer**.** The definition of methods would be complete and precise with a change to: "BACKFLOW PREVENTER**.** A backflow prevention assembly, a backflow prevention device or other means or method to prevent backflow into the potable water supply."

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X19 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Language makes it clear that approved methods include backflow preventers.

Assembly Action: **None**

Final Hearing Results

RP58-13	**AS**

Code Change No: RP61-13

Original Proposal

Section(s): P2902.3.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2902.3.1 Air gaps. Air gaps shall comply with ASME A112.1.2 and air gap fittings shall comply with ASME A112.1.3. ~~The minimum~~ An air gap shall be measured vertically from the lowest end of a water ~~supply~~ outlet to the flood level rim of the fixture or receptor into which ~~such potable~~ the water outlet~~s~~ discharges or to the floor. The ~~minimum~~ required air gap shall be not less than twice the diameter of the effective opening of the outlet~~,~~ ~~but in no case~~ and not less than the values specified in Table P2902.3.1. ~~An air gap is required at the discharge point of a relief valve or piping. Air gap devices shall be incorporated in dishwashing and clothes washing *appliances*.~~

Reason: The second to the last sentence of the section is redundant with Section P2803.6.1, Item 2 and should be deleted. The last sentence is redundant with Section P2717.1 for dishwashers. A new section is being proposed in another proposal to cover clothes washers in the same manner as dishwashers were covered. The remaining changes to the section are to clean up the wording. This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 38 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal cleans up the language and clarifies the requirements.

Assembly Action: **None**

Final Hearing Results

RP61-13	**AS**

Code Change No: RP62-13

Original Proposal

Section(s): P2902.3.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2902.3.2 Atmospheric-type vacuum breakers. ~~Pipe-applied~~ Atmospheric-type vacuum breakers shall conform to ASSE 1001 or CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. Both types of vacuum breakers shall be installed such with the outlet continuously open to the atmosphere. ~~These devices shall operate under normal atmospheric pressure when the critical level is installed at the required height.~~

Reason: The last sentence of this section doesn't make a lot of sense. The new language explains the outlet conditions that must be met for these types of backflow devices.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 39 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2902.3.2 Atmospheric-type vacuum breakers. Atmospheric-type vacuum breakers shall conform to ASSE 1001 or CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. Both types of vacuum breakers shall be installed ~~such~~ with the outlet continuously open to the atmosphere

Committee Reason: The modification as made to correct a word that was not needed in the sentence. The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP62-13 **AM**

Code Change No: RP63-13

Original Proposal

Section(s): P2902.3.2

Proponent: Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

P2902.3.2 Atmospheric-type vacuum breakers. ~~Pipe applied~~ Atmospheric-type vacuum breakers shall conform to ASSE 1001 or CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. These ~~devices~~ vacuum breakers shall operate under normal atmospheric pressure when the critical level is installed at the required height. The critical level of the atmospheric vacuum breaker shall be set at not less than 6 inches (152 mm) above the highest elevation of downstream piping and the flood level rim of the fixture or device.

Reason: Installation of vacuum breakers needs to be compliant with published manufacturer installation instructions. The information is the minimum standard for industry. This installation criterion provides adequate protection of the water supply and ensures protection of public health.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2902.3.2 Atmospheric-type vacuum breakers. ~~Pipe applied~~ Atmospheric-type vacuum breakers shall conform to ASSE 1001 or CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. These vacuum breakers shall operate under normal atmospheric pressure when the critical level is installed at the required height. The critical level of the atmospheric-type vacuum breaker shall be set at not less than 6 inches (152 mm) above the highest elevation of downstream piping and the flood level rim of the fixture or device.

Committee Reason: The modification provides consistency with the first sentence. The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP63-13	**AM**

Code Change No: RP65-13

Original Proposal

Section(s): P2902.3.3

Proponent: Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

P2902.3.3 Backflow preventer with intermediate atmospheric vent. Backflow with intermediate atmospheric vents shall conform to ASSE 1012 or CSA B64.3. These devices shall be permitted to be installed where subject to continuous pressure conditions. <u>These devices shall be prohibited as a means of protection where any chemical additives are introduced downstream of the device.</u> The relief opening shall discharge by air gap and shall be prevented from being submerged.

Reason: These backflow preventers are designed and sold for non-health hazard installations according to manufacturer specification sheets. They are inadequate for chemical additions or injections. Their use should be limited to potable water systems within a residential system only. Reference Sections P2902.5.4.1 and Section P2902.5.1.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The following is errata that was not posted to the ICC website.

P2902.3.3 Backflow preventer with intermediate atmospheric vent. Backflow preventers with intermediate atmospheric vents shall conform to ASSE 1012 or CSA B64.3. These devices shall be permitted to be installed where subject to continuous pressure conditions. <u>These devices shall be prohibited as a means of protection where any chemical additives are introduced downstream of the device.</u> The relief opening shall discharge by air gap and shall be prevented from being submerged.

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2902.3.3 Backflow preventer with intermediate atmospheric vent. Backflow preventers with intermediate atmospheric vents shall conform to ASSE 1012 or CSA B64.3. These devices shall be permitted to be installed where subject to continuous pressure conditions. These devices shall be prohibited as a means of protection where any <u>hazardous</u> chemical additives are introduced downstream of the device. The relief opening shall discharge by air gap and shall be prevented from being submerged.

Committee Reason: The committee made the modification so that the new sentence is connected with the concept of degree of hazard that is used in table P2902.3. The overall proposal was approved because this is a safety issue that needed cleared up.

Assembly Action: **None**

Final Hearing Results

RP65-13	**AM**

Code Change No: RP67-13

Original Proposal

Section(s): P2902.3.4

Proponent: Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

P2902.3.4 Pressure vacuum breaker assemblies. Pressure vacuum breaker assemblies shall conform to ASSE 1020 or CSA B64.1.2. Spill-resistant vacuum breaker assemblies shall comply with ASSE 1056. These assemblies are designed for installation under continuous pressure conditions where the critical level is installed at the required height. <u>The critical level of a pressure vacuum breaker and a spill resistant vacuum breaker assembly shall be set at not less than 12 inches (304 mm) above the highest elevation of downstream piping and the flood level rim of the fixture or device.</u> Pressure vacuum breaker assemblies shall not be installed in locations where spillage could cause damage to the structure.

Reason: Installation of different types of vacuum breakers within this section conflicts with published manufacturer installation instructions. Manufacturer literature recommends 12 inch installation above downstream piping and outlets for PVB's and SVB's for most conditions. This provides adequate protection of the water supply and ensures protection of public health.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides needed clear requirements for installation of this type of backflow preventer.

Assembly Action: **None**

Final Hearing Results

RP67-13	**AS**

Code Change No: RP70-13

Original Proposal

Section(s): P2902.3.6

Proponent: Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

P2902.3.6 Double check~~-valve~~ backflow prevention assemblies. Double check~~-valve~~ backflow prevention assemblies shall conform to ASSE 1015, CSA B64.5, CSA B64.5.1 or AWWA C510. Double~~-detector~~ check~~-valve~~ detector fire protection backflow prevention assemblies shall conform to ASSE 1048. These ~~devices~~ assemblies shall be capable of operating under continuous pressure conditions.

Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP70-13	**AS**

Code Change No: RP71-13

Original Proposal

Section(s): Table P2902.3

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org); Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

TABLE P2902.3
APPLICATION OF BACKFLOW PREVENTERS

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
<u>BACKFLOW PREVENTION ASSEMBLIES:</u>			
Double check backflow prevention assembly and double check fire protection backflow prevention assembly	Low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1015, AWWA C510, CSA B64.5, CSA B64.5.1
Double check detector fire protection backflow prevention assemblies	Low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1048
Pressure vacuum breaker assembly	High or low hazard	Backsiphonage only Sizes 1/2" - 2"	ASSE 1020, CSA B64.1.2
Reduced pressure principle backflow prevention assembly and reduced pressure principle fire protection backflow assembly	High or low hazard	Backpressure or backsiphonage Sizes 3/8 " – 16 "	ASSE 1013, AWWA C511, CSA B64.4, CSA B64.4.1
Reduced pressure detector fire protection backflow prevention assemblies	High or low hazard	Backpressure or backsiphonage (Fire Sprinkler Systems)	ASSE 1047
Spill-resistant vacuum breaker assembly	High or low hazard	Backsiphonage only Sizes 1/2" - 2"	ASSE 1056
<u>BACKFLOW PREVENTER PLUMBING DEVICES:</u>			
Antisiphon-type fill valves for gravity water closet flush tanks	High hazard	Backsiphonage only	ASSE 1002, CSA B125.3
Backflow preventer for carbonated beverage machines	Low hazard	Backpressure or backsiphonage Sizes 1/4" – 3/8"	ASSE 1022
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes 1/4" – 3/8"	ASSE 1012, CSA B64.3
Dual check valve type backflow preventer<u>s</u>	Low hazard	Backpressure or backsiphonage Sizes	ASSE 1024, CSA B64.6

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
		1/4"-1"	
Hose connection backflow preventer	High or low hazard	Low head backpressure, rated working pressure, backpressure or backsiphonage Sizes1/2”- 1”	ASSE 1052, CSA B64.2, B64.2.1
Hose connection vacuum breaker	High or low hazard	Low head backpressure or backsiphonage only Sizes 1/2", 3/4 “, 1”	ASSE 1011, CAN/CSA B64.1.1
Laboratory Faucet Backflow Preventer	High or low hazard	Low head backpressure and backsiphonage	ASSE 1035, CSA B64.7
Atmospheric type vacuum breaker	High or low hazard	Backsiphonage only Sizes 1/2" - 4"	ASSE 1001, CSA B64.1.1
Vacuum breaker wall hydrants, frost resistant, automatic draining type	High or low hazard	Low head backpressure and backsiphonage Sizes 3/4 “, 1”	ASSE 1019, CSA B64.2.2
OTHER MEANS or METHODS:			
Air gap	High or low hazard	Backsiphonage only	ASME A112.1.2
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backpressure or backsiphonage	ASME A112.1.3
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.13.4)

For SI: 1 inch = 25.4 mm

a. Low Hazard - See Pollution (Section 202), High Hazard - See Contamination (Section 202)

b. See Backpressure (Section 202), See Backpressure, low head (Section 202), See Backsiphonage (Section 202)

Reasons:

[Hall-PMGCAC] This same proposal was Approved as Submitted for the 2015 IPC. There is much confusion concerning protection provided by any ‘backflow preventer’. Reorganizing this table would better identify proper and correct applications for code users by identifying the different protection methods: assemblies, backflow prevention devices and other means or methods. The existing table gives the mistaken understanding that “any of the above provides adequate protection for any job”. This is not true. Adequate protection is based on hazard classification, application and proper installation. Backflow prevention assemblies are specifically recognized and accepted as separate and distinct units based on Section P2503.8 because of their requirement for periodic testing to ensure proper and reliable operation in order to protect public health.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X18 on the PMGCAC IRC-P list.

[MOSS] There is much confusion concerning protection provided by any ‘backflow preventer’. Reorganizing this table would better identify proper and correct applications for code users by identifying the different protection methods: assemblies, backflow prevention devices and other means or methods. The existing table gives the mistaken understanding that “any of the above provides adequate protection for any job”. This is not true. Adequate protection is based on hazard classification, application and proper installation. Backflow prevention assemblies are specifically recognized and accepted as separate and distinct units based on Section P2503.8 because of their requirement for periodic testing to ensure proper and reliable operation in order to protect public health.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The revised table provides needed clarity on the application of backflow preventers.

Assembly Action: **None**

Final Hearing Results

RP71-13	**AS**

Code Change No: RP72-13

Original Proposal

Section(s): P2902.4

Proponent: Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

P2902.4 Protection of potable water outlets. Potable water openings and outlets shall be protected by an air gap, <u>a</u> reduced pressure principle backflow prevent~~er~~<u>ion assembly</u> ~~with atmospheric vent~~, <u>an</u> atmospheric-type vacuum breaker, <u>a</u> pressure~~-type~~ vacuum breaker <u>assembly</u> or <u>a</u> hose connection backflow preventer.

Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2902.4 Protection of potable water outlets. Potable water openings and outlets shall be protected by an air gap, a reduced pressure principle backflow prevention assembly, an atmospheric-type vacuum breaker, a pressure<u>-type</u> vacuum breaker assembly or a hose connection backflow preventer.

Committee Reason: The modification was made to clarify pressure vacuum breaker assemblies. The overall proposal provides needed clarification for the types of backflow preventers that can be used.

Assembly Action: **None**

Final Hearing Results

RP72-13	**AM**

Code Change No: RP73-13

Original Proposal

Section(s): P2902.4.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2902.4.1 Fill valves. Flush tanks shall be equipped with an antisiphon fill valve conforming to ASSE 1002 or CSA B125.3. The critical level of the fill valve ~~backflow preventer~~ shall be located not less than 1 inch (25 mm) above the ~~full opening~~ top of the flush tank overflow pipe.

Reason: The current wording is sloppy and incomplete. The revision cleans up the text and makes the intent clear.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 44 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP73-13 **AS**

Code Change No: RP74-13

Original Proposal

Section(s): P2902.4.3

Proponent: Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

P2902.4.3 Hose connection. Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type vacuum breaker, a pressure~~-type~~ vacuum breaker assembly or a permanently attached hose connection vacuum breaker.

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2902.4.3 Hose connection. Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type vacuum breaker, a pressure-type vacuum breaker assembly or a permanently attached hose connection vacuum breaker.

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

Committee Reason: The modification was made to clarify pressure vacuum breaker assemblies. The overall proposal was approved because it provides a needed clarification about vacuum breakers.

Assembly Action: **None**

Final Hearing Results

RP74-13 **AM**

Code Change No: RP75-13

Original Proposal

Section(s): P2902.5.1

Proponent: Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

P2902.5.1 Connections to boilers. ~~The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CSA B64.3. Where conditioning chemicals are introduced into the system,~~ The potable water connection to a boiler shall be protected by an *air gap* or a reduced pressure principle backflow prevent~~er~~ion assembly complying with ASSE 1013, CSA B64.4 or AWWA C511.

Reason: These assemblies are designed and sold for high-health hazard installations according to manufacturer specification sheets. They are adequate for chemical additions or injections. Reduced pressure principle backflow *preventer* corrected to reduced pressure principle backflow *prevention assembly* to provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2902.5.1 Connections to boilers. The potable supply to the boiler shall be permitted to be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection to a boiler shall be protected by an *air gap* or a reduced pressure principle backflow prevention assembly complying with ASSE 1013, CSA B64.4 or AWWA C511.

Committee Reason: The modification puts backflow preventers covered by ASSE 1012 back into the code for this application. The overall proposal provides consistency that is needed.

Assembly Action: **None**

Public Comments

Public Comment:

Michael S. Moss of the American Backflow Prevention Association (msmoss@utah.gov) requests Approval as Modified by this Public Comment

Further modify proposal as follows:

P2902.5.1 Connections to boilers. Where chemicals will not be introduced into a boiler, the potable water supply to the boiler shall be ~~permitted~~ ~~to be equipped with~~ protected from the boiler by a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CSA B64.3. Where ~~conditioning~~ chemicals ~~are~~ will be introduced into ~~the~~ a boiler ~~system~~, the potable water supply ~~connection~~ to ~~a~~ the boiler shall be protected from the boiler by an *air gap* or a reduced pressure principle backflow prevention assembly complying with ASSE 1013, CSA B64.4 or AWWA C511.

Commenter's Reason: In reviewing the language of the floor proposal submitted during the Committee Action Hearings, I recognize the need to reword this proposal to make it clearly mandatory language. Also my intent is to ensure that the proposal provides adequate and appropriate protection based upon addition of chemicals into the boiler system. I recommend that this proposal be accepted and approved as modified.

Final Hearing Results

RP75-13	AMPC

Code Change No: RP76-13

Original Proposal

Section(s): P2902.5.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2902.5.2 Heat exchangers. Heat exchangers using an *essentially toxic transfer fluid* shall be separated from the potable water by double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. Single-wall construction heat exchangers shall be used only where an *essentially nontoxic transfer fluid* is utilized~~ing is an essentially nontoxic~~. ~~transfer fluid shall be permitted to be of single-wall construction.~~

Reason: The term "shall be permitted" is not mandatory code language. The revised language corrects this problem.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 45 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed language provides clearer language for where single wall heat exchangers can be used.

Assembly Action: **None**

Final Hearing Results

RP76-13	**AS**

Code Change No: RP77-13

Original Proposal

Section(s): P2902.5.5

Proponent: Michael S. Moss, representing American Backflow Prevention Association (msmoss@utah.gov)

Revise as follows:

P2902.5.5 Solar systems. The potable water supply to a solar system shall be equipped with a backflow preventer with intermediate atmospheric vent complying with ASSE 1012 or a reduced pressure principle backflow preventer~~er~~ion assembly complying with ASSE 1013. Where chemicals are used, the potable water supply shall be protected by a reduced pressure principle backflow prevent~~er~~ion assembly.

> **Exception:** Where all solar system piping is a part of the potable water distribution system, in accordance with the requirements of the *International Plumbing Code*, and all components of the piping system are listed for potable water use, ~~cross-connection protection measures~~ backflow protection shall not be required.

Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed language provides for clear and consistent use of terminology in the code.

Assembly Action: **None**

Final Hearing Results

RP77-13	**AS**

Code Change No: RP79-13

Original Proposal

Section(s): Table P2903.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

TABLE P2903.1
REQUIRED CAPACITIES AT POINT OF OUTLET DISCHARGE

FIXTURE SUPPLY OUTLET SERVING	FLOW RATE (gpm)	FLOW PRESSURE (psi)
Bathtub, ~~pressure balanced~~ balanced-pressure ~~or~~, thermostatic or combination balanced-pressure/ thermostatic mixing valve	4	20
Bidet, thermostatic mixing valve	2	20
Dishwasher	2.75	8
Laundry ~~tub~~ tray	4	8
Lavatory	~~2~~ 0.8	8
Shower, ~~pressure balanced~~ balanced-pressure ~~or~~, thermostatic or combination balanced-pressure/ thermostatic mixing valve	~~3~~ 2.5[a]	20
Sillcock, hose bibb	5	8
Sink	~~2.5~~ 1.75	8
Water closet, flushometer tank	1.6	20
Water closet, tank, close coupled	3	20
Water closet, tank, one piece	6	20

For SI: 1 pound per square inch = 6.895 kPa,1 gallon per minute = 3.785 L/m.

a. Where the shower mixing valve manufacturer indicates a lower flow rating for the mixing valve, the lower value shall be applied.

Reason: This revised numbers in the table were approved for the 2015 IPC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X11 on the PMGCAC IRC-P list.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal updates the table to be aligned with newer low flow fixtures which will result in less expense for piping to some fixtures.

Assembly Action: **None**

Final Hearing Results

RP79-13	AS

Code Change No: RP82-13

Original Proposal

Section(s): P2903.3

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2903.3 Minimum pressure. ~~The static water pressure (as determined by the local water authority) at the building entrance for either public or private water service shall be not less than 40 psi (276 kPa).~~ Where the water pressure supplied by the public water main or an individual water supply system is insufficient to provide for the minimum pressures and quantities for the plumbing fixtures in the building, the pressure shall be increased by means of an elevated water tank, a hydropnuematic pressure booster system or a water pressure booster pump.

Reason: The IPC doesn't require a minimum static pressure at the building entrance so why should the IRC? We believe this requirement came from long ago and before the code required minimum pressures and flow rates at fixtures. It does not matter what the pressure is at the building entrance just as long as the pressures at the fixtures are satisfied. If the plumber has to install a booster pump, an elevated water tank, or a hydropnuematic pressure booster system to meet the demands of the building, then the code will be satisfied. The new language basically comes from the IPC.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 46 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provide needed options for areas where utility pressures are less than 40 psi.

Assembly Action: **None**

Final Hearing Results

RP82-13	**AS**

Code Change No: RP85-13

Original Proposal

Section(s): P2903.8

Proponent: Gary Klein, Affiliated International Management, LLC, representing self, gary@aim4sustainability.com

Revise as follows:

P2903.8 Gridded and parallel water distribution systems. Hot water and cold water manifolds installed with ~~gridded or~~ parallel-connected individual distribution lines <u>and</u> <u>cold water manifolds installed with gridded distribution lines</u> to each fixture or fixture fitting~~s~~ shall be designed in accordance with Sections P2903.8.1 through P2903.8.6. <u>Gridded systems for hot water distribution systems shall be prohibited.</u>

Reason: A gridded distribution system has two or more water paths to each fixture supply pipe.

If a gridded system were installed on the hot water distribution piping, the hot water would take multiple paths to the fixture being used, only one of which would be the most direct route. This would serve to slow down the flow of hot water and exacerbate already long delivery times and dramatically increase the heat loss and energy wasted in the hot water delivery system.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal appropriately prevents fire sprinklers from being attached to a hot water distribution system

Assembly Action: **None**

Final Hearing Results

RP85-13	**AS**

Code Change No: RP87-13

Original Proposal

Section(s): P2903.8.3

Proponent: Gary Klein, Affiliated International Management, LLC, representing self, gary@aim4sustainability.com

Revise as follows:

P2903.8.3 Orientation. The installation orientation of manifolds shall not be limited ~~be permitted~~ to ~~be installed in a~~ horizontal ~~or~~ and vertical orientations.

Reason: While horizontal and vertical are the most common orientations, the current language seems to prohibit installation in any other orientations, for example on a diagonal. If diagonal will give the best performance or reduce the cost of installation, it should be allowed. The sentence was reworded to eliminate the non-mandatory language of "shall be permitted".

If the committee prefers, it would be acceptable to delete the entire section.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

~~**P2903.8.3 Orientation.** The installation orientation of manifolds shall not be limited be permitted to be installed in a horizontal or and vertical orientations.~~

Committee Reason: The modification was made because the code should not specify any orientation in the first place.

Assembly Action: **None**

Final Hearing Results

RP87-13	**AM**

Code Change No: RP90-13

Original Proposal

Section(s): P2903.9.3

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2903.9.3 Fixture valves and access. ~~An individual~~ Shutoff valves shall be required on ~~the~~ each fixture supply pipe to each plumbing appliance and to each plumbing fixture other than bathtubs and showers. Valves serving individual plumbing fixtures, *plumbing appliances*, risers and branches shall be ~~provided with~~ *accessible*.

Reason: The first sentence was moved to be the last sentence as it makes more sense in the context of the subjects. Access is not a defined term in the IRC but *accessible* is defined (and does not mean "suitable for persons having disabilities").
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 51 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides a needed clean up of the language.

Assembly Action: **None**

Final Hearing Results

RP90-13	**AS**

Code Change No: RP91-13

Original Proposal

Section(s): P2903.9.4

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2903.9.4 Valve requirements. Valves shall be of an approved type and compatible with the type of piping material installed in the system. ~~Ball valves, gate valves, butterfly valves, globe valves and plug.~~ Valves intended to supply drinking water shall meet the requirements of NSF 61.

Reason: This revised language was approved for the 2015 IPC.. NSF/ANSI Standard 61 Drinking Water System Components-Health Effects addresses crucial aspects of drinking water system components: whether contaminants that leach or migrate from the product/material into the drinking water are above acceptable levels in finished waters. Requiring NSF 61 will help protect the drinking water supply from the leaching of contaminants. The IPC and IRC already requires conformance to NSF 61 for pipes, fittings, faucets and valves intended to supply drinking water. (Sections 424.1, 605.3, 605.4, 605.5, 605.7 of IPC).

The current list of valves in Section P2903.9.4 which require NSF-61 was a concession during previous code change cycles to allow manufacturers time to bring product lines into compliance with this standard. The requirement should apply to all valves intended to supply drinking water. The Uniform Plumbing Code currently requires all valves to conform to NSF 61.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X16 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides needed consistency with the requirements of the 2015 IPC.

Assembly Action: **None**

Final Hearing Results

RP91-13	**AS**

Code Change No: RP92-13

Original Proposal

Section(s): P2903.9.4, Table P2903.9.4 (New), Chapter 44

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2903.9.4 Valves. Valves shall be ~~of an approved type and~~ compatible with the type of piping material installed in the system. Valves shall conform to one of the standards listed in Table 605.7 or shall be *approved.* Ball valves, gate valves, globe valves and plug valves intended to supply drinking water shall meet the requirements of NSF 61.

TABLE P2903.9.4
VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASTM F 1970, CSA B125.3
Copper or copper alloy	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASME B16.34, CSA B125.3, MSS SP-67, MSS SP-80, MSS SP-10
Gray and ductile Iron	ASTM A126, AWWA C500, AWWA C504, AWWA C507, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14, ASME A112.18.1, CSA B125.3, NSF 359
Polypropylene (PP) plastic	ASME A112.4.14, ASTM F 2389,
Polyvinyl chloride (PVC) plastic	ASME A112.4.14, ASTM F 1970

Add new standards to Chapter 44 as follows:

ASME
A112.4.14 – 2004 Manually Operated, Quarter-Turn Shutoff Valves for Use in Plumbing Systems
B16.34 – 2009 Valves Flanged, Threaded and Welding End

ASTM
A126-04(2009) Gray Iron Castings for Valves, Flanges, and Pipe Fittings
F1970 - 05 Special Engineered Fittings, Appurtenances or Valves for use in Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Systems

AWWA
C500-09 AWWA Standard for Metal-Seated Gate Valves for Water Supply Service
C504-10 AWWA Standard for Rubber-Seated Butterfly Valves
C507-11 AWWA Standard for Ball Valves, 6 In. Through 60 In.

MSS
Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
127 Park Street, N.E.
Vienna, VA 22180

SP-42-2009	Corrosion Resistant Gate, Globe, Angle and Check Valves with Flanged and Butt Weld Ends (Classes 150, 300 & 600)
SP-67-2011	Butterfly Valves
SP-70-2011	Gray Iron Gate Valves, Flanged and Threaded Ends
SP-71-2011	Grey Iron Swing Check Valves, Flanged and Threaded Ends
SP-72-2010	Ball Valves with Flanged or Butt-Welding Ends for General Service
SP-78-2011	Cast Iron Plug Valves, Flanged and Threaded Ends
SP-80-2008	Bronze Gate, Globe, Angle and Check Valves
SP-110-2010	Ball Valves, Threaded, Socket Welded, Solder Joint, Grooved and Flared Ends

NSF

359-2011	Valves for Crosslinked Polyethylene (PEX) Water Distribution Tubing Systems

Reason: This revised language was approved for the 2015 IPC. Currently the code requires valves to be approved but does not contain requirements for which performance standards are acceptable for use. While a number of valve standards have been created over the years, they have not been included in the code. The intent of this code change is to create a table to identify appropriate standards for valves. This list is not all inclusive of all material types and in some cases there are not national standards for every type of valve and material used. For this reason, the language “shall be approved or conform to . . .”

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X17 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction..

Analysis: A review of the standards proposed for inclusion in the code, ASME A112.4.14–2004 , ASME B16.34–2009 , ASTM A126-04(2009), ASTM F1970-05, AWWA C500-09, AWWA C504-10, AWWA C507-11, MSS SP-42-2009, MSS SP-67-2011, MSS SP-70-2011, MSS SP-71-2011, MSS SP-72-2010, MSS SP-78-2011, MSS SP-80-2008, MSS SP-100-2010 and NSF 359-2011 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

For staff analysis of the content of ASME A112.4.14–2004 , ASME B16.34–2009 , ASTM A126-04(2009), ASTM F1970-05, AWWA C500-09, AWWA C504-10, AWWA C507-11, MSS SP-42-2009, MSS SP-67-2011, MSS SP-70-2011, MSS SP-71-2011, MSS SP-72-2010, MSS SP-78-2011, MSS SP-80-2008, MSS SP-100-2010 and NSF 359-2011relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: Approved as Modified

Modify the proposal as follows:

TABLE P2903.9.4
VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASTM F 1970, CSA B125.3
Copper or copper alloy	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASME B16.34, CSA B125.3, MSS SP-67, MSS SP-80, MSS SP-110
Gray and ductile Iron	ASTM A126, AWWA C500, AWWA C504, AWWA C507, MSS SP-42, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, CSA B125.3, NSF 359
Polypropylene (PP) plastic	ASME A112.4.14, ASTM F 2389,
Polyvinyl chloride (PVC) plastic	ASME A112.4.14, ASTM F 1970

Committee Reason: The modification was made to correct errors identified in testimony. The overall proposal was approved for consistency with the IPC.

Assembly Action: None

Final Hearing Results

RP92-13	**AM**

Code Change No: RP101-13

Original Proposal

Section(s): P2904.3

Proponent: Jeffrey M. Hugo, CBO, National Fire Sprinkler Association, representing the National Fire Sprinkler Association (hugo@nfsa.org)

Revise as follows:

P2904.3 Sprinkler piping system. Sprinkler piping shall be supported in accordance with the ~~requirements for cold water distribution~~ piping manufacturer's and sprinkler manufacturer's installation instructions. Sprinkler piping shall comply with all requirements for cold water distribution piping. For multipurpose piping systems, the sprinkler piping shall connect to and be a part of the cold water distribution piping system.

Reason: Section P2904.3 and the pre-concealment inspection requirements of Section P2904.8.1 conflict. Section P2904.3 states that the piping shall be supported like all other cold water piping (Table P2605.1) but Section P2904.8.1 states that piping supports shall be inspected according to the manufacturers installation instructions. Some piping manufacturers, such as CPVC, have different spacing requirements. Sprinkler piping support can also have different spacing for the hangers for in-line drop tee's and end-line drop elbows.

Designers, installers and code officials should be using all the same documents for fire sprinkler installations.

Cost Impact: Will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2904.3 Sprinkler piping system. Sprinkler piping shall be supported in accordance with the piping manufacturer's and sprinkler manufacturer's installation instructions. Sprinkler piping shall comply with all requirements for cold water distribution piping. For multipurpose piping systems, the sprinkler piping shall connect to and be a part of the cold water distribution piping system.

Exception: For plastic piping, it shall be permissible to follow the manufacturer's installation instructions.

Committee Reason: The modification was made to allow for sprinkler piping manufacturer's instructions to be used for support details. The overall proposal was approved because the committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP101-13	AM

Code Change No: RP102-13

Original Proposal

Section(s): P2905.2, P2905.2.1 (New), Chapter 44

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org); Jeremy Brown, NSF International, (brown@nsf.org)

Revise as follows:

P2905.2 Lead content. <u>The lead content in</u> pipe and fittings used in the water supply system shall <u>be</u> ~~have lead content of~~ not greater than 8 percent ~~lead~~.

Add new text as follows:

<u>**P2905.2.1 Lead content of drinking water pipe and fittings.** Pipe, pipe fittings, joints, valves, faucets, and fixture fittings utilized to supply water for drinking or cooking purposes shall comply with NSF 372 and shall have a weighted average lead content of 0.25 percent lead or less.</u>

Add new standard to Chapter 14 as follows:

NSF
<u>372-2010</u> <u>Drinking Water System Components - Lead Content</u>

Reason: Section P2505.2 is reworded to state the 8 percent limitation of lead content. The existing language *requires* lead content to be not greater than 8 percent. A subtle change but more correct as revised.

The new Section P2905.2.1 coordinates the IRC with Federal legislation limiting the amount of lead is pipe, pipe fittings, joints, valves, faucets, and fixture fittings that can be used to supply *drinking water*. Section P2905.2 is still necessary since remaining components in a potable water distribution system must still ne limited to 8 percent lead. The Federal legislation only applies to drinking water components. There are other components that have a greater quantity of lead than 0.25 percent and they are permitted to by Federal law. This is identical language that was approved for the 2015 IPC.

NSF 372 is the new standard used to evaluate the weighted average of lead in drinking water components. This standard allows manufacturers to perform a mathematical analysis of their product to determine the weighted average of lead. NSF 372 is consistent with the Federal legislation. This standard was approved for addition to the 2015 IPC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 57 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

The code change is contained in the <u>Updates to the 2013 Proposed Changes</u> posted on the ICC website. Please go to <u>http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf</u> for more information.

Committee Action: **Approved as Submitted**

Committee Reason: The proposed change is necessary to make the code consistent with the upcoming federal mandate in January 2014.

Assembly Action: **None**

Final Hearing Results

RP102-13	**AS**

Code Change No: RP103-13

Original Proposal

Section(s): P2905.4.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

~~P2905.4.1~~ P2905.3.7 Dual check~~-valve-type~~ backflow preventer. ~~Where a~~ Dual check~~-valve~~ backflow preventers ~~is installed on the water supply system, it~~ shall ~~comply~~ conform with ASSE 1024 or CSA B64.6.

Reason: This same language was Approved as Modified for addition to 2015 IPC. The term "valve" is not in the title of the ASSE standard. The section is being moved to the correct location with all other backflow preventers for continuity (and similarity to how the IPC groups all of the backflow preventers). The IRC does not require a backflow preventer on water supply systems so this section should not be within Section P2905.4.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 2X0 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP103-13	**AS**

Code Change No: RP104-13

Original Proposal

Section(s): P2905.4.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org); Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association and Virginia Building and Code Officials Association (Richard.Grace@fairfaxcounty.gov)

Delete and substitute as follows:

~~**P2905.4.2 Water service installation.** Trenching, pipe installation and backfilling shall be in accordance with Section P2604. Water-service pipe is permitted to be located in the same trench with a *building sewer* provided such sewer is constructed of materials listed for underground use within a building in Section P3002.1. If the *building sewer* is not constructed of materials listed in Section P3002.1, the water-service pipe shall be separated from the *building sewer* by not less than 5 feet (1524 mm), measured horizontally, of undisturbed or compacted earth or placed on a solid ledge not less than 12 inches (305 mm) above and to one side of the highest point in the sewer line.~~

> ~~**Exception:** The required separation distance shall not apply where a water service pipe crosses a sewer pipe, provided that the water service pipe is sleeved not less than 5 feet (1524 mm), horizontally from the sewer pipe centerline, on both sides of the crossing with pipe materials listed in Tables P2905.4, P3002.1(1), P3002.1(2) or P3002.2.~~

P2905.4.2 Separation of water service and building sewer. Trenching, pipe installation and backfilling shall be in accordance with Section P2604. Where water service piping is located in the same trench with the building sewer, such sewer shall be constructed of materials listed in Table P3002.1(2). Where the building sewer piping is not constructed of materials listed in Table P3002.1(2), the water service pipe and the building sewer shall be horizontally separated by not less than 5 feet (1524 mm) of undisturbed or compacted earth. The required separation distance shall not apply where a water service pipe crosses a sewer pipe, provided the water service is sleeved to a point not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing. The sleeve shall be of pipe materials listed in Table P2905.4, P3002.1(2) or P3002.2. The required separation distance shall not apply where the bottom of the water service pipe located within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the highest point of the top of the building sewer.

Reason:
[GRACE] This proposal is consistent with IPC change that was approved and was to further update the IPC with language that was in the IRC. When this new section was written for the IPC it was found that there where further updates that could be done to the IRC section. Note none of these updates change the requirement of the existing section but just reformat it in code language without the use of the exception and further clarify the initial intent of the section in a more user friendly format. With the approval of the above language both the IRC and IPC will have the exact same language in regard to the separation of water services and building sewers.

[HALL-PMGCAC] Reason: This revised language was approved for the 2015 IPC. There is no reason for the language to be different between the IRC and the IPC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X10 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved to make the IRC coordinate with the IPC.

Assembly Action: **None**

Final Hearing Results

RP104-13	**AS**

Code Change No: RP105-13

Original Proposal

Section(s): Table P2905.4, P3004.3, Table P3302.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

TABLE P2905.4
WATER SERVICE PIPE

MATERIAL	STANDARD
~~Asbestos-cement pipe~~	~~ASTM C296~~

(Portions of table not shown are unchanged)

~~**P3003.4 Asbestos-cement.** Joints between asbestos-cement pipe or fittings shall be made with a sleeve coupling of the same composition as the pipe, sealed with an elastomeric ring conforming to ASTM D 1869.~~

TABLE P3302.1
SUBSOIL DRAIN PIPE

MATERIAL	STANDARD
~~Asbestos-cement pipe~~	~~ASTM C508~~

(Portions of table not shown are unchanged)

Reason: Asbestos cement pipe is no longer manufactured in North America. The potential health issues associated with asbestos make this piping material unsuitable for use. The material needs to be removed from the code. A similar proposal to the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 58 on the PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Modify the proposal as follows:

Committee Reason: The material is no longer made in this country so there is no need to have it in the code.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh of Arlington County Virginia representing the ICC PMG Code Action Committee requests Approval as Modified by this Public Comment.

Further modify proposal as follows:

TABLE P3002.1(2)
UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

PIPE	STANDARD
~~Asbestos-cement pipe~~	~~ASTM C 428~~

TABLE P3002.2
BUILDING SEWER PIPE

MATERIAL	STANDARD
~~Asbestos-cement pipe~~	~~ASTM C 428~~

TABLE P3002.3
PIPE FITTINGS

PIPE MATERIAL	FITTING STANDARD
~~Asbestos cement~~	~~ASTM C 428~~

Commenter's Reason: We forgot to include the removal of asbestos-cement pipe from several tables in Chapter 30, Sanitary Drainage. This public comment corrects the oversight.

Final Hearing Results

RP105-13 **AMPC**

Code Change No: RP106-13

Original Proposal

Section(s): Table P2905.4

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

TABLE P2905.4
WATER SERVICE PIPE

MATERIAL	STANDARD
Polypropylene (PP) plastic tubing	ASTM F 2389; CSA B137.11

(Portions of table not shown are unchanged)

Reason: The IPC shows this material to be suitable for water service applications and the material is also indicated in Table P2905.5 as water distribution piping. There's no technical justification for not allowing it to be used for water service piping.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 59 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The addition of this material to the code provides for more options for the installer.

Assembly Action: **None**

Final Hearing Results

RP106-13 **AS**

Code Change No: RP107-13

Original Proposal

Section(s): Table P2905.4, Table P2905.5, P2905.9.1.3 (New), Chapter 44

Proponent: David W. Ash, Lubrizol Advanced Materials Inc

Revise as follows:

TABLE P2905.4
WATER SERVICE PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F 2855

(Portions of table not shown are unchanged)

TABLE P2905.5
WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F 2855

(Portions of table not shown are unchanged)

P2905.9.1.3 CPVC/AL/CPVC pipe. Joint surfaces shall be clean and free from moisture, and an *approved* primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D2846 or ASTM F493. Solvent-cement joints shall be installed above or below ground.

Exception: A primer shall not be required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM F493.
2. The solvent cement used is yellow in color.
3. The solvent cement is used only for joining ½ inch (12.7 mm) through 1 inch (25.4 mm) diameter CPVC/AL/CPVC pipe and CPVC fittings.
4. The CPVC fittings are manufactured in accordance with ASTM D 2846.

Add new standard to Chapter 44 as follows:

ASTM

F2855-11 Specifications for Chlorinated Poly (Vinyl Chloride)/Aluminum/Chlorinated Poly (Vinyl Chloride) (CPVC-AL-CPVC) Composite Pressure Tubing

Reason: CPVC/AL/CPVC pipe has been developed that is suitable for use as potable water piping, both as water service pipe and water distribution pipe. This product has been used successfully on a limited basis since 2007 based on NSF Standard 61 listing and a special engineered standard (SE) from NSF International. Including this product in the IRC will recognize another plumbing pipe option for installers.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, CSA 22.2 No. 130 and UL 515 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The addition of this material to the code provides for more options for the installer.

Assembly Action: **None**

Final Hearing Results

RP107-13	AS

Code Change No: RP108-13

Original Proposal

Section(s): Table P2905.4, Table P2905.5, Table P2905.6

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

TABLE P2905.4
WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
~~Brass pipe~~	~~ASTM B 43~~
Copper or copper-alloy pipe	ASTM B 42; ASTM B 43; ASTM B 302

(Portions of table not shown are unchanged)

TABLE P2905.5
WATER SERVICE PIPE

MATERIAL	STANDARD
~~Brass pipe~~	~~ASTM B 43~~

MATERIAL	STANDARD
~~Brass pipe~~	~~ASTM F1974~~
Copper or copper-alloy pipe	ASTM B 42; ASTM B 43; ASTM B 302

(Portions of table not shown are unchanged)

TABLE P2905.6
PIPE FITTINGS

(Portions of table not shown are unchanged)

Reason: Brass and Bronze are copper alloys. Moving the standards under the applicable heading eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Standard ASTM F1974 is a metal insert fitting for Polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/polyethylene (PEX-AL-PEX) and is already shown with the appropriate material.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change in terminology aligns the code with the industry's terminology for this material.

Assembly Action: **None**

Final Hearing Results

RP108-13	**AS**

Code Change No: RP109-13

Original Proposal

Section(s): Table P2905.6, Chapter 44

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org); Curtis Dady, Viega, LLC representing Viega, LLC (curtis.dady@viega.com)

Revise as follows:

TABLE P2905.6
PIPE FITTINGS

MATERIALS	STANDARDS
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME 16.26; ASME B16.29; ASME B16.51, ASSE 1061

Add new standard to Chapter 44 as follows:

ASME
B16.51-2011 Copper and Copper Alloy Press-Connect Pressure Fittings

Reason:
[HALL-PMCAC]: The addition of the new standard was approved for the 2015 IPC. There is no reason to not include it in the IRC.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X12 on the PMGCAC IRC-P list.

[DADY]: Harmonization with IPC and IMC proposals “Approved as Submitted” in the 2012 Final Action Hearings. Ref: P97-12; P98-12; M195-12; M198-12; M211-12

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ASME B16.51-2011, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1. 2013.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The addition of this standard allows for use of copper press connect fittings for IRC buildings which provides more options for the user. The changes align the IRC with the IPC.

Assembly Action: **None**

Final Hearing Results

RP109-13 **AS**

Code Change No: RP110-13

Original Proposal

Section(s): Table P2905.6

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

TABLE P2905.6
PIPE FITTINGS

MATERIAL	STANDARD
Copper or copper alloy	ASSE 1061; ASME B16.15; ASME B16.18; ASME B16.22; ~~ASME B16.23;~~ ASME B16.26; ~~ASME B16.29~~

Reason: This deletion was approved for the 2015 IPC. The above proposal removes DWV fittings from Potable Water table to benefit the end user. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV and ASME B 16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings – DWV are designed with short cup depth and ¼ inch per foot slope.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X13 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal makes a necessary correction in the table to eliminate reference to a standard that doesn't belong in the table.

Assembly Action: **None**

Final Hearing Results

RP110-13 **AS**

Code Change No: RP111-13

Original Proposal

Section(s): Table P2905.6

Proponent: Larry Gill, IPEX USA LLC (larry.gill@ipexna.com)

Revise as follows:

TABLE P2905.6
PIPE FITTINGS

MATERIAL	STANDARD
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F 1807; ASTM F 2098; ASTM F 2159; ASTM F 2735; ASTM F 2769

(Portions of table not shown remain unchanged)

Reason: Add ASTM F2769 as a fittings standard for polyethylene of raised temperature (PE-RT). ASTM F2769 is a standard for hot and cold water tubing and distribution systems and includes provisions for tubing, fittings, valves and manifolds.

Cost Impact: The code change proposal will not increase the cost of construction

Analysis: Standard ASTM F 2769 is in the 2012 IRC.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal adds a standard to the table to provide the installer with more options.

Assembly Action: **None**

Final Hearing Results

RP111-13 **AS**

Code Change No: RP112-13

Original Proposal

Section(s): Table P2905.5

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

TABLE P2905.6
PIPE FITTINGS

MATERIAL	STANDARD
Cast-iron	ASME B16.4; ~~ASME B16.12~~

(Portions of table not shown are unchanged)

Reason: ASME B16.12 is for threaded *drainage* fittings and is inappropriate to be listed in a water distribution pipe fitting table. A similar proposal submitted to the 2015 IPC was Approved as Submitted.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 60 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal makes a necessary correction in the table to eliminate reference to a standard that doesn't belong in the table.

Assembly Action: **None**

Final Hearing Results

RP112-13 **AS**

Code Change No: RP114-13

Original Proposal

Section(s): P2905.14, Chapter 44

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

P2905.14 Soldered and brazed joints. Soldered joints in copper and copper alloy tubing shall be made with fittings approved for water piping and shall conform to ASTM B 828. Surfaces to be soldered shall be cleaned bright. Fluxes for soldering shall be in accordance with ASTM B813 and shall become noncorrosive and non-toxic after soldering. Brazing fluxes shall be in accordance with AWS A5.31. ~~The joints shall be properly fluxed and made with approved solder.~~ Solders and fluxes used in potable water-supply systems shall have a lead content of not greater than 0.2 percent. ~~Fluxes shall conform to ASTM B 813.~~

Add standard to Chapter 44 as follows:

AWS
A5.31-2012 Specification for Fluxes for Brazing and Braze Welding

Reason: This proposal relocated existing sections, ensures copper and copper alloy systems are installed correctly and removes redundant language to aid the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, ASME A112.18.8 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1 2013.

Public Hearing Results

For staff analysis of the content of ASME A112.18.8 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Modify the proposal as follows:

Committee Reason: Potable water piping can no longer be soldered, it has to be brazed based on the fact the material is used and the heat required to join piping. The proposal addresses this and provides the standard in which to use it by. It also addresses non-toxic and non-corrosive soldering.

Assembly Action: **None**

Public Comments

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing & Mechanical Inspectors Association (VPMIA) & VA Building Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

P2905.14 Soldered and brazed joints. Soldered joints in copper and copper alloy tubing shall be made with fittings approved for water piping and shall conform to ASTM B 828. Surfaces to be soldered shall be cleaned bright. Fluxes for soldering shall be in accordance with ASTM B813 ~~and shall become noncorrosive and non-toxic after soldering~~. Brazing fluxes shall be in accordance with AWS A5.31. The joints shall be properly fluxed and made with approved solder. Solders and fluxes used in potable water-supply systems shall have a lead content of not greater than 0.2 percent. Fluxes shall conform to ASTM B 813.

Commenter's Reason: ASTM B813 already requires fluxes to be non corrosive and non toxic after soldering. This additional language is not needed as how would an inspector verify this in the field?

Final Hearing Results

RP114-13	AMPC

Code Change No: RP115-13

Original Proposal

Section(s): P2905.17.1

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

P2905.17.1 Copper or copper-alloy tubing to galvanized steel pipe. Joints between copper or copper-alloy tubing and galvanized steel pipe shall be made with a ~~brass~~ copper alloy fitting or dielectric fitting. The copper tubing shall be joined to the fitting in an approved manner, and the fitting shall be screwed to the threaded pipe.

Reason: This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved to be in-line with prior proposals that changed “brass” to “copper alloy”.

Assembly Action: **None**

Final Hearing Results

RP115-13	**AS**

Code Change No: RP116-13

Original Proposal

Section(s): P2905.18

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P2905.18 Press connect joints. Press-connect joints shall conform to one of the standards indicated in Table P2905.6. Press-type mechanical joints in copper tubing shall be made in accordance with the manufacturer's instructions. Cut tube ends shall be reamed to the full inside diameter of the tube end. Joint surfaces shall be cleaned. The tube shall be fully inserted into the press connect fitting. Press connect joints shall be pressed with a tool certified by the manufacturer. ~~using *approved* tools which affix the copper fitting with integral O-ring to the tubing.~~

Reason: This revised language was approved for the 2015 IPC. This change coordinates with the change to add the press connect fitting standard to Table P2905.6. The proposed new text identifies the method of joining copper tube by press connect. The tube must be cut square and reamed. The tool must be certified by the manufacturer to assure that the proper press connection is made.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X14 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Press-connect joints are the way plumbing installation is headed. This language provides necessary instructions for installation and instructs the user to use a certified tool.

Assembly Action: **None**

Final Hearing Results

RP116-13	AS

Code Change No: RP118-13

Original Proposal

Section(s): P2905.19.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

~~**P2905.19.1 Flared joints.** Flared pipe ends shall be made by a tool designed for that operation.~~

(Renumber subsequent section)

Reason: Manufacturers of PE-RT tubing indicate that the tubing cannot be flared and that a tool for flaring this type of tubing does not exist. A similar proposal submitted to the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 61 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

RP118-13	**AS**

Code Change No: RP120-13

Original Proposal

Section(s): 202, P2909 (New), P2910 (New), P2911 (New), P2912 (New), P3009

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Add new definitions to Chapter 2 as follows:

RECLAIMED WATER. Nonpotable water that has been derived from the treatment of wastewater by a facility or system licensed or permitted to produce water meeting the jurisdiction's water requirements for its intended uses. Also known as "Recycled Water."

ONSITE NONPOTABLE WATER REUSE SYSTEMS. Water systems for the collection, treatment, storage, distribution, and reuse of nonpotable water generated onsite, including but not limited to graywater systems. This definition does not include rainwater harvesting systems.

COLLECTION PIPE. Unpressurized pipe used within the collection system that drains onsite non-potable water or rainwater to a storage tank by gravity.

Add new Section and new text:

SECTION P2909
NONPOTABLE WATER SYSTEMS

P2909.1 Scope. The provisions of this shall govern the materials, design, construction and installation of systems for the collection, storage, treatment, and distribution of non-potable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

P2909.2 Water quality. Nonpotable water for each end use application shall meet the minimum water quality requirements as established for the intended application by the laws, rules and ordinances applicable in the jurisdiction. Where nonpotable water from different sources is combined in a system, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

P2909.2.1 Residual disinfectants. Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 mg/L of chloramines or free chlorine. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use.

> **Exception:** Reclaimed water sources shall not be required to comply with the requirements of this section.

P2909.2.2 Filtration required. Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100 micron or finer filter.

> **Exception:** Reclaimed water sources shall not be required to comply with the requirements of this section.

P2909.3 Signage required. Nonpotable water outlets such as hose connections, open ended pipes, and faucets shall be identified at the point of use for each outlet with signage that reads as follows:

"Nonpotable water is utilized for [application name]. Caution: Nonpotable water. DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant, waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches in height and in colors in contrast to the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure P2909.3 shall appear on the signage required by this section.

Figure P2909.3
Pictograph DO NOT DRINK

P2909.4 Permits. Permits shall be required for the construction, installation, alteration, and repair of nonpotable water systems. Construction documents, engineering calculations, diagrams, and other such data pertaining to the non-potable water system shall be submitted with each application for permit.

P2909.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.

P2909.6 Approved components and materials. Piping, plumbing components, and materials used in the collection and conveyance systems shall be manufactured of material approved for the intended application and compatible with any disinfection and treatment systems used.

P2909.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate corrosion of system components.

P2909.8 Freeze protection. Where sustained freezing temperatures occur, provisions shall be made to keep storage tanks and the related piping from freezing.

P2909.9 Nonpotable water storage tanks. Nonpotable water storage tanks shall comply with Sections P2909.9.1 through P2909.9.11.

P2909.9.1 Sizing. The holding capacity of the storage tank shall be sized in accordance with the anticipated demand.

P2909.9.2 Location. Storage tanks shall be installed above or below grade. Above-grade storage tanks shall be protected from direct sunlight and shall be constructed using opaque, UV resistant, materials such as, but not limited to, heavily tinted plastic, lined metal, concrete, wood, or painted to prevent algae growth, or shall have specially constructed sun barriers including but not limited to installation in garages, crawlspaces, or sheds. Storage tanks and their manholes shall not be located directly under any soil piping, waste piping or any source of contamination.

P2909.9.3 Materials. Where collected onsite, water shall be collected in an approved tank constructed of durable, nonabsorbent and corrosion-resistant materials. The storage tank shall be constructed of materials compatible with any disinfection systems used to treat water upstream of the tank and with any systems used to maintain water quality within the tank. Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.

P2909.9.4 Foundation and supports. Storage tanks shall be supported on a firm base capable of withstanding the weight of the storage tank when filled to capacity. Storage tanks shall be supported in accordance with this code.

P2909.9.4.1 Ballast. Where the soil can become saturated, an underground storage tank shall be ballasted, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the storage tank weight when full, consistent with the bearing capability of adjacent soil.

P2909.9.4.2 Structural support. Where installed below grade, storage tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

P2909.9.5 Makeup water. Where an uninterrupted nonpotable water supply is required for the intended application, potable or reclaimed water shall be provided as a source of makeup water for the storage tank. The makeup water supply shall be protected against backflow by means of an air gap not less than 4 inches (102 mm) above the overflow or an approved backflow device in accordance with Section P2902. A full-open valve located on the makeup water supply line to the storage tank shall be provided. Inlets to storage tank shall be controlled by fill valves or other automatic supply valves installed so as to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. Where makeup water is provided, the water level shall be prohibited from dropping below the source water inlet or the intake of any attached pump.

P2909.9.5.1 Inlet control valve alarm. Make-up water systems shall be fitted with a warning mechanism that alerts the user to a failure of the inlet control valve to close correctly. The alarm shall activate before the water within the storage tank begins to discharge into the overflow system.

P2909.9.6 Overflow. The storage tank shall be equipped with an overflow pipe having a diameter not less than that shown in Table P2909.9.6. The overflow outlet shall discharge at a point not less than 6 inches (152 mm) above the roof or roof drain; floor or floor drain; or over an open water-supplied fixture. The overflow outlet shall be covered with a corrosion-resistant screen of not less than 16 by 20 mesh per inch (630 by 787 mesh per m) and by 1/4-inch (6.4 mm) hardware cloth or shall terminate in a horizontal angle seat check valve. Drainage from overflow pipes shall be directed so as not to freeze on roof walks. The overflow drain shall not be equipped with a shutoff valve. Not less than one cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.

TABLE P2909.9.6
SIZE OF DRAIN PIPES FOR WATER TANKS

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1500	1 1/2
1501 to 3000	2

3001 to 5000	2 1/2
5001 to 7500	3
Over 7500	4

For SI: 1 gallon = 3.875 liters; 1 inch = 25.4 mm

P2909.9.7 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an approved locking device or other approved method of securing access. Below grade storage tanks, located outside of the building, shall be provided with either a manhole not less than 24 inches (610 mm) square or a manhole with an inside diameter not less than 24 inches (610 mm. Manholes shall extend not less than 4 inches (102 mm) above ground or shall be designed to as to prevent water infiltration. Finished grade shall be sloped away from the manhole to divert surface water from the manhole. Manhole covers shall be secured to prevent unauthorized access. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access.

> **Exception:** Storage tanks under 800 gallons (3028 l) in volume installed below grade shall not be required to be equipped with a manhole, but shall have a service port not less than 8 inches (203 mm) in diameter.

P2909.9.8 Venting. Storage tanks shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an approved cap or a U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade, or as necessary to prevent surface water from entering the storage tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P2902.7.

P2909.9.9 Drain. A drain shall be located at the lowest point of the storage tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P209.9.6. Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.

P2909.10 Marking and signage. Each nonpotable water storage tank shall be labeled with it's rated capacity. The contents of storage tanks shall be identified with the words "CAUTION: NON-POTABLE WATER – DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER – CONFINED SPACE." Markings shall be indelibly printed on the tank, or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inches in height and shall be of a color in contrast with the background on which they are applied.

P2909.9.11 Storage tank tests. Storage tanks shall be tested in accordance with the following:

1. Storage tanks shall be filled with water to the overflow line prior to and during inspection. All seams and joints shall be left exposed and the tank shall remain water tight without leakage for a period of 24 hours.
2. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and verify that there are no leaks.
3. Following a successful test of the overflow, the water level in the tank shall be reduced to a level that is at 2 inches (51 mm) below the makeup water trigger point by using the tank drain. The tank drain shall be observed for proper operation. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified. Water shall not be drained from the overflow at any time during the refill test.

P2909.10 System abandonment. If the owner of an onsite nonpotable water reuse system or rainwater collection and conveyance system elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with the following:

1. All system piping connecting to a utility-provided water system shall be removed or disabled.

2. The distribution piping system shall be replaced with an approved potable water supply piping system. Where an existing potable water pipe system is already in place, the fixtures shall be connected to the existing system.
3. The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

P2909.11 Separation requirements for non-potable water piping. Nonpotable water collection and distribution piping and reclaimed water piping shall be separated from the building sewer and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water collection and distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials conforms to Table P3002.2.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is a minimum of 12 inches (305 mm) above the top of the highest point of the non-potable water pipe and the pipe materials comply with the requirements of Table P2905.5
3. The required separation distance shall not apply where a nonpotable water pipe is located in the same trench with a building sewer that is constructed of materials that comply with the requirements of Table P3002.2.
4. The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe provided that the nonpotable water pipe is sleeved to at least 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing with pipe materials that comply with Table P3002.2
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe provided that the potable water service pipe is sleeved for a distance of at least 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing with pipe materials that comply with Table P3002.2.
6. The required separation distance shall not apply to irrigation piping located outside of a building and downstream of the backflow preventer where nonpotable water is used for outdoor applications.

P2909.12 Outdoor outlet access. Sillcocks, hose bibs, wall hydrants, yard hydrants, and other outdoor outlets supplied by non-potable water shall be located in a locked vault or shall be operable only by means of a removable key.

SECTION P2910
ONSITE NONPOTABLE WATER REUSE SYSTEMS

P2910.1 General. The provisions of this section shall govern the construction, installation, alteration, and repair of onsite nonpotable water reuse systems for the collection, storage, treatment and distribution of onsite sources of nonpotable water as permitted by the jurisdiction.

P2910.2 Sources. Onsite nonpotable water reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers, and laundry trays. Water from other approved nonpotable sources including swimming pool backwash operations, air conditioner condensate, rainwater, foundation drain water, fluid cooler discharge water and fire pump test water shall also be permitted to be collected for reuse by onsite nonpotable water reuse systems, as approved by the building official and as appropriate for the intended application.

P2910.1 Prohibited sources. Reverse osmosis system reject water, water softener backwash water, kitchen sink wastewater, dishwasher wastewater and wastewater containing urine or fecal matter shall not be collected for reuse within an onsite nonpotable water reuse system.

P2910.3 Traps. Traps serving fixtures and devices discharging wastewater to onsite nonpotable water reuse systems shall comply with the Section P3201.2.

P2910.4 Collection pipe. Onsite nonpotable water reuse systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey untreated water for reuse. Vent piping approved for use within plumbing venting systems shall be utilized for vents within the graywater system. Collection and vent piping materials shall comply with Section P3002.

P2910.4.1 Installation. Collection piping conveying untreated water for reuse shall be installed in accordance with Section P3005.

P2910.4.2 Joints. Collection piping conveying untreated water for reuse shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section P3002.

P2910.4.3 Size. Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.

P2910.4.4 Marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by the Chapter 30.

P2910.5 Filtration. Untreated water collected for reuse shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gage or other approved method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

P2910.6 Disinfection. Where the intended application for nonpotable water collected onsite for reuse requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Nonpotable water collected onsite containing untreated graywater shall be retained in collection reservoirs for a maximum of 24 hours.

P2910.7 Storage tanks. Storage tanks utilized in onsite nonpotable water reuse systems shall comply with Section P2909.9. and P2910.7.1 through P2910.7.3.

P2910.7.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2910.7.1.

TABLE P2910.7.1
LOCATION OF NON-POTABLE WATER REUSE STORAGE TANKS

ELEMENT	**MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (FEET)**
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (FEET)
Water wells	50
Streams and lakes	50
Water service	5
Public water main	10

For SI: 1 foot = 304.8 mm

P2910.7.2 Inlets. Storage tank inlets shall be designed to introduce water into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P2910.7.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank, and shall not skim water from the surface.

P2910.8 Valves. Valves shall be supplied on onsite non-potable water reuse systems in accordance with Sections P2910.8.1 and P2910.8.2.

P2910.8.1 Bypass valve. One three-way diverter valve certified to NSF 50 or other approved device shall be installed on collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated onsite reuse sources to the sanitary sewer to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections Bypass valves shall be labeled to indicate the direction of flow, connection and storage tank or drainfield connection. Bypass valves shall be installed in accessible locations. Two shutoff valves shall not be installed to serve as a bypass valve.

P2910.8.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P2910.9 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall appropriate for the application and in accordance with Section P2903.

P2910.10 Water-pressure reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the nonnpotable water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.1.

P2910.11 Distribution pipe. Distribution piping utilized in onsite nonpotable water reuse systems shall comply with Sections P2910.11.1 through P2910.11.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

P2910.11.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2905 for nonpotable water.

P2910.11.2 Design. Onsite nonpotable water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P2910.11.3 Labeling and marking. Onsite nonpotable water distribution piping labeling and marking shall comply with Section P2901.1

P2910.12 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P2910.12.1 through P2910.12.6.

P2910.12.1 Collection pipe and vent test. Drain, waste and vent piping used for onsite water reuse systems shall be tested in accordance with Section P2503.

P2910.12.2 Storage tank test. Storage tanks shall be tested in accordance with the Section P2909.9.11.

P2910.12.3 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7

P2910.12.4 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P2910.12.5 Inspection vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2909.7.

P2910.12.6 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the jurisdiction.

P2910.13 Operation and maintenance manuals. Operations and maintenance materials shall be supplied with non-potable onsite water reuse systems in accordance with Sections P2910.13.1 through P2910.13.4.

P2910.13.1 Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

P2910.13.2 Schematics. The manual shall include a detailed system schematic, locations of all system components, and a list of all system components including manufacturer and model number.

P2910.13.3 Maintenance procedures. The manual shall provide a maintenance schedule and procedures for all system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.

P2910.13.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION P2911
NONPOTABLE RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS

P2911.1 General. The provisions of this section shall govern the construction, installation, alteration, and repair of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for non-potable applications, as permitted by the jurisdiction.

P2911.2 Collection surface. Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from approved materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including but not limited to evaporative coolers, water heaters, and solar water heaters shall not discharge onto rainwater collection surfaces.

P2911.3 Debris excluders. Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.

P2911.4 Roof washer. An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices, and shall operate automatically. Diverted rainwater shall not be drained to the roof surface, and shall be discharged in a manner consistent with the storm water runoff requirements of the jurisdiction. Roof washers shall be accessible for maintenance and service.

P2911.5 Roof gutters and downspouts. Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be water-tight.

P2911.5.1 Slope. Roof gutters, leaders, and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than 1/8 inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.

P2911.5.2 Cleanouts. Cleanouts shall be provided in the water conveyance system so as to allow access to all filters, flushes, pipes and downspouts.

P2911.6 Drainage. Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and debris excluders shall be provided with an automatic means of self draining between rain events and shall not drain onto roof surfaces.

P2911.7 Collection pipe. Rainwater collection and conveyance systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping approved for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.

P2911.7.1 Installation. Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3

P2911.7.2 Joints. Collection piping conveying captured rainwater shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section P3003

P2911.7.3 Size. Collection piping conveying captured rainwater shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.

P2911.7.4 Labeling and marking. Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by the Chapter 30.

P2911.8 Filtration. Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gage or other approved method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

P2911.9 Disinfection. Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.

P2911.10 Storage tanks. Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section P2909.9 and P2911.10.1 through P2911.10.3.

P2911.10.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2911.10.1.

TABLE P2911.10.1

LOCATION OF RAINWATER STORAGE TANKS

Element	Minimum Horizontal Distance from Storage Tank (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

For SI: 1 foot = 304.8 mm

P2911.10.2 Inlets. Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P2911.10.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.

P2911.11 Valves. Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P2911.11.1 and P2911.11.2.

P2911.11.1 Influent Diversion. A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.

P2911.11.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P2911.12 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall appropriate for the application and in accordance with Section P2903.

P2911.13 Water-pressure reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.1.

P2911.14 Distribution pipe. Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P2911.14.1 through P2911.14.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

P2911.14.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2905 for nonpotable water.

P2911.14.2 Design. Distribution piping systems shall be designed and sized in accordance with the Section P2903 for the intended application.

P2911.14.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.1.

P2911.15 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P2910.15.1 through P2910.15.8.

P2911.15.1 Roof gutter inspection and test. Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P2911.5.1. Gutters shall be tested by pouring not less than one gallon of water (3.8 l) into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.

P2911.15.2 Roofwasher test. Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P2911.4 shall be verified.

P2911.15.3 Collection pipe and vent test. Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.

P2911.15.4 Storage tank test. Storage tanks shall be tested in accordance with the Section P2909.9.11.
P2911.15.5 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7

P2911.15.6 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8

P2911.15.7 Inspection vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2909.7.

P2911.15.8 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the jurisdiction.

P2911.16 Operation and maintenance manuals. Operations and maintenance materials shall be supplied with rainwater collection and conveyance systems in accordance with Sections P2911.16.1 through P2911.16.4.

P2911.16.1 Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

P2911.16.2 Schematics. The manual shall include a detailed system schematic, locations of all system components, and a list of all system components including manufacturer and model number.

P2911.16.3 Maintenance procedures. The manual shall provide a maintenance schedule and procedures for all system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.

P2911.16.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION P2912
RECLAIMED WATER SYSTEMS

P2912.1 General. The provisions of this section shall govern the construction, installation, alteration, and repair of systems supplying non-potable reclaimed water.

P2912.2 Water-pressure reducing valve or regulator. Where the reclaimed water pressure supplied to the building exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.1

P2912.3 Reclaimed water systems. The design of the reclaimed water systems shall conform to accepted engineering practice.

P2911.3.1 Distribution pipe. Distribution piping shall comply with Sections P2912.3.1.1 through P2912.3.1.3.

> **Exception:** Irrigation piping located outside of the building and downstream of a backflow preventer.

P2912.3.1.1 Materials, joints and connections. Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2905 for nonpotable water.

P2912.3.1.2 Design. Distribution piping systems shall be designed and sized in accordance with the Section P2903 for the intended application.

P2912.3.1.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.1

P2912.4 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P2912.4.1 and P2912.4.2.

P29124.1 Water supply system test. The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7

P2912.4.2 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers shall be conducted in accordance with Section P2503.8

Delete and substitute as follows:

~~SECTION P3009~~
~~GRAY WATER RECYCLING SYSTEMS~~

~~**P3009.1 Scope.** The provisions of Section P3009 shall govern the materials, design, construction and installation of gray water systems for flushing of water closets and urinals and for subsurface landscape irrigation. See Figures P3009.1(1) and P3009.1(2).~~

~~**P3009.2 Installation.** In addition to the provisions of Section P3009, systems for flushing of water closets and urinals shall comply with Section P3009.13 and systems for subsurface landscape irrigation shall comply with Section P3009.14. Except as provided for in Section P3009, all systems shall comply with the provisions of the other sections of this code.~~

~~**P3009.3 Materials.** Above-ground drain, waste and vent piping for gray water systems shall conform to one of the standards listed in Table P3002.1(1). Gray water underground building drainage and vent pipe shall conform to one of the standards listed in Table P3002.1(2).~~

~~**P3009.4 Tests.** Drain, waste and vent piping for gray water systems shall be tested in accordance with Section P2503.~~

~~**P3009.5 Inspections.** Gray water systems shall be inspected in accordance with Section P2503.~~

~~**P3009.6 Potable water connections.** Only connections in accordance with Section 3009.13.1 shall be made between a gray water recycling system and a potable water system.~~

~~**P3009.7 Waste water connections.** Gray water recycling systems shall receive only the waste discharge of bathtubs, showers, lavatories, clothes washers or laundry trays.~~

~~**P3009.8 Collection reservoir.** Gray water shall be collected in an approved reservoir constructed of durable, nonabsorbent and corrosion-resistant materials. The reservoir shall be a closed and gas-tight vessel. Access openings shall be provided to allow inspection and cleaning of the reservoir interior.~~

~~**P3009.9 Filtration.** Gray water entering the reservoir shall pass through an approved filter such as a media, sand or diatomaceous earth filter.~~

~~**P3009.9.1 Required valve.** A full-open valve shall be installed downstream of the last fixture connection to the gray water discharge pipe before entering the required filter.~~

~~**P3009.10 Overflow.** The collection reservoir shall be equipped with an overflow pipe having the same or larger diameter as the influent pipe for the gray water. The overflow pipe shall be trapped and shall be indirectly connected to the sanitary drainage system.~~

~~**P3009.11 Drain.** A drain shall be located at the lowest point of the collection reservoir and shall be indirectly connected to the sanitary drainage system. The drain shall be the same diameter as the overflow pipe required in Section P3009.10.~~

~~**P3009.12 Vent required.** The reservoir shall be provided with a vent sized in accordance with Chapter 31 and based on the diameter of the reservoir influent pipe.~~

~~**P3009.13 Flushing water systems.** Systems for flushing water closets and urinals shall comply with Sections P3009.13.1 through P3009.13.6~~

~~**P3009.13.1 Collection reservoir.** The holding capacity of the reservoir shall be a minimum of twice the volume of water required to meet the daily flushing requirements of the fixtures supplied with gray water, but not less than 50 gallons (189 L). The reservoir shall be sized to limit the retention time of gray water to a maximum of 72 hours.~~

~~**P3009.13.2 Disinfection.** Gray water shall be disinfected by an approved method that employs one or more disinfectants such as chlorine, iodine or ozone that are recommended for use with the pipes, fittings and equipment by the manufacturer of the pipes, fittings and equipment.~~

~~**P3009.13.3 Makeup water.** Potable water shall be supplied as a source of makeup water for the gray water system. The potable water supply shall be protected against backflow in accordance with Section P2902. There shall be a full-open valve located on the makeup water supply line to the collection reservoir.~~

~~**P3009.13.4 Coloring.** The gray water shall be dyed blue or green with a food grade vegetable dye before such water is supplied to the fixtures.~~

~~**P3009.13.5 Materials.** Distribution piping shall conform to one of the standards listed in Table P2905.4.~~

~~**P3009.13.6 Identification.** Distribution piping and reservoirs shall be identified as containing nonpotable water. Piping identification shall be in accordance with Section P2901.1.~~

~~**P3009.14 Landscape irrigation systems.** Subsurface landscape irrigation systems shall comply with Sections P3009.14.1 through P3009.14.11~~

~~**P3009.14.1 Collection reservoir.** Reservoirs shall be sized to limit the retention time of gray water to a maximum of 24 hours.~~

~~**P3009.14.1.1 Identification.** The reservoir shall be identified as containing nonpotable water.~~

~~**P3009.14.2 Valves required.** A check valve and a full-open valve located on the discharge side of the check valve shall be installed on the effluent pipe of the collection reservoir.~~

~~**P3009.14.3 Makeup water.** Makeup water shall not be required for subsurface landscape irrigation systems. Where makeup water is provided, the installation shall be in accordance with Section 3009.13.3.~~

~~**P3009.14.4 Disinfection.** Disinfection shall not be required for gray water used or subsurface landscape irrigation systems.~~

~~**P3009.14.5 Coloring.** Gray water used for subsurface landscape irrigation systems shall not be required to be dyed.~~

~~**P3009.14.6 Estimating gray water discharge.** The system shall be sized in accordance with the gallons-per-day-per occupant number based on the type of fixtures connected to the gray water system. The discharge shall be calculated by the following equation:~~
~~C = A × B~~
~~A = Number of occupants:~~

~~Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.~~

~~B = Estimated flow demands for each occupant:~~
~~Residential—25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.~~

~~C = Estimated gray water discharge based on the total number of occupants.~~

~~**P3009.14.7 Percolation tests.** The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.~~

~~**P3009.14.7.1 Percolation tests and procedures.** At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.~~

~~**P3009.14.7.1.1 Percolation test hole.** The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.~~

~~**P3009.14.7.1.2 Test procedure, sandy soils.** The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section 3009.14.7.1.3.~~

~~**P3009.14.7.1.3 Test procedure, other soils.** The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: Any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed refer ence point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless~~

~~two successive water level drops do not vary by more than 1/16 inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.~~

~~**P3009.14.7.1.4 Mechanical test equipment.** Mechanical percolation test equipment shall be of an approved type.~~

~~**P3009.14.7.2 Permeability evaluation.** Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section P3009.14.7.1 for evaluating the soil.~~

~~**P3009.14.8 Subsurface landscape irrigation site location.** The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining lot. Where this is not possible, the site shall be located so that surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table P3009.14.8. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.~~

~~TABLE P3009.14.8~~
~~LOCATION OF GRAY WATER SYSTEM~~

~~**P3009.14.9 Installation.** Absorption systems shall be installed in accordance with Sections P3009.14.9.1 through P3009.14.9.5 to provide landscape irrigation without surfacing of gray water.~~

~~**P3009.14.9.1 Absorption area.** The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table P3009.14.9.1.~~

~~TABLE P3009.14.9.1~~
~~DESIGN LOADING RATE~~

~~**P3009.14.9.2 Seepage trench excavations.** Seepage trench excavations shall be a minimum of 1 foot (304 mm) to a maximum of 5 feet (1524 mm) wide. Trench excavations shall be spaced a minimum of 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be a maximum of 100 feet (30 480 mm) in developed length.~~

~~**P3009.14.9.3 Seepage bed excavations.** Seepage bed excavations shall be a minimum of 5 feet (1524 mm) wide and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced a maximum of 5 feet (1524 mm) and a minimum of 3 feet (914 mm) apart, and a maximum of 3 feet (914 mm) and a minimum of 1 foot (305 mm) from the sidewall or headwall.~~

~~**P3009.14.9.4 Excavation and construction.** The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry~~

~~so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.~~

~~**P3009.14.9.5 Aggregate and backfill.** A minimum of 6 inches of aggregate ranging in size from 1/2 to 21/2 inches (12.7 mm to 64 mm) shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed a minimum of 2 inches (51 mm) over the top of the distribution pipe. The aggregate shall be covered with approved synthetic materials or 9 inches (229mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. A minimum of 9 inches (229 mm) of soil backfill shall be provided above the covering.~~

~~**P3009.14.10 Distribution piping.** Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table P3009.14.10. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be a minimum of 2 inches (51 mm) and a maximum of 4 inches (102 mm) per 100 feet (30 480 mm).~~

~~**P3009.14.11 Joints.** Joints in distribution pipe shall be made in accordance with Section P3003.~~

Add new section and text.

SECTION P3009
SUBSURFACE LANSCAPE IRRIGATION SYSTEMS

P3009.1 Scope. The provisions of this section shall govern the materials, design, construction and installation of subsurface landscape irrigation systems connected to nonpotable water from onsite water reuse systems.

P3009.2 Materials. Above-ground drain, waste and vent piping for subsurface landscape irrigation systems shall conform to one of the standards listed in Table P3002.2(1). Subsurface landscape irrigation underground building drainage and vent pipe shall conform to one of the standards listed in Table P3002.1(2)

P3009.3 Tests. Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section P2503.

P3009.4 Inspections. Subsurface landscape irrigation systems shall be inspected in accordance with Section R109.

P3009.5 Disinfection. Disinfection shall not be required for onsite non-potable reuse water used for subsurface landscape irrigation systems.

P3009.6 Coloring. Onsite non-potable reuse water used for subsurface landscape irrigation systems shall not be required to be dyed.

P3009.7 Sizing. The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface irrigation system. Where gray water collection piping is connected to subsurface landscape irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant (liters per day per occupant) number based on the type of fixtures connected. The gray water discharge shall be calculated by the following equation:

C = A x B (Equation 30-1)

where:

A = Number of occupants:

Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.

B = Estimated flow demands for each occupant:

25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.
C = Estimated gray water discharge based on the total number of occupants.

P3009.8 Percolation tests. The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.

P3009.8.1 Percolation tests and procedures. Not less than three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.

P3009.8.1.1 Percolation test hole. The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.

P3009.8.1.2 Test procedure, sandy soils. The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section P3009.8.1.3

P3009.8.1.3 Test procedure, other soils. The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than 1/16 inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

P3009.8.1.4 Mechanical test equipment. Mechanical percolation test equipment shall be of an approved type.

P3009.8.2 Permeability evaluation. Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section P3009.8.1.1 for evaluating the soil.

P3009.9 Subsurface landscape irrigation site location. The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining lot. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table P3009.9. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.

TABLE P3009.9
LOCATION OF SUBSURFACE IRRIGATION SYSTEM

ELEMENT	MINIMUM HORIZONTAL DISTANCE	
	STORAGE TANK (feet)	IRRIGATION DISPOSAL FIELD (feet)
Buildings	5	2
Lot line adjoining private property	5	5
Water wells	50	100
Streams and lakes	50	50
Seepage pits	5	5
Septic tanks	0	5
Water service	5	5
Public water main	10	10

For SI: 1 foot = 304.8 mm.

P3009.10 Installation. Absorption systems shall be installed in accordance with Sections P3009.10.1 through P30091.10.5 to provide landscape irrigation without surfacing of water.

P3009.10.1 Absorption area. The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table P3009.10.1.

TABLE P3009.10.1
DESIGN LOADING RATE

PERCOLATION RATE (minutes per inch)	DESIGN LOADING FACTOR (gallons per square foot per day)
0 to less than 10	1.2
10 to less than 30	0.8
30 to less than 45	0.72
45 to 60	0.4

For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m^2.

P3009.10.2 Seepage trench excavations. Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (1524 mm) in width. Trench excavations shall be spaced not less than 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be not greater than 100 feet (30 480 mm) in developed length.

P3009.10.3 Seepage bed excavations. Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (1524 mm) and not less than 3 feet (914 mm) apart, and greater than 3 feet (914 mm) and not less than 1 foot (305 mm) from the sidewall or headwall.

P3009.10.4 Excavation and construction. The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

P3009.10.5 Aggregate and backfill. Not less than 6 inches in depth of aggregate ranging in size from 1/2 to 2-1/2 inches (12.7 mm to 64 mm) shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggregate shall be covered with approved synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. Not less than 9 inches (229 mm) of soil backfill shall be provided above the covering.

P3009.11 Distribution piping. Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table P3009.11. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).

TABLE P3009.11
DISTRIBUTION PIPE

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F 405
Polyvinyl chloride (PVC) plastic pipe	ASTM D 2729
Polyvinyl chloride (PVC) plastic pipe with a 3.5 inch O.D. and solid cellular core or composite wall.	ASTM F 1488

For SI: 1 inch = 25.4 mm

P3009.11.1 Joints. Joints in distribution pipe shall be made in accordance with Section P3003 of this code.

Add new standard to Chapter 44:

NSF

50-2010 Equipment for Swimming Pools, Spas, Hot Tubs, and other Recreational Water Facilities

Reason: The sections shown to be added to the code are from the IgCC. These sections really need to be in the IRC as these subjects are more applicable to the IRC scope. Currently, the IRC does not address different types of nonpotable water (other than gray water) and therefore provides no guidance as to how nonpotable waters are to be collected, stored and distributed. This proposal for the 2015 IPC was Approved as Modified by Public Comment.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 68 on the

PMGCAC IRC-P list.

Cost impact: The code change proposal will not increase the cost of construction.

Analysis: Standard NSF 50 is in the referenced standards of the 2012 ISPSC.

Public Hearing Results

For staff analysis of the content of NSF 50 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides important guidance when installing these systems. This makes the code all inclusive.

Assembly Action: **None**

Final Hearing Results

RP120-13 **AS**

Code Change No: RP122-13

Original Proposal

Section(s): Table P3002.1(1)

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

TABLE P3002.1(1)
ABOVE-GROUND DRAINAGE AND VENT PIPE

~~PIPE~~ MATERIAL	STANDARD
~~Brass pipe~~	~~ASTM B 43~~
Copper or copper-alloy pipe	ASTM B 42; ASTM B 43; ASTM B 302

(Portions of table not shown remain unchanged)

Reason: This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change in terminology aligns the code with the industry's terminology for this material.

Assembly Action: **None**

Final Hearing Results

RP122-13	**AS**

Code Change No: RP123-13

Original Proposal

Section(s): P3002.2.1 (New)

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org); Richard Grace/Fairfax County/Virginia Plumbing and Mechanical Inspectors Association and Virginia Building and Code Officials Association

Add new text as follows:

P3002.2.1 Building sewer pipe near the water service. The proximity of a building sewer to a water service shall comply with Section P2905.4.2.

Reason:
[HALL-PMGCAC]: The addition of this language to Chapter 30 provides an important pointer to the requirements of P2905.4.2 for separation between the water service piping and the building sewer piping. The IPC has the same pointer because sewer installers might overlook this important safety requirement.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X21 on the PMGCAC IRC-P list.

[GRACE]: The existing IRC sanitary drainage section has no section that points you back to the water distribution chapter to see the complete separation requirement for the a water service and a building sewer. While we feel it is not necessary to put the same redundant language in two different sections within the same code we feel it is necessary to point to the section which clearly states the requirements which is P2905.4.2.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal makes a necessary clarification of the requirement.

Assembly Action: **None**

Final Hearing Results

RP123-13	**AS**

Code Change No: RP124-13

Original Proposal

Section(s): P3003.5, P3003.5.1, P3003.5.2, P3003.5.3, P3003.10, P3003.10.1, P3003.10.3, P3003.10.11, P3003.10.11.1, P3003.10.11.2, P3003.10.11.3

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

~~**P3003.5 Brass.** Joints between brass pipe or fittings shall comply with Sections P3003.5.1 through 3003.5.3.~~

~~**P3003.5.1 Brazed joints**. All joint surfaces shall be cleaned. An approved flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.~~

~~**P3003.5.2 Mechanical joints**. Mechanical joints shall be installed in accordance with the manufacturer's instructions.~~

~~**P3003.5.3 Threaded joints**. Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only~~.

(Renumber subsequent sections)

P3003.10 Copper and copper alloy pipe and tubing. Joints between copper or copper alloy pipe, tubing, or fittings shall comply with Sections P3003.10.1 through P3003.10.4.

P3003.10.1 Brazed joints. All joint surfaces shall be cleaned. An approved flux shall be applied where required. Brazing materials shall have a melting point in excess of 1,000ºF (538ºC). ~~The joint shall be~~ Braz~~ed~~ing alloys ~~with a~~ filler metal shall be in accordance with ~~conforming to~~ AWS A5.8.

P3003.10.2 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

P3003.10.3 Soldered joints. Copper and copper alloy ~~Solder~~ joints shall be ~~made~~ soldered in accordance with ~~the methods of~~ ASTM B 828. All cut tube ends shall be reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned. ~~A~~ Fluxes for soldering shall be in accordance with ~~conforming to~~ ASTM B 813 and shall become ~~applied~~ noncorrosive and non-toxic after soldering. The joint shall be soldered with a solder conforming to ASTM B 32.

P3003.10.4 Threaded joints. Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

~~**P3003.11 Copper tubing**. Joints between copper or copper alloy tubing or fittings shall comply with Sections P3003.11.1 through P3003.11.3.~~

~~**P3003.11.1 Brazed joints**. All joint surfaces shall be cleaned. An approved flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.~~

~~**P3003.11.2 Mechanical joints**. Mechanical joints shall be installed in accordance with the manufacturer's instructions.~~

~~**P3003.11.3 Soldered joints.** Solder joints shall be made in accordance with the methods of ASTM B 828. Cut tube ends shall be reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned. A flux conforming to ASTM B 813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B 32.~~
(Renumber subsequent sections)

Reason: Brass and Bronze are copper alloys and by combining pipe and tubing section P3003.10, section P3003.11 is no longer necessary. This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: None

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal makes a necessary consolidation of sections and aligns the code with the industry's terminology for materials.

Assembly Action: **None**

Final Hearing Results

RP124-13	**AS**

Code Change No: RP126-13

Original Proposal

Section(s): P3003.6.3. Chapter 44

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3003.6.3 Mechanical joint coupling. Mechanical joint couplings for hubless pipe and fittings shall consist of an elastomeric sealing sleeve and a metallic shield that comply with CISPI 310, ~~or~~ ASTM C1277 or ASTM C1540. The elastomeric sealing sleeve shall conform to ASTM C564 or CSA B602 and shall have ~~be provided with~~ a center stop. Mechanical joint couplings shall be installed in accordance with the manufacturer's installation instructions.

Add standard to Chapter 44:

ASTM
C1540-08 Specification for Heavy Duty Shielded Couplings Joining Hubless Cast-Iron Soil Pipe and Fittings

Reason: This revised language was approved for the 2015 IPC. The phrase "consist of an elastomeric sealing sleeve and a metallic shield that" should be added to provide the same clarification for the IRC. The ASTM C1540 standard is being added and other changes are being made to make this section identical to the same section in the IPC. While it is unlikely that heavy duty shielded couplings would normally be used in residential applications, there is nothing wrong with allowing their use if the installer wishes to use them. Note that ASTM C1540 is already a referenced standard in the IPC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X22 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

ASTM
C1540-~~08~~ 11 Specification for Heavy Duty Shielded Couplings Joining Hubless Cast-Iron Soil Pipe and Fittings

Committee Reason: The medication was made to update the standard year to the current standard year. The overall proposal was approved because it provides another option for the installer.

Assembly Action: **None**

Final Hearing Results

RP126-13 **AM**

Code Change No: RP127-13

Original Proposal

Section(s): P3003.8, P3003.8.1, P3003.8.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Delete without substitution:

~~**P3003.8 Coextruded composite ABS pipe.** Joints between coextruded composite pipe with an ABS outer layer or ABS fittings shall comply with Sections P3003.8.1 and P3003.8.2.~~

~~**P3003.8.1 Mechanical joints.** Mechanical joints on drainage pipe shall be made with an elastomeric seal conforming to ASTM C 1173, ASTM D 3212 or CSA B602. Mechanical joints shall not be installed in above-ground systems, unless otherwise *approved*. Joints shall be installed in accordance with the manufacturer's instructions.~~

~~**P3003.8.2 Solvent cementing.** Joint surfaces shall be clean and free from moisture. Solvent cement that conforms to ASTM D 2235 or CSA B181.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet. Joints shall be made in accordance with ASTM D 2235, ASTM D 2661, ASTM F 628 or CSA B181.1. Solvent- cement joints shall be permitted above or below ground.~~

(Renumber subsequent sections)

Reason: ABS pipe can be made by several different methods. The manufacturing method of an ABS pipe has nothing to do with how the pipe is joined. All forms of ABS pipe are joined by the joining method for ABS pipe, Section P3003.3.2. These sections are redundant and should be deleted. A similar proposal to the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 63 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal does a good cleanup as the information is already provided in another code section.

Assembly Action: **None**

Final Hearing Results

RP127-13	**AS**

Code Change No: RP128-13

Original Proposal

Section(s): P3003.9, P3003.9.1, P3003.9.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Delete without substitution:

~~**P3003.9 Coextruded composite PVC pipe.** Joints between coextruded composite pipe with a PVC outer layer or PVC fittings shall comply with Sections P3003.9.1 and P3003.9.2.~~

~~**P3003.9.1 Mechanical joints.** Mechanical joints on drainage pipe shall be made with an elastomeric seal conforming to ASTM D 3212. Mechanical joints shall not be installed in above-ground systems, unless otherwise *approved*. Joints shall be installed in accordance with the manufacturer's instructions.~~

~~**P3003.9.2 Solvent cementing.** Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D 2564, CSA B137.3 or CSA B181.2 shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and shall be in accordance with ASTM D 2855. Solvent cement joints shall be permitted above or below ground.~~

(Renumber subsequent sections)

Reason: PVC pipe can be made by several different methods. The manufacturing method of a PVC pipe has nothing to do with how the pipe is joined. All forms of PVC pipe are joined by the joining method for PVC pipe, Section P3003.14.2. These sections are redundant and should be deleted. A similar proposal to the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 64 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal does a good cleanup as the information is already provided in another code section.

Assembly Action: **None**

Final Hearing Results

RP128-13 **AS**

Code Change No: RP129-13

Original Proposal

Section(s): P3003.9.2, P3003.14.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org); Michael Cudahy, Plastic Pipe and Fittings Association, representing Plastic Pipe and Fittings Association (mikec@cmservnet.com)

Revise as follows:

P3003.9.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be ~~permitted~~ installed above or below ground.

Exception: A primer shall not be required where both of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM D 2564.
2. The solvent cement is used only for joining PVC drain, waste and vent pipe and fittings in non-pressure applications in sizes up to and including 4 inch (102 mm) in diameter.

P3003.14.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTMD2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be ~~permitted~~ installed above or below ground.

Exception: A primer shall not be required where both of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM D 2564.
2. The solvent cement is used only for joining PVC drain, waste and vent pipe and fittings in non-pressure applications in sizes up to and including 4 inch (102 mm) in diameter

Reason: The addition of this exception was approved for the 2015 IPC. This exception allows for an optional one-step procedure for joining non-pressure DWV PVC piping systems 4" in diameter and below with solvent cement conforming to ASTM D 2564. This method is commonly practiced, and the code should include specific language to indicate when and where the practice is acceptable.

Pressure testing completed by NSF International has shown that solvent cement conforming to ASTM D 2564, when used without primer on PVC DWV pipe and fittings, both solid wall and cell core, generates bonding forces well in excess of what is required for these systems. The strength of the joint often exceeds the pipe and fitting pressure capacity.

ICC Code Development initiative for clearer code language has identified the phrase "shall be permitted" to be nonmandatory language that needs to be eliminated from code text wherever possible.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X23 on the PMGCAC IRC-P list.

Bibliography: NSF International report J-00036842.can be found on the PPFA website, www.ppfahome.org//ICC09/PPFA_NSF_J-00036842.pdf

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

P3003.9.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be installed above or below ground.

Exception: A primer shall not be required where ~~both~~ all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM D 2564.
2. The solvent cement is used only for joining PVC drain, waste and vent pipe and fittings in non-pressure applications in sizes up to and including 4 inch (102 mm) in diameter.

Committee Reason: The modification was made to make the language more clear. The overall proposal was approved because primer is hard to remove from surfaces that you can't have it on. Primer is isn't needed for smaller piping sizes.

Assembly Action: **None**

Final Hearing Results

RP129-13	AM

Code Change No: RP130-13

Original Proposal

Section(s): P3003.18.1, P3003.18.2, P3003.18.3

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

P3003.18.1 Copper or copper-alloy tubing to cast-iron hub pipe. Joints between copper or copper-alloy tubing and cast-iron hub pipe shall be made with a ~~brass~~ copper alloy ferrule or compression joint. The copper or copper-alloy tubing shall be soldered to the ferrule in an approved manner, and the ferrule shall be joined to the cast-iron hub by a caulked joint or a mechanical compression joint.

P3003.18.2 Copper or copper-alloy tubing to galvanized steel pipe. Joints between copper or copper-alloy tubing and galvanized steel pipe shall be made with a ~~brass converter~~ copper alloy fitting or dielectric fitting. The copper tubing shall be soldered to the fitting in an approved manner, and the fitting shall be screwed to the threaded pipe.

P3003.18.3 Cast-iron pipe to galvanized steel or brass pipe. Joints between cast-iron and galvanized steel or ~~brass~~ copper alloy pipe shall be made by either caulked or threaded joints or with an approved adapter fitting.

Reason: This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change in terminology aligns the code with the industry's terminology for this material.

Assembly Action: **None**

Final Hearing Results

RP130-13	**AS**

Code Change No: RP132-13

Original Proposal

Section(s): P3005.1.5

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Delete without substitution:

~~**P3005.1.5 Dead ends.** Dead ends shall be prohibited except where necessary to extend a cleanout or as an *approved* part of a rough-in more than 2 feet (610 mm) in length.~~

(Renumber subsequent sections)

Reason: The IPC no longer has this prohibition. It doesn't make any sense to have to remove unused drainage piping in a building. This would be extremely cost prohibitive for a slab on grade building or where piping is concealed by finished walls and ceilings. This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 66 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The section needs to be removed for consistency with the IPC.

Assembly Action: **None**

Final Hearing Results

RP132-13 **AS**

Code Change No: RP133-13

Original Proposal

Section(s): P3005.2, P3005.2.1, P3005.2.2, P3005.2.3, P3005.2.4, P3005.2.5, P3005.2.6, P3005.2.7, P3005.2.8, P3005.2.9, P3005.2.10, P3005.2.10.1 (New), P3005.2.10.2 (New), P3005.2.11

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Delete and substitute as follows:

~~**P3005.2 Drainage pipe cleanouts.** Drainage pipe cleanouts shall comply with Sections P3005.2.1 through P3005.2.11.~~

> ~~**Exception:** These provisions shall not apply to pressurized *building drains* and *building sewers* that convey the discharge of automatic pumping equipment to a gravity drainage system.~~

~~**P3005.2.1 Materials.** Cleanouts shall be liquid and gas tight. Cleanout plugs shall be brass or plastic.~~

~~**P3005.2.2 Spacing.** Cleanouts shall be installed not more than 100 feet (30 480 mm) apart in horizontal drainage lines measured from the upstream entrance of the cleanout.~~

~~**P3005.2.3 Underground drainage cleanouts.** When installed in underground drains, cleanouts shall be extended vertically to or above finished grade either inside or outside the building.~~

~~**P3005.2.4 Change of direction.** Cleanouts shall be installed at each fitting with a change of direction more than 45 degrees (0.79 rad) in the *building sewer, building drain* and horizontal waste or soil lines. Where more than one change of direction occurs in a run of piping, only one cleanout shall be required in each 40 feet (12 192 mm) of *developed length* of the drainage piping.~~

~~**P3005.2.5 Accessibility.** Cleanouts shall be accessible. The clearance in front of cleanouts shall be not less than 18 inches (457 mm) on 3-inch (76 mm) and larger pipes, and not less than 12 inches (305 mm) on smaller pipes. Concealed cleanouts shall be provided with access of sufficient size to permit removal of the cleanout plug and rodding of the system. Cleanout plugs shall not be concealed by permanent finishing material.~~

~~**P3005.2.6 Base of stacks.** A cleanout shall be provided at the base of each waste or soil stack.~~

~~**P3005.2.7 Building drain and building sewer junction.** There shall be a cleanout near the junction of the *building drain* and *building sewer*. This cleanout shall be either inside or outside the building wall, provided that it is brought up to finish grade or to the lowest floor level. An *approved* two-way cleanout shall be permitted to serve as the required cleanout for both the *building drain* and the *building sewer*. The cleanout at the junction of the *building drain* and *building sewer* shall not be required where a cleanout on a 3 inch (76 mm) or larger diameter soil stack is located within a *developed length* of 10 feet (3048 mm) of the *building drain* and *building sewer* junction.~~

~~**P3005.2.8 Direction of flow.** Cleanouts shall be installed so that the cleanout opens to allow cleaning in the direction of the flow of the drainage line.~~

~~**P3005.2.9 Cleanout size.** Cleanouts shall be the same nominal size as the pipe they serve up to 4 inches (102 mm). For pipes larger than 4 inches (102 mm) nominal size, the size of the cleanout shall be not less than 4 inches (102 mm).~~

~~**Exceptions:**~~

1. ~~"P" trap connections with slip joints or ground joint connections, or stack cleanouts that are not more than one pipe diameter smaller than the drain served, shall be permitted.~~
2. ~~Cast-iron cleanouts sized in accordance with the referenced standards in Table P3002.3, ASTM A 74 for hub and spigot fittings or ASTM A 888 or CISPI 301 for hubless fittings.~~

~~**P3005.2.10 Cleanout equivalent.** A fixture trap or a fixture with integral trap, readily removable without disturbing concealed piping shall be acceptable as a cleanout equivalent.~~

~~**P3005.2.11 Connections to cleanouts prohibited.** Cleanout openings shall not be used for the installation of new fixtures except where *approved* and an acceptable alternate cleanout is provided.~~

P3005.2 Cleanouts required. Cleanouts shall be provided for drainage piping in accordance with Sections P3005.2.1 through P3005.2.11.

P3005.2.1 Horizontal drains and building drains. Horizontal drainage pipes in buildings shall have cleanouts located at intervals of not more than 100 feet (30 480 mm). Building drains shall have cleanouts located at intervals of not more than100 feet (30 480 mm) except where manholes are used instead of cleanouts, the manholes shall be located at intervals of not more than 400 feet (122 m). The interval length shall be measured from the cleanout or manhole opening, along the developed length of the piping to the next drainage fitting providing access for cleaning, the end of the horizontal drain or the end of the building drain.

Exception: Horizontal fixture drain piping serving a nonremovable trap shall not be required to have a cleanout for the section of piping between the trap and the vent connection for such trap.

P3005.2.2 Building sewers. Building sewers smaller than 8 inches (203 mm) shall have cleanouts located at intervals of not more than 100 feet (30 480 mm). Building sewers 8 inches (203 mm) and larger shall have a manhole located not more than 200 feet (60 960 mm) from the junction of the building drain and building sewer and at intervals of not more than 400 feet (122 m). The interval length shall be measured from the cleanout or manhole opening, along the developed length of the piping to the next drainage fitting providing access for cleaning, a manhole or the end of the building sewer.

P3005.2.3 Building drain and building sewer junction. The junction of the building drain and the building sewer shall be served by a cleanout that is located at the junction or within 10 feet (3048 mm) developed length of piping upstream of the junction. For the requirements of this section, the removal of water closet shall not be required to provide cleanout access.

P3005.2.4 Changes of direction. Where a horizontal drainage pipe, a building drain or a building sewer has a change of horizontal direction greater than 45 degrees (0.79 rad), a cleanout shall be installed at the change of direction. Where more than one change of horizontal direction greater than 45 degrees (0.79 rad) occurs within 40 feet (12 192 mm) of developed length of piping, the cleanout installed at the first change of direction shall serve as the cleanout for all changes in direction within that 40 feet (12 192 mm) of developed length of piping.

P3005.2.5 Cleanout size. Cleanouts shall be the same size as the piping served by the cleanout except cleanouts for piping larger than 4 inches (102 mm) need not be larger than 4 inches (102 mm).

Exceptions:

1. A removable P- trap with slip or ground joint connections can serve as a cleanout for drain piping that is one size larger than the P-trap size.
2. Cleanouts located on stacks can be one size smaller than the stack size.
3. The size of cleanouts for cast-iron piping can be in accordance with the referenced standards for cast iron fittings as indicated in Table P3002.3.

P3005.2.6 Cleanout plugs. Cleanout plugs shall be brass, plastic or other approved materials. Cleanout plugs for borosilicate glass piping systems shall be of borosilicate glass. Brass cleanout plugs shall conform to ASTM A74 and shall be limited for use only on metallic piping systems. Plastic cleanout plugs shall conform to the referenced standards for plastic pipe fittings as indicated in Table P3002.3. Cleanout plugs shall have a raised square head, a countersunk square head or a countersunk slot head. Where a cleanout plug will have a trim cover screw installed into the plug, the plug shall be manufactured with a blind end threaded hole for such purpose.

P3005.2.7 Manholes. Manholes and manhole covers shall be of an approved type. Manholes located inside of a building shall have gas-tight covers that require tools for removal.

P3005.2.8 Installation arrangement. The installation arrangement of a cleanout shall enable cleaning of drainage piping only in the direction of drainage flow.

Exceptions:

1. Test tees serving as cleanouts.
2. A two-way cleanout installation that is approved for meeting the requirements of Section P3005.2.3.

P3005.2.9 Required clearance. Cleanouts for 6-inch (153 mm) and smaller piping shall be provided with a clearance of not less than 18 inches (457 mm) from, and perpendicular to, the face of the opening to any obstruction. Cleanouts for 8-inch (203 mm) and larger piping shall be provided with a clearance of not less than 36 inches (914 mm) from, and perpendicular to, the face of the opening to any obstruction.

P3005.2.10 Cleanout access. Required cleanouts shall not be installed in concealed locations. For the purposes of this section, concealed locations include, but are not limited to, the inside of plenums, within walls, within floor/ceiling assemblies, below grade and in crawl spaces where the height from the crawl space floor to the nearest obstruction along the path from the crawl space opening to the cleanout location is less than 24 inches (610 mm). Cleanouts with openings at a finished wall shall have the face of the opening located within 1-1/2 inches (38 mm) of the finished wall surface. Cleanouts located below grade shall be extended to grade level so that the top of the cleanout plug is at or above grade. A cleanout installed in a floor or walkway that will not have a trim cover installed shall have a countersunk plug installed so the top surface of the plug is flush with the finished surface of the floor or walkway.

P3005.2.10.1 Cleanout plug trim covers. Trim covers and access doors for cleanout plugs shall be designed for such purposes. Trim cover fasteners that thread into cleanout plugs shall be corrosion resistant. Cleanout plugs shall not be covered with mortar, plaster or any other permanent material.

P3005.2.10.2 Floor cleanout assemblies. Where it is necessary to protect a cleanout plug from the loads of vehicular traffic, cleanout assemblies in accordance with ASME A112.36.2M shall be installed.

P3005.2.11 Prohibited use. The use of a threaded cleanout opening to add a fixture or extend piping shall be prohibited except where another cleanout of equal size is installed with the required access and clearance.

Reason: Section P3005.2 is disorganized. For example, the second section, Section P3005.2.1, discusses requirements for cleanout plugs. The more significant sections of the section are scattered throughout the remainder of the section in a disorganized fashion. This section has been reorganized in a more logical format for ease of understanding. Note that the requirement for a cleanout at the base of stacks was deleted. The reason for this is that the requirement for cleanout access for horizontal drain pipes includes cleanouts that are placed in stacks. The stack cleanout is not for accessing the stack but just one way to get to the horizontal drain that the stack is connected to. Cleanouts at the base of the stack *can be* installed in the horizontal drain line. It is all about gaining access to the horizontal drain system and not for clearing obstructions in vertical sections of pipe (such as stacks). This proposal to the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 67 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal is a good cleanup of the existing language and will make the IRC consistent with the IRC.

Assembly Action: **None**

Final Hearing Results

RP133-13 **AS**

Code Change No: RP134-13

Original Proposal

Section(s): P3005.2.1

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

P3005.2.1 Materials. Cleanouts shall be liquid and gas tight. Cleanout plugs shall be ~~brass~~ copper alloy or plastic.

Reason: This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change in terminology aligns the code with the industry's terminology for this material.

Assembly Action: **None**

Final Hearing Results

RP134-13	**AS**

Code Change No: RP135-13

Original Proposal

Section(s): P3005.3.3.1

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

P3007.3.3.1 Materials. Pipe and fitting materials shall be constructed of ~~brass,~~ copper, copper alloy, CPVC, ductile iron, PE, or PVC.

Reason: This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change in terminology aligns the code with the industry's terminology for this material.

Assembly Action: **None**

Final Hearing Results

RP135-13	**AS**

Code Change No: RP136-13

Original Proposal

Section(s): P3007.3.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3007.3.2 Sump pit. The sump pit shall be not less than 18 inches (457 mm) in diameter and not less than 24 inches (610 mm) in depth, unless otherwise approved. The pit shall be accessible and located such that all drainage flows into the pit by gravity. The sump pit shall be constructed of tile, concrete, steel, plastic or other approved materials. The pit bottom shall be solid and provide permanent support for the pump. The sump pit shall be fitted with a gas-tight removable cover that is installed above grade level or floor level, or not more than 2 inches (51 mm) below grade or floor level, The cover shall be adequate to support anticipated loads in the area of use. The sump pit shall be vented in accordance with Chapter 31.

Reason: The cover for sump pits needs to be located at or near grade. Otherwise, there is nothing to prevent an installation where the cover is located way below grade in a well such that in order to service the pump, someone has to stand on his head in order to just remove the sump pit cover. Requiring the cover to be not more than 2 inches below grade or floor level eliminates this problem. This change still allows the sump cover to be any dimension above grade.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X24 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This will allow flooring to be added to an existing building floor that has a sump.

Assembly Action: **None**

Final Hearing Results

RP136-13	**AS**

Code Change No: RP137-13

Original Proposal

Section(s): P3008.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3008.1 Sewage backflow. Where plumbing fixtures are installed on a floor with a finished floor elevation below the elevation of the manhole cover of the next upstream manhole in the *public sewer,* such fixtures shall be protected by a backwater valve installed in the *building drain,* or horizontal *branch* serving such fixtures. Plumbing fixtures installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the *public sewer* shall not discharge through a backwater valve.

> **Exception:** In existing buildings, fixtures above the elevation of the manhole cover of the next upstream manhole in the *public sewer* shall not be prohibited from discharging through a backwater valve.

Reason: The addition of this exception was approved for the 2015 IPC. Building owners who have experienced a sewage backup in a building that was caused by problems in an existing public sewer main should be allowed to install a backwater valve in the building drain or sewer to protect their property. Having a basement full of raw sewage is an experience that no one wants to repeat. The requirement that only those fixtures that are on a floor elevation below the top of the next upstream manhole in the public sewer are allowed to discharge through the BWV, places a significant impediment for the building owner to protect his property against an event over which currently he has no control. For example, consider an existing two story hotel with multiple stacks connecting to a building drain. The fixtures on the lower floor are connected to the same building drain. The existing code language would require that all of the stacks be rerouted to connect downstream of a backwater valve installed to serve only the fixtures on the lower floor level. This would be cost prohibitive to do. The simpler solution would be to just install the BWV in the building drain or sewer. However, as the code is currently written, this is prohibited. The main reason why the code prohibits this is so that the discharge from upper floors does not flood the lower floor when the building sewer is backed up. If the BWV serves only the lower elevation fixtures, it would be closed when the sewer backed up and any discharge from higher elevation fixtures could not flow out of the lower elevation fixtures. BWV's are not known to create problems in a building sewer; rather, they provide protection from sewage backups and provide peace of mind for the building owners and occupants. Although the current code requirement can be easily accomplished in new construction, it is a hardship for those building owners who need protection for existing buildings. Imagine the work that would be necessary to separate the building drain into different sub building drains in an existing building with piping under slab floors.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X25 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This makes the IRC consistent with the IPC. The concept makes sense.

Assembly Action: **None**

Final Hearing Results

RP137-13	AS

Code Change No: RP138-13

Original Proposal

Section(s): P3009.13.2, P3009.13.2.1 (New)

Proponent: Jeremy Brown, NSF International (brown@nsf.org)

Revise as follows:

P3009.13.2 Disinfection and treatment. ~~Gray water shall be disinfected by an approved method that employs one or more disinfectants such as chlorine, iodine or ozone that are recommended for use with the pipes, fittings and equipment by the manufacturer of the pipes, fittings and equipment.~~ Nonpotable water collected onsite for reuse shall be disinfected, treated or both to provide the quality of water needed for the intended end use application. Where the intended end use application does not have requirements for the quality of water, disinfection and treatment of water collected onsite for reuse shall not be required. Onsite collected nonpotable water that contains untreated gray water ans is collected in reserviors shall be retained for not more than 24 hours.

P3009.13.2.1 Gray water used for fixture flushing. Gray water used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350.

Add new standard to Chapter 44:

NSF
350-11 Onsite Residential and Commercial Water Reuse Treatment Systems

Reason: The proposed requirements were approved for the 2015 IPC. In addition to microbiological contaminants that need disinfection, gray water contains organic compounds, suspended solids, turbidity, surfactants, and other contaminants that have the potential to accumulate and negatively impact the functioning of water closets and urinals if not treated properly. NSF/ANSI-350 *Onsite Residential and Commercial Water Reuse Treatment Systems* establishes the minimum materials, design and construction, and performance requirements for systems that disinfect and treat gray water for non-potable reuse applications, including flushing water for closets and urinals. Rigorous testing with gray water as defined by the standard ensures the treatment systems meet strict effluent quality requirements suitable for reuse applications, along with providing protection of public health and the environment. NSF 350 is currently referenced in the IgCC and IAPMO Green Supplement.

Cost Impact: Because on-site water reuse treatment systems are not required, this code change proposal will not increase the cost of construction.

Analysis: Standard NSF 350 is currently in the 2012 IgCC.

Public Hearing Results

For staff analysis of the content of NSF 350 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides necessary guidance for nonpotable water that is not treated.

Assembly Action: **None**

Final Hearing Results

RP138-13	**AS**

Code Change No: RP139-13

Original Proposal

Section(s): P3009.13.4

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

~~**P3009.13.4 Coloring.** The gray water shall be dyed blue or green with a food grade vegetable dye before such water is supplied to the fixtures.~~

Reason: This deletion of language was approved for the 2015 IPC. This is an archaic requirement that dates back to when gray water was first considered for flushing water closets and urinals. The reason for abandoning the practice was because the dye stained building components when there was splashing of the dyed gray water. The means of identifying gray water is the purple coloring of the piping system.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X32 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This section needs removal because the coloring can cause a lot of problems with finishes in the building.

Assembly Action: **None**

Final Hearing Results

RP139-13 **AS**

Code Change No: RP140-13

Original Proposal

Section(s): P3009.19

Proponent: Gary Kozan, CPD, Ridgeway Plumbing, representing Florida Association of Plumbing Heating Cooling Contractors (garyk@ridgewayplumbing.com)

Revise as follows:

P3009.19 Joints between drainage piping and water closets. Joints between drainage piping and water closets or similar fixtures shall be made by means of a closet flange or a waste connector and sealing gasket compatible with the drainage system material, securely fastened to a structurally firm base. ~~The inside diameter of the drainage pipe shall not be used as a socket fitting for a 4-inch by 3-inch (102 mm by 76 mm) closet flange.~~ The joint shall be bolted, with an approved gasket flange to fixture connection complying with ASME A112.4.3 or setting compound between the fixture and the closet flange or waste connector and sealing gasket. The waste connector and sealing gasket joint shall comply with the joint-tightness test of ASME A112.4.3 and shall be installed in accordance with the manufacturer's installation instructions.

Reason: For over forty years, and with tens of millions installed, inside-fit closet flanges have a proven track record as the best deterrent to leaking or rocking toilets. Inside-fit flanges are particularly useful on slab-on-grade construction, as they do not require an annular space around the closet stub. The flange can be set at the time of WC installation, eliminating the guesswork of determining finished floor.

Inside-fit flanges are manufactured with a carefully designed taper to compensate for any variations in the pipe ID. They do not leak. They do not fail. In many parts of the country, the current IRC prohibition has been largely ignored because it makes no sense and is actually counterproductive to proper water closet installations.

The other model plumbing code (UPC) does not prohibit inside-fit flanges. Neither does the IPC. In fact, an attempt to expand the prohibition of inside flanges into the IPC was roundly rejected at last year's final action hearing. Eliminating this unreasonable prohibition will simplify WC installations, eliminate leaks, and improve the overall quality of the plumbing system.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This language needs removal because this practice has become accepted for many years.

Assembly Action: **None**

Final Hearing Results

RP140-13	**AS**

Code Change No: RP141-13

Original Proposal

Section(s): P3010 (New), Chapter 44

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Add new text as follows:

SECTION P3010
REPLACEMENT OF UNDERGROUND SEWERS
BY PIPE BURSTING METHODS

P3010.1 General. This section shall govern the replacement of existing building sewer piping by pipe-bursting methods.

P3010.2 Applicability. The replacement of building sewer piping by pipe bursting methods shall be limited to gravity drainage piping of sizes 6 inches and smaller. The replacement piping shall be of the same nominal size as the existing piping.

P3010.3 Pre-installation inspection. The existing piping sections to be replaced shall be inspected internally by a recorded video camera survey. The survey shall include notations of the position of cleanouts and the depth of connections to the existing piping.

P3010.4 Pipe. The replacement piping shall be of extra high molecular weight PE3408 material and shall be manufactured with an SDR of 17 and in compliance with ASTM F 714.

P3010.5 Pipe fittings. Pipe fittings to be connected to the replacement piping shall be of extra high molecular weight PE3408 material and shall be manufactured with an SDR of 17 and in compliance with ASTM D2683.

P3010.6 Cleanouts. Where the existing building sewer did not have cleanouts meeting the requirements of this code, cleanout fittings shall be installed as required by this code.

P3010.7 Post-installation inspection. The completed replacement piping section shall be inspected internally by a recorded video camera survey. The video survey shall be reviewed and approved by the code official prior to pressure testing of the replacement piping system.

P3010.8 Pressure testing. The replacement piping system as well as the connections to the replacement piping shall be tested in accordance with Section P2503.4.

Add standards to Chapter 44 as follows:

ASTM F 714-06a Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) based on Outside Diameter.

D2683-04 Standard Specification for Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.

Reason: The IRC lacks coverage concerning the replacement of sewer systems by pipe bursting methods. These methods are being widely used throughout the country. Proper guidance concerning this type of replacement provides additional value to the code. This proposal to the 2015 IPC was Approved as Modified by Public Comment.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 69 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: None

Public Comments

Public Comment 2:

Michael Cudahy of Plastic Pipe and Fitting Association (PPFA) representing the Plastic Pipe and Fitting Association (PPFA) (mikec@cmservnet.com) requests Approval as Modified by this Public Comment

Modify the proposal as follows:

P3010.4 Pipe. The replacement pip<u>e</u>~~ing~~ shall be ~~of extra high molecular weight~~ <u>made of a high density polyethylene (HDPE) that conforms to cell classification number</u> ~~PE3408~~ ~~material~~ <u>PE3608, PE4608 or PE4710 as indicated in ASTM F714.</u> <u>The pipe</u> ~~and~~ shall be manufactured with an SDR of 17 and in compliance with ASTM F 714.

P3010.5 Pipe fittings. Pipe fittings to be connected to the replacement piping shall be <u>made</u> of ~~extra high molecular weight~~ <u>a high density polyethylene (HDPE) that conforms to cell classification number</u> ~~PE3408~~ ~~material~~ <u>PE3608, PE4608 or PE4710 as indicated in ASTM F714. The pipe fittings</u> shall be manufactured with an SDR of 17 and in compliance with ASTM D2683.

Commenter's Reason: The section is a welcome addition to the code, but is in need of several updates to reflect current polyethylene nomenclature and materials.

The phrase "extra high molecular weight" has no meaning in this code, nor in the way the pipe resin is specified, and should be deleted. Changes to the methodology on how the classification numbers for polyethylene resin are specified have made the designation "PE3408" obsolete. Resins that could be used in this application include; PE3608, PE4608, and PE4710, which are the modern classification designations. SDR 17 pipe is the thinnest wall pipe that can be used.

Final Hearing Results

RP141-13 AMPC2

Code Change No: RP142-13

Original Proposal

Section(s): P3101.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3101.2 Trap seal protection. The plumbing system shall be provided with a system of vent piping that will ~~permit~~ allow the admission or emission of air so that the liquid seal of any fixture trap shall not be subjected to a ~~pneumatic~~ pressure differential of more than 1 inch of water column (249 Pa).

Reason: The term **"**pneumatic" is confusing word in this section's context. Pressure is pressure whether it is water or air. This proposal to the 2015 IPC was Approved as Submitted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 70 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change is necessary so the IRC is in alignment with what the IPC says.

Assembly Action: **None**

Final Hearing Results

RP142-13	**AS**

Code Change No: RP143-13

Original Proposal

Section(s): P3103.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3103.1 Roof extension. Open vent pipes that extend through a roof shall be terminated not less than [NUMBER] inches (mm) above the roof or 6 inches (152 mm) above the anticipated snow accumulation, whichever is greater ~~, except that~~. Where a roof is to be used for assembly or as a promenade, observation deck, sunbathing deck or similar purposes ~~for any purpose other than weather protection~~, ~~the~~ open vent pipes ~~extensions~~ shall terminate not less than 7 feet (2134 mm) above the roof.

Reason: This revised language was approved for the 2015 IPC. The current language literally states that if a roof is to be used for anything other than weather protection, then vent pipes must be extended 7 feet above the roof. If there is equipment on the roof (HVAC units, grease duct fans, etc.), the roof is being used for another purpose, but, that is not the intent of the section. The intent of the section is that when the roof can be "normally occupied" such as where the roof is being used as an assembly area, a promenade, observation deck or sunbathing deck, that is when the vent pipes must be extended. The revised language makes the intent of the section more clear.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X26 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal make a necessary clarification that the roof has to be occupied before extensions of vents are required. This aligns the IRC with the IPC.

Assembly Action: **None**

Final Hearing Results

RP143-13	**AS**

Code Change No: RP144-13

Original Proposal

Section(s): P3103.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3103.2 Frost closure. Where the 97.5-percent value for outside design temperature is 0°F (-18°C) or less, ~~every~~ vent extensions through a roof or wall shall be not less than 3 inches (76 mm) in diameter. Any increase in the size of the vent shall be made not less than 1 foot inside the ~~structure at a point not less than 1 foot (305 mm) below the roof or inside the wall~~ thermal envelope of the building.

Reason: This revised language was approved for the 2015 IPC. Requiring that the size transition occur at least 1 foot below the roof accomplishes nothing if it is just as cold below the roof as it is outdoors. The intent is to prevent frost blockage in the vent by making the part that is exposed to freezing temperatures at least 3 inches in diameter. The part of the vent that is less than 3 inches in size must be located in an area that stays above freezing. In most attics, the attic temperatures are very near the outdoor temperature , therefore, putting the size transition in the cold attic will subject the smaller pipe to freezing temperatures which is exactly what this section intended to avoid. The transition from a smaller size vent pipe to the 3 inch (or larger size) needs to occur at least one foot inside of the building's thermal envelope in order to avoid frost blockage.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X27 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change will prevent vent pipes from freezing in colder climates.

Assembly Action: **None**

Final Hearing Results

RP144-13	**AS**

Code Change No: RP145-13

Original Proposal

Section(s): P3111.2.2

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

P3111.2.2 Connection. ~~The combination waste and vent pipe shall connect to a horizontal drain that is vented or a vent shall connect to the combination waste and vent. The vent connecting to the combination waste and vent pipe shall extend vertically not less than 6 inches (152 mm) above the flood level rim of the highest fixture being vented before offsetting horizontally.~~ The combination waste and vent system shall be provided with a dry vent connected at any point within the system or the system shall connect to a horizontal drain that serves vented fixtures located on the same floor. Combination waste and vent systems connecting to building drains receiving only the discharge from a one or more stacks shall be provided with a dry vent. The vent connection to the combination waste and vent pipe shall extend vertically to a point not less than 6 inches (152 mm) above the flood level rim of the highest fixture being vented before offsetting horizontally.

Reason: The current section language is not clear about what type of a vent must connect to a combination waste and vent system. The section also did not provide coverage for where only stacks connected to a building drain that had a combination waste and vent system connected to it. The majority of this language comes from the IPC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 71 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal makes a good clarification and aligns the IRC with the IPC.

Assembly Action: **None**

Final Hearing Results

RP145-13 **AS**

Code Change No: RP146-13

Original Proposal

Section(s): P3114.5

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3114.5 Access and ventilation. Access shall be provided to all air admittance valves. ~~The~~ Such valves shall be installed in a loca~~ted~~tion ~~within a ventilated space~~ that allows air to enter the valve.

Reason: This revised language was approved for the 2015 IPC. The question is frequently raised: "What constitutes a ventilated space?" The proposed language simply requires the AAVs to be located where air can enter the valve. For example, an AAV installed in wall cavity would require some means to allow air to enter the cavity.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X29 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal makes a good clarification and aligns the IRC with the IPC.

Assembly Action: **None**

Final Hearing Results

RP146-13	**AS**

Code Change No: RP147-13

Original Proposal

Section(s): P3114.8

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3114.8 Prohibited installations. *Air admittance valves* ~~without an engineered design~~ shall not be used to vent sumps or tanks <u>except where the vent system for the sump or tank has been designed by an engineer.</u> ~~of any type~~.

Reason: The "without an engineered design" was an attempt by the AAV manufacturers to allow AAVs to be used on sumps and tanks if special piping arrangements were used to "prevent" a positive pressure condition from occurring. The code does not address these special piping arrangements and the intent was to have an engineer become involved to design the special venting arrangement. A committee modification made on-the-fly, got the wording wrong. The revised wording allows the use of an AAV in sump and tank vent systems that are designed by an engineer.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 72 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal corrects an improper committee modification and clarifies the alternative method for venting a sump.

Assembly Action: **None**

Final Hearing Results

RP147-13	**AS**

Code Change No: RP148-13

Original Proposal

Section(s): P3201.1

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing the Copper Development Association (penniefeehan@me.com)

Revise as follows:

P3201.1 Design of traps. Traps shall be of standard design, shall have smooth uniform internal waterways, shall be self cleaning and shall not have interior partitions except where integral with the fixture. Traps shall be constructed of lead, cast iron, ~~cast or drawn brass~~ copper and copper alloy or approved plastic. ~~Tubular brass~~ Copper or copper alloy traps shall be not less than No. 20 gage (0.8 mm) thickness. Solid connections, slip joints and couplings shall be permitted to be used on the trap inlet, trap outlet, or within the trap seal. Slip joints shall be accessible.

Reason: This proposal eliminates outdated language and provides the appropriate terminology and correct information to the end user.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The change in terminology aligns the code with the industry's terminology for this material.

Assembly Action: **None**

Final Hearing Results

RP148-13	AS

Code Change No: RP150-13

Original Proposal

Section(s): P3201.2, P3201.2.1 (New), P3201.2.2 (New), P3201.2.3 (New), P3201.2.3 (New), Chapter 44

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3201.2 Trap seals ~~and trap seal protection~~. Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm). ~~Traps for floor drains shall be fitted with a trap primer or shall be fitted with a trap primer or shall be of the deep seal design.Trap seal primer valves shall connect to the trap at a point above the level of the trap seal.~~

<u>**P3201.2.1 Trap seal protection.** Traps seals of emergency floor drain traps and traps subject to evaporation shall be protected by one of the methods in Sections P3201.2.1 through P3201.2.4.</u>

<u>**P3201.2.1 Potable water supplied trap seal primer valve.** A potable water supplied trap seal primer valve shall supply water to the trap. Water supplied trap seal primer valves shall conform to ASSE 1018. The discharge pipe from the trap seal primer valve shall connect to the trap above the trap seal on the inlet side of the trap.</u>

<u>**P3201.2.2 Reclaimed or gray water supplied trap seal primer valve.** A reclaimed or gray water supplied trap seal primer valve shall supply water to the trap. Water supplied trap seal primer valves shall conform to ASSE 1018. The quality of reclaimed or gray water supplied to trap seal primer valves shall be in accordance with the requirements of the manufacturer of the trap seal primer valve. The discharge pipe from the trap seal primer valve shall connect to the trap above the trap seal on the inlet side of the trap.</u>

<u>**P3201.2.3 Waste water supplied trap primer device.** A waste water supplied trap primer device shall supply water to the trap. Waste water supplied trap primer devices shall conform to ASSE 1044. The discharge pipe from the trap seal primer device shall connect to the trap above the trap seal on the inlet side of the trap.</u>

<u>**P32001.2.4 Barrier type trap seal protection device.** A barrier-type trap seal protection device shall protect the floor drain trap seal from evaporation. Barrier type floor drain trap seal protection devices shall conform to ASSE 1072. The devices shall be installed in accordance with the manufacturer's instructions.</u>

Add new standard to Chapter 44 as follows:

ASSE

<u>1072-07</u> <u>Performance Requirements for Barrier Type Floor Drain Tap Seal Protection Devices</u>

Reason: This revised and new language was approved for the 2015 IPC. This modification adds language to identify all of the methods available for protecting the trap seal of emergency floor drain traps or traps subject to evaporation. The four methods available are: water supplied trap seal primers, waste supplied trap primer devices, trap seal protection devices, and reclaimed water. A water supplied trap seal primer that is unrestricted can discharge 300 to 500 gallons a year to a trap. A 2" trap requires less than ½ gallon a year to maintain the trap seal. There are now devices available that limit the amount of water discharging to 8 gallons per year. This is another water conservation measure.

Waste supplied trap primer devices divert water from a sink or lavatory to the trap. There is no need to limit the flow on these devices since they use waste water.

Trap seal protection devices do not require any water. They are tested for providing protection of the trap seal.

Reclaimed water can also be used to maintain the trap seal. Since the water is reclaimed, there is no need to limit the annual discharge.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. X30 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, ASSE 1072 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1. 2013.

Public Hearing Results

For staff analysis of the content of ASSE 1072 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The proposal aligns the IRC with the IPC.

Assembly Action: **None**

Final Hearing Results

RP150-13 **AS**

Code Change No: RP152-13

Original Proposal

Section(s): P3201.7, Table P3201.7

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

P3201.7 Size of fixture traps. ~~Fixture~~ Trap sizes <u>for plumbing fixtures</u> shall be ~~sufficient to drain the fixture rapidly and~~ ~~not less than the size~~ <u>as</u> indicated in Table P3201.7. <u>Where the tailpiece of a plumbing fixture is larger than that indicated in Table P3201.7, the trap size shall be the same nominal size as the fixture tailpiece.</u> A trap shall not be larger than the drainage pipe into which the trap discharges.

TABLE P3201.7
REQUIRED SIZES OF TRAPS ~~AND TRAP ARMS~~ FOR PLUMBING FIXTURES

PLUMBING FIXTURE	<u>REQUIRED</u> TRAP SIZE ~~MINIMUM~~ (inches)
Lavatory	1 ¼ <u>or 1 1/2</u>
~~Water closet~~	~~Note a~~

~~Consult fixture standards for trap dimensions of specific bowls.~~

(Portions of table not shown remain unchanged)

Reason: "Sufficient to drain the fixture rapidly" is unenforceable language. The trap sizes in the table should not be minimum sizes but required sizes because too large of trap doesn't allow for proper scouring and cleaning action in the trap. The term "trap arm" is slang. As a water closet has an integral trap, it should not be listed in the table so footnote a was deleted.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 73 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides necessary clarity for minimum trap size.

Assembly Action: **None**

Public Comments

Public Comment:

David Beahm, Building Official Warren County Virginia, representing VA Plumbing & Mechanical Inspectors Association (VPMIA) and VA Building Code Officials Association (VBCOA) (dbeahm@warrencountyva.net) requests As Modified by this Public Comment.

Modify the proposal as follows:

TABLE P3201.7
REQUIRED SIZES OF TRAPS FOR PLUMBING FIXTURES

PLUMBING FIXTURE	~~REQUIRED~~ TRAP SIZE MINIMUM (inches)
Lavatory	1 ¼ ~~or 1 ½~~

Commenter's Reason: The code change proposal as approved by the committee would in fact, further confuse what is intended by this section and table. By adding the word "required" and removing the word "minimum" in the table indicates this is what is required, but which is required for a lavatory, 1 ¼ or 1 ½ or possibly something larger because the added language indicates that if the tail piece is larger, the trap must be the same nominal size. This single item would now require three different sizes for the trap. By removing the proposed table language "required" and leaving "minimum in addition to removing the new size for the lavatory trap of 1 ½ the unintended consequences would not require three different sizes.

Final Hearing Results

RP152-13 AMPC

Code Change No: RP153-13

Original Proposal

Section(s): Table P3302.1

Proponent: David Hall CFM, Georgetown, Texas representing the ICC PMG Code Action Committee (Dave.Hall@georgetown.org)

Revise as follows:

TABLE P3302.1
SUBSOIL DRAIN PIPE

MATERIAL	STANDARD
Polyvinyl chloride (PVC) Plastic pipe (type sewer pipe, <u>SDR 35</u> PS25, PS50 or PS100)	ASTM D 2729; <u>ASTM D 3034</u>; ASTM F 891; CSA B182.2; CSA B182.4

(Portions of table not shown are unchanged)

Reason: This type of pipe material is readily available in perforated form and should be allowed to be used in the application. It is commonly being used in these applications. A similar proposal to the IPC was Approved as Submitted.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes. For PMGCAC member reference, this was item no. 74 on the PMGCAC IRC-P list.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The standard needs to be in the code as this material is commonly used. This change aligns the IRC with the IPC.

Assembly Action: **None**

Final Hearing Results

RP153-13	**AS**

Code Change No: RP154-13

Original Proposal

Section(s): P2708.2 (New)

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing self (JBEngineer@aol.com)

Add new text as follows:

P2708.2 Shower drain. Shower drains shall have a outlet size of not less than 1-1/2 inches [38 mm] in diameter.

(Renumber subsequent section)

Reason: There is no statement in the IRC listing the size of a shower drain. The proposed size is consistent with the International Plumbing Code.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: The code needs to indicate the minimum trap size for a shower drain.

Assembly Action: **None**

Final Hearing Results

RP154-13 **AS**

Code Change No: RP155-13

Original Proposal

Section(s): P2905.9.1.2

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing self (JBEngineer@aol.com)

Revise as follows:

P2905.9.1.2 Solvent cementing. Joint surfaces shall be clean and free from moisture~~,~~. Joints shall be made in accordance with the pipe, fitting or solvent cement manufacturer's installation instructions. Where such instructions require a primer to be used, ~~and~~ an *approved* primer shall be applied, ~~.~~ and a solvent cement, orange in color and conforming to ASTM F 493, shall be applied to joint surfaces. Where such instructions allow for a one step solvent cement, yellow or red in color and conforming to ASTM F 493, to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied. The joint shall be made while the cement is wet, and in accordance with ASTM D 2846 or ASTM F 493. Solvent cement joints shall be permitted above or below ground.

~~**Exception:** A primer is not required where all of the following conditions apply:~~

1. ~~The solvent cement used is third-party certified as conforming to ASTM F 493.~~
2. ~~The solvent cement used is yellow in color.~~
3. ~~The solvent cement is used only for joining ½ inch (12.7 mm) through 2 inch (51 mm) diameter CPVC pipe and fittings.~~
4. ~~The CPVC pipe and fittings are manufactured in accordance with ASTM D 2846.~~

Reason: This section is currently very convoluted. The requirements can be simplified by referencing the pipe manufacturer's installation instructions. The installation instructions are part of the listing which is required by the code. This will also recognize changes to the listing of the joining method, rather than requiring constant changing of this section.

The current requirements are incorrect since UL lists ASTM F442 for joining with one-step solvent cement. Furthermore, UL lists the joining for pipe up to 3 inch in diameter. Neither requirement is addressed in the current code text. UL also requires the solvent cement to be red in color. Hence, when doing a multipurpose piping system, the CPVC solvent cement would have to be red in color.

Cost Impact: This change does not increase the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal makes a needed cleanup of the language and informs the installer that a primer is not needed for smaller pipe sizes.

Assembly Action: **None**

Final Hearing Results

RP155-13 **AS**

Code Change No: RP156-13

Original Proposal

Section(s): P3007.5

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing self (JBEngineer@aol.com)

Revise as follows:

P3007.5 Macerating toilet systems <u>and pumped waste systems</u>. Macerating toilet systems <u>and pumped waste systems</u> shall comply with CSA B45.9 or ASME A112.3.4 and shall be installed in accordance with the manufacturer's installation instructions.

Reason: The macerating toilet system standard has been harmonized between ASME and CSA. During the harmonization process, pumped waste systems were added to the standard. Pumped waste systems are used to add fixtures to existing dwelling units. They are commonly used to add handicapped accessible fixtures to an accessible level of the dwelling unit.

Cost Impact: This change does not increase the cost of construction.

Analysis: The proponent indicated in his proposal submission that the standards shown in this code section, CSA B45.9 or ASME A112.3.4, have been recently harmonized into standard ASME A112.3.4/CSA B45.9. The proponent's request for updating the standard for this section has been processed and will be included in a proposal for all standard updates that will be heard by the ADMIN committee in proposal ADM 62-13.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides for a needed method for installing plumbing fixtures for "aging in place" situations.

Assembly Action: **None**

Final Hearing Results

RP156-13	**AS**

Code Change No: F43-13 Part IV

Original Proposal

Section(s): IFC 505.1; IBC [F] 501.2; IPMC [F] 304.3; IRC R319.1

THIS IS A 4 PART CODE CHANGE. PARTS I THROUGH III WILL BE HEARD BY THE IFC CODE DEVELOPMENT COMMITTEE. PART IV WILL BE HEARD BY THE IRC B/E CODE DEVELOPMENT COMMITTEE. ALL 4 PARTS WILL BE HEARD AS SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Adolf Zubia. Chairman IAFC Fire and Life Safety Section, representing ICC Fire Code Action Committee (azumiamia@yahoo.com)

PART IV – INTERNATIONAL RESIDENTIAL CODE

Revise as follows:

R319.1 Address ~~numbers~~ identification. Buildings shall ~~have~~ be provided with approved address ~~numbers, building numbers or approved building~~ identification. The address identification shall be legible and placed in a position that is ~~plainly legible and~~ visible from the street or road fronting the property. ~~These numbers~~ Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers ~~or alphabetical letters~~. Numbers shall not be spelled out. ~~Numbers~~ Each character shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of ~~½~~ 0.5 inch (12.7 mm). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

Reason: When the address numbers are difficult to find, read or identify, the result is a delay in the emergency response, whether it be for fire, medical assistance, or law enforcement. Address numbers which are spelled out in alpha characters, add to this difficultly in quickly responding to emergency situations.

This proposal will require that the address numbers are numeric and clearly identifiable. There are correlating sections in the IBC, IFC, IPMC and IRC with regard to address identification.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

PART IV – IRC Building
Committee Action: **Approved as Modified**

Modify the proposal as follows:

R319.1 Address identification. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 0.5 inch (12.7 mm). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

Committee Reason: The committee approved this proposed code change and modification to be consistent with prior actions by other committees on other parts of this proposal. Similar requirements are also contained in the International Property Maintenance Code and it is important to also have similar requirements for new buildings. This assures that visitors and fire fighters can identify structures.

Assembly Action: **None**

Final Hearing Results

F43-13 Part IV	**AM**

Code Change No: CE4-13, Part II

Original Proposal

Section(s): C101.4.1 through C101.4.5, C202, C401.2.1, Chapter 5 (CE) (NEW), R101.4, R202 (IRC N1101.9); R402.3.6 (IRC N1102.3.6), Chapter 5 (RE) (NEW) (IRC N1106 (NEW))

Proponent: Brenda A. Thompson, Clark County Development Services, Clark County, Nevada, representing Sustainable/Energy/High Performance Code Action Committee (bat@clarkcounty.gov)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC – RESIDENTIAL PROVISIONS

Revise as follows:

R101.4 Applicability. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

~~**R101.4.1 Existing buildings.** Except as specified in this chapter, this code shall not be used to require the removal, *alteration* or abandonment of, nor prevent the continued use and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code.~~

~~**R101.4.2 Historic buildings.** Any building or structure that is listed in the State or National Register of Historic Places; designated as a historic property under local or state designation law or survey; certified as a contributing resource with a National Register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the National or State Registers of Historic Places either individually or as a contributing building to a historic district by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, are exempt from this code.~~

~~**R101.4.3 (N1101.3) Additions, alterations, renovations or repairs.** Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.~~

~~**Exception:** The following need not comply provided the energy use of the building is not increased:~~

1. ~~Storm windows installed over existing fenestration.~~
2. ~~Glass only replacements in an existing sash and frame.~~
3. ~~Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.~~
4. ~~Construction where the existing roof, wall or floor cavity is not exposed.~~

5. ~~Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.~~
6. ~~Replacement of existing doors that separate *conditioned space* from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a *conditioned space* from the exterior shall not be removed,~~
7. ~~Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.~~
8. ~~Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.~~

~~**R101.4.4 Change in occupancy or use.** Spaces undergoing a change in occupancy that would result in an increase in demand for either fossil fuel or electrical energy shall comply with this code.~~

~~**R101.4.5 (N1101.4) Change in space conditioning.** Any nonconditioned space that is altered to become *conditioned space* shall be required to be brought into full compliance with this code.~~

~~R101.4.6~~ <u>R101.4.1</u> Mixed occupancy. Where a building includes both *residential* and *commercial* occupancies, each occupancy shall be separately considered and meet the applicable provisions of the IECC—Commercial and Residential Provisions.

Delete without substitution as follows:

~~**R402.3.6 (N1102.3.6) Replacement fenestration .** Where some or all of an existing fenestration unit is replaced with a new fenestration product, including sash and glazing, the replacement fenestration unit shall meet the applicable requirements for *U*-factor and SHGC in Table R402.1.1.~~

Add new text as follows:

<u>CHAPTER 5 (RE)</u>
<u>EXISTING BUILDINGS</u>

<u>SECTION R501 (N1106)</u>
<u>GENERAL</u>

<u>**R501.1 (N1106.1) Scope.** The provisions of this chapter shall control the *alteration*, *repair*, *addition* and change of occupancy of existing buildings and structures.</u>

<u>**R501.2 (N1106.2) Existing buildings.** Except as specified in this chapter, this code shall not be used to require the removal, *alteration* or abandonment of, nor prevent the continued use and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code.</u>

<u>**R501.3 (N1106.3) Maintenance.** Buildings and structures, and parts thereof, shall be maintained in a safe and sanitary condition. Devices or and systems which are required by this code shall be maintained in conformance with the code edition under which installed. The owner or the owner's designated agent shall be responsible for the maintenance of buildings and structures. The requirements of this chapter shall not provide the basis for removal or abrogation of energy conservation, fire protection and safety systems and devices in existing structures.</u>

<u>**R501.4 (N1106.4) Compliance.** *Alterations*, *repairs*, *additions* and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions for *alterations*, *repairs*, *additions* and changes of occupancy or relocation, respectively, in the *International Residential Code, International Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code* and NFPA 70.</u>

R501.5 (N1106.5) New and replacement materials. Except as otherwise required or permitted by this code, materials permitted by the applicable code for new construction shall be used. Like materials shall be permitted for repairs, provided no hazard to life, health or property is created. Hazardous materials shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.

R501.6 (N1106.6) Historic buildings. *Historic buildings* are exempt from this code.

SECTION R502 (N1107)
ADDITIONS

R502.1 (N1107.1) General. Additions to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code. Additions shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

SECTION R503 (N1108)
ALTERATIONS

R503.1 (N1108.1) Alterations. *Alterations* to any building or structure shall comply with the requirements of the code for new construction. *Alterations* shall be such that the existing building or structure is no less conforming with the provisions of this code than the existing building or structure was prior to the *alteration*. Alterations to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code. Alterations shall not create an unsafe or hazardous condition or overload existing building systems.

> **Exception:** The following alterations need not comply with the requirements for new construction provided the energy use of the building is not increased:
>
> 1. Storm windows installed over existing fenestration.
> 2. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
> 3. Construction where the existing roof, wall or floor cavity is not exposed.
> 4. Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.

R503.2 (N1108.2) Change in space conditioning. Any nonconditioned or low energy space that is altered to become *conditioned space* shall be required to be brought into full compliance with this code.

R503.3. (N1108.3) Replacement fenestration . Where some or all of an existing fenestration unit is replaced with a new fenestration product, including sash and glazing, the replacement fenestration unit shall meet the applicable requirements for *U*-factor and SHGC in Table R402.1.1.

SECTION R504 (N1109)
REPAIRS

R504.1 (N1109.1) General. Buildings and structures, and parts thereof, shall be repaired in compliance with Section C501.3 and this section. Work on nondamaged components that is necessary for the required *repair* of damaged components shall be considered part of the *repair* and shall not be subject to the requirements for *alterations* in this chapter. Routine maintenance required by Section C501.3, ordinary repairs exempt from *permit*, and abatement of wear due to normal service conditions shall not be subject to the requirements for *repairs* in this section.

R504.2 (N1109.2) Application. For the purposes of this code, the following shall be considered repairs.

1. Glass only replacements in an existing sash and frame.
2. Roof repairs where neither the sheathing nor the insulation is exposed.
3. Repairs where only the bulb and/or ballast within the existing luminaires in a space are replaced provided that the replacement does not increase the installed interior lighting power.

SECTION R505 (N1110)
CHANGE OF OCCUPANCY OR USE

R505.1 (N1110.1) General. Spaces undergoing a change in occupancy that would result in an increase in demand for either fossil fuel or electrical energy shall comply with this code.

Add new definitions as follows:

HISTORIC BUILDINGS. Buildings that are listed in or eligible for listing in the National Register of Historic Places, or designated as historic under an appropriate state or local law.

REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance.

(PART II): This proposal was submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the SEHPCAC has held 3 open meetings and over 30 workgroup calls which included members of the SEHPCAC as well as any interested party to discuss and debate proposed changes and public comments. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx.

See the Reason statement for Part I of this proposal.

When the IECC was divided into two parallel documents, the provisions for existing buildings were copied nearly word for word into both C104 and R104. Therefore the IECC residential proposal mirrors the IECC Commercial proposal with 3 distinct differences.

1. ASHRAE 90.1 is not address as the standard is not applicable to 'residential' buildings.
2. Section R402.3.6 on replacement fenestration is added as it only applies to residential.
3. What is Item 3 in Section C504.2 does not appear in the residential version. This Item addresses maintaining door vestibules and/or revolving doors where such doors separate conditioned from non-conditioned space. Vestibules are a requirement in the IECC Commercial new construction provisions – but are not found in the residential. Therefore requiring maintenance under the residential provisions is inappropriate.

Cost Impact: The code change proposal will not increase the cost of construction. The proposal is an editorial relocation of existing text. There will be no impact on the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: This code change proposal creates a needed framework for energy conservation requirements for existing buildings. This consolidates all existing building requirements in a single location and provides a framework for future development of regulations for existing buildings.

Assembly Action: **None**

Public Comments

Public Comment 2:

Maureen Traxler, City of Seattle Department of Planning & Development, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R501.3 (N1106.3) Maintenance. Buildings and structures, and parts thereof, shall be maintained in a safe and sanitary condition. Devices or and systems which are required by this code shall be maintained in conformance with the code edition under which installed. The owner or the owner's ~~designated~~ authorized agent shall be responsible for the maintenance of buildings and structures. The requirements of this chapter shall not provide the basis for removal or abrogation of energy conservation, fire protection and safety systems and devices in existing structures.

(Portions of the code change proposal not shown remain unchanged.)

Commenter's Reason: This modification makes these 2 sections of the IECC consistent with ADM22-13, all 5 parts of which were approved as submitted at the Committee Action Hearings. ADM22 consistently replaced "designated agent" with "authorized agent" throughout the International Codes.

Final Hearing Results

CE4-13, Part II	**AMPC2**

Code Change No: CE15-13 Part II

Original Proposal

Section(s): C101.4.3, C202 (NEW), C402.2.1.1, R101.4.3 (IRC N1101.3), R202 (NEW) (IRC N1101.9 (NEW))

Proponents: Michael. D. Fischer, Kellen Company, representing Center for the Polyurethanes Industry (mfischer@kellencompany.com); Michael D. Fischer, Kellen Company, representing Polyisocyanurate Insulation Manufacturers Association; Brian Dean, ICF International, representing Energy Efficient Codes Coalition; Garrett Stone, Brickfield Burchette Ritts & Stone, PC; Jeff Harris, Alliance to Save Energy; Harry Misuriello, American Council for an Energy-Efficient Economy; and Bill Prindle, Energy Efficient Codes Coalition.

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC-RESIDENTIAL PROVISIONS

Revise as follows:

R101.4.3 (N1101.3) Additions, alterations, renovations or repairs. Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

Exception: The following need not comply provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
3. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
4. Construction where the existing roof, wall or floor cavity is not exposed.
5. ~~Reroofing for roofs where neither the sheathing nor the insulation is exposed.~~ Roof recover or roof repair.
6. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.
~~6~~7. Replacement of existing doors that separate *conditioned space* from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a *conditioned space* from the exterior shall not be removed,
~~7~~8. Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.
~~8~~9. Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.

Add new definitions as follows:

SECTION R202 (N1101.9)
GENERAL DEFINITIONS

[B] REROOFING. The process of recovering or replacing an existing *roof covering*. See "Roof recover" and "Roof replacement."

[B] ROOF RECOVER. The process of installing an additional *roof covering* over a prepared existing *roof covering* without removing the existing *roof covering*.

[B] ROOF REPAIR. Reconstruction or renewal of any part of an existing roof for the purposes of its maintenance.

[B] ROOF REPLACEMENT. The process of removing the existing *roof covering*, repairing any damaged substrate and installing a new *roof covering*.

Reason: Fischer (Part II) The exceptions to applicability of the IECC for reroofing are unclear, and include confusing language. This proposal includes definitions used in the roofing chapter of the IBC in order to better scope the appropriate exceptions to the envelope requirements in the IECC.

The proposed language clarifies that roof replacement triggers the envelope requirements, but only when the roof assembly is part of the thermal envelope and the insulation is entirely above the roof deck. If the insulation is located within an attic cavity, roof replacement itself does not trigger insulation upgrades. The proposal also makes it clear that recover and repairs are not intended to trigger energy upgrades, while ensuring that the opportunity to add roof insulation when the roof is replaced is not missed.

Reason: Dean, Harris, Misuriello, Prindle, Stone: The purpose of this code change is to clarify code requirements related to roofs on existing buildings by distinguishing between roof repairs, roof recovering, and roof replacement. The proposal creates new definitions for each of these actions (Chapter 2), clarifies that repair and recover are exceptions to the code (section C101.4.3), and clarifies that when certain roof replacements occur (new section C402.2.1.1), that the roof must meet the roof insulation requirements in Table C402.1.2 or C402.2.

While the code generally requires additions, alterations, renovations or repairs to comply with the code, the specific application in many instances may not be entirely clear or consistently interpreted and enforced. Roof replacements are a good example of this issue. This code proposal is intended to resolve any interpretation issues related to roof replacement and ensure that proper insulation is installed when the opportunity is presented. It is important that opportunities to improve the efficiency of existing buildings are seized when presented and the replacement of roofs is one such important opportunity.

Cost Impact: The code change proposal will not increase the cost of construction.

Note: The four proposed definitions are terms defined in the IBC, the term 'roof replacement' is also found in the IgCC. The definitions found in the other codes are the same as proposed here.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: This language improves the clarity of the code regarding roofing repair and replacement.

Assembly Action: **None**

Final Hearing Results

CE15-13 Part II **AS**

Code Change No: CE23-13 Part II

Original Proposal

Section(s): C101.5.2, C402.1, R101.5.2 (IRC N1101.6), R402.1 (IRC N1102.1)

Proponent: Brenda A. Thompson, Clark County Development Services, Clark County, Nevada, representing Sustainable/Energy/High Performance Code Action Committee (bat@clarkcounty.gov)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC-RESIDENTIAL PROVISIONS

Revise as follows:

~~**R101.5.2 (N1101.6) Low energy buildings.** The following buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this code shall be exempt from the *building thermal envelope* provisions of this code:~~

~~1. Those with a peak design rate of energy usage less than 3.4 Btu/h ft^2 (10.7 W/m^2) or 1.0 watt/ft^2 (10.7 W/m^2) of floor area for space conditioning purposes.~~
~~2. Those that do not contain *conditioned space*.~~

Revise as follows:

R402.1 (N1102.1) General (Prescriptive). The building thermal envelope shall meet the requirements of Sections R402.1.1 through R402.1.4.

> **Exception:** The following low energy buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this section shall be exempt from the *building thermal envelope* provisions of Section R402.
>
> 1. Those with a peak design rate of energy usage less than 3.4 Btu/h ft^2 (10.7 W/m^2) or 1.0 watt/ft^2 (10.7 W/m^2) of floor area for space conditioning purposes.
> 2. Those that do not contain *conditioned space*.

Reason: This proposal was submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the SEHPCAC has held 3 open meetings and over 30 workgroup calls which included members of the SEHPCAC as well as any interested party to discuss and debate proposed changes and public comments. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx.

The proposal moves an existing exception found in each Administration chapter to the building thermal envelop provisions in C402 and R402. Chapter 1 should not be the location of specific code requirements nor exceptions to such requirements. Chapter 1 will be the location where exceptions to the scope of the code are provided. However such is not the case with these exceptions. These exceptions are for only the envelope and these buildings still need to comply with the requirements for lighting and HVAC systems.

Locating the exceptions at the beginning of the building envelope provisions places the exception immediately with the relevant requirements. This location does reduce the potential for people to interpret that low energy buildings are exempt from the code.

The proposed text is reworded slightly to reflect its location as an exception with Section 402. The change is editorial.

Cost Impact: This code change proposal will not increase the cost of construction. This is editorial in nature.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART I – IECC - Commercial
Committee Action: **Approved as Submitted**

Committee Reason: Moving this language from Chapter 1 to Chapter 4 is appropriate, and makes the code organization more logical, and the code easier to understand.

Assembly Action: **None**

Final Hearing Results

CE23-13 Part II **AS**

Code Change No: CE37-13, Part II

Original Proposal

Section(s): C103.2.1 (NEW), R103.2.1 (NEW)

Proponent: Robby Schwarz, EnergyLogic, Inc., (robby@nrglogic.com)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC-RESIDENTIAL PROVISIONS

Add new text as follows:

<u>**R103.2.1. Thermal envelope definition.** The building's thermal envelope shall be defined on the construction documents as the alignment of the air barrier and insulation systems separating conditioned space from unconditioned space. Where it is not possible to define the alignment of the air barrier and thermal barrier systems on the construction documents inspection shall determine success of accomplishing this requirement.</u>

Reason: The single most important energy and performance aspect of the home is the buildings thermal envelope and the alignment of the air barrier and thermal barrier systems. It is crucial that the design professional demonstrate an understanding of location of the thermal envelope and that they make an effort to draw its location so that the construction personnel can successfully implement the construction of the building in accordance with the code and the specifications that have been drawn. The air sealing details help make this possible but understanding where the details will be implemented helps ensure better implementation and enforcement.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Disapproved**

Committee Reason: This is confusing language that would serve to make application of the code more difficult.

Assembly Action: **None**

Public Comments

Public Comment:

Robby Schwarz, EnergyLogic, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

<u>**R103.2.1. Thermal envelope depiction.** The building's thermal envelope shall be represented on the construction documents.</u>

Commenter's Reason: Representing the building's thermal envelope on the construction documents ensures that the design professional of the building understands how the thermal envelope will separate conditioned space from unconditioned space. This is a crucial step in ensuring not only the energy efficiency of the building but also the safety, durability, and comfort created in the structure.

The simplification of the requirement allows for flexibility in how the building's thermal envelope is depicted but clearly forces the design professional to understand how what they are drawing will ultimately be constructed.

Final Hearing Results

CE37-13, Part II AMPC

Code Change No: CE49-13, Part III

Original Proposal

Section(s): C202 (New), R202 (New) (IRC N1101.9 (New)), IPC 202 (New)

THIS IS A 3 PART CODE CHANGE PROPOSAL. PARTS I AND II WILL BE HEARD BY THE IECC COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AS 2 SEPARATE CODE CHANGES. PART III WILL BE HEARD BY THE IECC RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Proponent: Greg Towsley, LEED AP BD+C Grundfos representing Grundfos (gtowsley@grundfos.com)

PART III – IECC-RESIDENTIAL PROVISIONS

Add new definition as follows:

SECTION R202 (N1101.9)
GENERAL DEFINITIONS

CIRCULATING HOT WATER SYSTEM. A specifically designed water distribution system where one or more pumps are operated in the service hot water piping to circulate heated water from the water-heating equipment to fixtures and back to the water-heating equipment.

Reason: A definition of a "circulating hot water system" does not exist in the code, yet it is referenced in the IRC and other ICC codes. This definition brings clarity to how a "circulating hot water system" should be designed and operated. In the codes and sections where "circulating hot water system" is used, this definition would also reduce the probability of confusion between hot water systems used for space heating or tempered water. Currently, the only place that the term CIRCULATING HOT WATER SYSTEM shows up in the code is IECC Section C404.6, IPC [E] 607.2.1 and IECC Section R403.4.1 (IRC N1103.4.1). Other proposals by other proponents will most likely be adding language that uses this term so it is important to have the term defined.

As referenced in CHAPTER 50 - SERVICE WATER HEATING of *ASHRAE Handbook-HVAC Applications* (2011, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.), "Some recirculation-loop systems...are equipped with circulating pumps to force water through the piping and back to the water heater, thus keeping water in the piping hot." Adding this definition in the code will be consistent with industry's understanding.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Parts I and II of this code changes were heard by the Commercial Energy Conservation Code Development Committee and Part III was heard by the Residential Energy Conservation Code Development Committee.

PART III – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: This is an important definition to have in the code because these types of systems are used in buildings.

Assembly Action: **None**

Public Comments

Public Comment:

Greg Towsley, Grundfos representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

CIRCULATING HOT WATER SYSTEM. A specifically designed water distribution system where one or more pumps are operated in the service hot water piping to circulate heated water from the water-heating equipment to ~~fixtures~~ the *fixture supply* and back to the water-heating equipment.

Commenter's Reason: The initial proposal was not intended to mean to recirculate to the actual fixture, but to supply the pipe serving the fixture. This modification clarifies the intent and identifies the correct connecting point ("fixture supply") between the circulation line and the actual fixture which is already defined in the IRC.

Final Hearing Results

CE49-13, Part III AMPC

Code Change No: CE50-13, Part II

Original Proposal

Section(s): C202 (NEW), R202 (NEW) (IRC N1101.9 (NEW)), IRC 202 (NEW)

Proponent: Brenda A. Thompson, Clark County Development Services, Clark County, Nevada, representing Sustainable/Energy/High Performance Code Action Committee (bat@clarkcounty.gov)

THIS IS A 3 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE, PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART III WILL BE HEARD BY THE IRC BUILDING CODE DEVELOPMENT COMMITTEE.

PART II – IECC – RESIDENTIAL PROVISIONS

Add new definition as follows:

SECTION R202 (N1101.9)
GENERAL DEFINITIONS

CLIMATE ZONE. A geographical region that has ~~been~~ assigned climatic criteria as specified in this code.

Reason: This proposal was submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the SEHPCAC has held 3 open meetings and over 30 workgroup calls which included members of the SEHPCAC as well as any interested party to discuss and debate proposed changes and public comments. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx.

Reasons for this specific proposal:

There are increasing numbers of proposals in which the term 'climate zone' is used in the proposed code text. This has primarily occurred in the *International Building Code* and the *International Green Construction Code*. In 2012 at least 8 proposals heard in Dallas included the term. The Code Development Committees generally tried to make sure that each approved action included that it was Climate Zones as established in the IECC.

The SEHPCAC submitted public comments to G147-12 and G149-12 to remove individual references in the text of the IBC stating that Climate Zones 'as established in the IECC' and proposed the inclusion in Chapter 2 of the IBC the following definition of Climate Zone.

CLIMATE ZONE. A geographic region that have been assigned climatic criteria as specified in Chapters 3CE and 3RE of the *International Energy Conservation Code.*

The public comments were approved by the membership and the definition is established in the IBC.

The proposed definition for the IECC is a further simplification of the version in the IBC as the extended reference isn't needed. The SEHPCAC reviewed the other codes which are part of Group B. Only the International Residential Code uses the term Climate Zone. This is addressed in Part III of this proposal. The intent of the public comments to the IBC was to simplify the reference each time Climate Zone is used to those zones 'defined' in the IECC. The issue is that 'Climate Zones' are established in the IECC, but there is no definition.

In Cycle C, the SEHPCAC will submit a code change to the IgCC to add a definition of Climate Zone. This will allow all future references to Climate Zone to be simple and not have to say "as established in the International Energy Conservation Code.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee; Part II was heard by the Residential Energy Conservation Code Development Committee and Part III was heard by the Residential Building Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Modified**

Modify the proposal as follows:

CLIMATE ZONE. A geographic region ~~that has been assigned~~ based on climatic criteria as specified in this code.

Committee Reason: This definition is needed in the energy code. The modification is to correct inappropriate implication that climatic criteria is chosen for a region.

Assembly Action: **None**

Final Hearing Results

CE50-13, Part II **AM**

Code Change No: CE51-13 Part II

Original Proposal

Section(s): C202, R202 (IRC N1101.9)

Proponent: Shaunna Mozingo, City of Cherry Hills Village, representing Colorado Chapter of ICC, Inc (smozingo@coloradocode.net), Brent Ursenbach, Salt Lake County, representing Utah Chapter ICC and Utah Association of Plumbing and Mechanical Officials Chapter ICC (bursenbach@slco.org)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC RESIDENTIAL PROVISIONS

Delete and substitute as follows:

SECTION R202 (N1101.9)
GENERAL DEFINITIONS

~~**CONDITIONED SPACE.** For energy purposes, space within a building that is provided with heating and/or cooling *equipment* or systems capable of maintaining, through design or heat loss/gain, 50°F (10°C) during the heating season and 85°F (29°C) during the cooling season, or communicates directly with a *conditioned space*. For mechanical purposes, an area, room or space being heated or cooled by any *equipment* or *appliance*.~~

CONDITIONED SPACE. An area, room or space that is enclosed within the building thermal envelope and that is directly heated or cooled or that is indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate thru openings with conditioned spaces, where they are separated from conditioned spaces by un-insulated walls, floors or ceilings, or where they contain un-insulated ducts, piping or other sources of heating or cooling.

Reason: (Mozingo) Currently the definition for conditioned space differs in each code. The proposed change to the definition would bring the IECC and IRC in line with what was approved in Group A for the 2015 IMC as proposal M2-12. This proposal shows the modifications that were made by the committee and then went on to the consent agenda as there were no public comments received. This proposed change is similar to the definition in ASHRAE 90.1 – 2010.
(Ursenbach) (**Part I)** Confusion exists between the definitions in the IMC, IRC and IECC. The IECC attempts to define how a space may be indirectly conditioned; however, further clarification is needed. The definition for conditioned space as proposed above is the definition approved in the Group A hearings for the IMC under M2-12. This proposed change is similar to the definition in ASHRAE 90.1 – 2010. **(Part II)** Confusion exists between the definitions in the IMC, IRC and IECC. The IECC attempts to define how a space may be indirectly conditioned; however, further clarification is needed. The definition for conditioned space as proposed above is the definition approved for the IMC in the Group A hearings under M2-12. This proposed change is similar to the definition in ASHRAE 90.1 – 2010.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: Disapproved

Committee Reason: The present definition of conditioned space is appropriate for the IECC.

Assembly Action: None

Final Hearing Results

CE51-13 Part II	**AS**

Code Change No: CE52-13 Part II

Original Proposal

Section(s): C202 (NEW), R202 (NEW) (IRC N1101.9 (NEW))

Proponent: Jay Crandell, ARES Consulting, representing American Chemistry Council- Foam Sheathing Committee (jcrandell@aresconsulting.biz Eric Makela, Britt/Makela Group, Inc., representing Northwest Energy Codes Group (Eric@BrittMakela.com), Steve Ferguson, ASHRAE (sferguson@ashrae.org), Theresa A. Weston, PhD., DuPont Building Innovations (theresa.a.weston@usa.dupont.com)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC – RESIDENTIAL PROVISIONS

Add new definition as follows:

SECTION R202 (N1101.9)
GENERAL DEFINITIONS

CONTINUOUS INSULATION (ci): Insulating material that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building envelope.

Reason: (Crandell) This proposal provides a needed definition for continuous insulation (a term presently used in the IRC and IECC). The proposed definition is from the 2010 edition of ASHRAE 90.1 and provides an effective definition that is inclusive of all types of continuous insulation materials, including spray foam, insulated siding, foam sheathing, and others.
(Makela) The term continuous insulation was introduced to the commercial provisions of the IECC in 2006. Unfortunately, the term has never been defined in the code. Since its introduction into the code, questions have arisen concerning what is and is not considered continuous insulation. For example, if furring strips are installed on a mass wall and insulation is installed between the furring strips over the face of the wall, is this considered continuous insulation or insulation installed in the cavity? This proposal provides a reasonable definition for continuous insulation that doesn't prohibit different types of materials from being used. The definition uses the term "Insulating material" which can be a variety of products including wood. The R-value requirements for walls in Table C402.2 provides the minimum R-values for the insulating material and as long at as the material can be demonstrated to meet the minimum R-value it can be considered an insulating material. The key to maintaining the effectiveness of continuous insulation is to reduce or eliminate thermal bridging, which this definition achieves.
(Ferguson) In table C402.2, the term continuous insulation has been added, though it is undefined. This adds a definition for the term which is identical to the already existing definition in ANSI/ASHRAE/IES Standard 90.1-2010
(Weston) This proposal adds a definition for continuous insulation. Continuous insulation is used within the code, but the definition is missing. The proposed definition is consistent with that in ASHRAE 90.1

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: The term "continuous insulation" is used extensively in the code and therefore a definition is needed.

Assembly Action: **None**

Final Hearing Results

CE52-13 Part II	**AS**

Code Change No: CE61-13 Part II

Original Proposal

Section(s): Table C301.1, Table R301.1

Proponent: Jeremiah Williams, U.S. Department of Energy (jeremiah.williams@ee.doe.gov)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC-RESIDENTIAL PROVISIONS

Revise as follows:

TABLE R301.1
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY

COLORADO
5B Adams
6B Alamosa
5B Arapahoe
6B Archuleta
4B Baca
5B Bent
5B Boulder
5B Broomfield
6B Chaffee

(Portions of Table not shown remain unchanged)
Reason: Broomfield County is a consolidated city-county and a suburb of Denver. Constituted on November 15, 2001, it was apparently missing from the county database(s) used to establish the IECC's county-zone mappings. See http://en.wikipedia.org/wiki/Broomfield, Colorado.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: This makes a needed correction on the climate zone maps, to add a county that was missing from the list.

Assembly Action: **None**

Final Hearing Results

CE61-13 Part II **AS**

Code Change No: CE62-13 Part II

Original Proposal

Section(s): Figure C301.1, Table C301.1, Figure R301.1 (IRC Figure N1101.10), Table R301.1 (IRC Table N1101.10)

Proponent: Shirley Ellis, Energy Systems Laboratory, Texas A&M Engineering Experiment Station, Texas A&M University System (shirleyellis@tamu.edu)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART I – IECC-COMMERCIAL PROVISIONS

Revise as follows: End the Warm-Humid white line at the line separating the Dry (B) and Moist (A) moisture zones.

PART II – IECC-RESIDENTIAL PROVISIONS

Revise as follows: End the Warm-Humid white line at the line separating the Dry (B) and Moist (A) moisture zones.

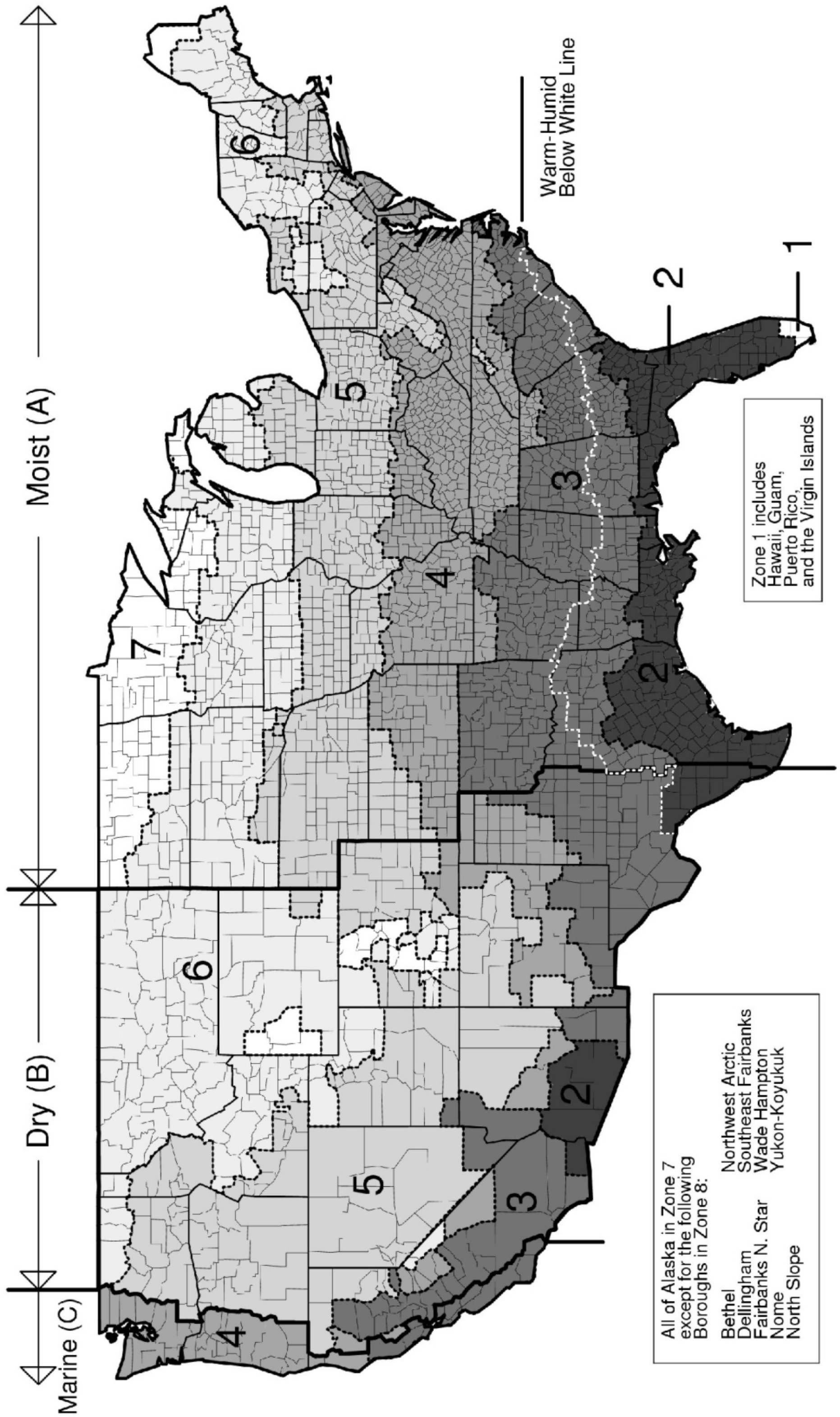


FIGURE R301.1 (N1101.10)
CLIMATE ZONES

Revise as follows: Remove the asterisk (*) from the following Counties, thereby removing the warm-humid location designation.

TABLE R301.1 (N1101.10)
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY

TEXAS

Bandera*
Dimmit*
Edwards*
Frio*
Kinney*
La Salle*
Maverick*
Medina*
Real*
Uvalde*
Val Verde*
Webb*
Zapata*
Zavala*

Reason: These 14 counties are in the Dry (B) moisture zone and therefore do not need to meet the requirements for Warm-Humid locations. This is based on the following studies *Calculation of Precipitation Data and Climate Zones for ASHRAE Standard 169, Prepared by: Sonia Zhang and Didier Thevenard* and *Numerical Logics Inc. and Steve Cornick National Research Council of Canada.* ASHRAE Std 169 is also working on revisions to these Figures and Tables based on the above studies.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: This makes a needed correction to the climate zone map in Texas, to fix a previous mistake.

Assembly Action: **None**

Final Hearing Results

CE62-13 Part II AS

Code Change No: CE63-13 Part II

Original Proposal

Section(s): C303.1.1, R303.1.1 (IRC N1101.12.1)

Proponent: Matt Dobson, Vinyl Siding Institute (mdobson@vinylsiding.org)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC-RESIDENTIAL PROVISIONS

Revise as follows:

R303.1.1 (N1101.12.1) Building thermal envelope insulation. An *R*-value identification mark shall be applied by the manufacturer to each piece of *building thermal envelope* insulation 12 inches (305 mm) or greater in width. Alternately, the insulation installers shall provide a certification listing the type, manufacturer and *R*-value of insulation installed in each element of the *building thermal envelope*. For blown or sprayed insulation (fiberglass and cellulose), the initial installed thickness, settled thickness, settled *R*-value, installed density, coverage area and number of bags installed shall be *listed* on the certification. For sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and *R*-value of installed thickness shall be *listed* on the certification. <u>For insulated siding the *R-value* shall be labeled on the product's package and shall be *listed* on the certification.</u> The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.

Reason: This change will help building officials and energy specialists/raters identify insulated siding, including its specified R-value based on ASTM C1363 testing. Currently, labeling or identification marks are not specified for insulated siding, but have been developed and established since the publication of the last energy code. For more information, go to www.insulatedsiding.info.

Cost Impact: The code change proposal will have minimal cost impact as many insulated siding products are on the market and are certified and labeled in the way.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: This adds needed information regarding labeling of insulated siding.

Assembly Action: **None**

Final Hearing Results

CE63-13 Part II AS

Code Change No: CE65-13 Part II

Original Proposal

Section(s): C303.1.3, Chapter 5, R303.1.3 (IRC N1101.12.3), Chapter 5

Proponent: Joseph R. Hetzel, P.E., Thomas Associates, Inc., representing the Door & Access Systems Manufacturers Association (DASMA) International (jhetzel@thomasamc.com)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC-RESIDENTIAL PROVISIONS

Revise as follows:

R303.1.3 (N1101.12.3) Fenestration product rating. U-factors of fenestration products (windows, doors and skylights) shall be determined in accordance with NFRC 100 ~~by an accredited, independent laboratory, and labeled and certified by the manufacturer~~.

> **Exception:** Where required, garage door U-factors shall be determined in accordance with either NFRC 100 or ANSI/DASMA 105.

U-factors shall be determined by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled U-factor shall be assigned a default *U*-factor from Table R303.1.3(l) or R303.1.3(2). The solar heat gain coefficient (SHGC) and *visible transmittance* (VT) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled SHGC or VT shall be assigned a default SHGC or VT from Table R303.1.3(3).

Add new standard to Chapter 5 as follows:

DASMA

ANSI/DASMA 105-2004 Test Method for Thermal Transmittance and Air Infiltration of Garage Doors

Reason: Although NFRC 100 has been updated to include procedures for garage doors, there are instances where companies do not and cannot manufacture the 7' by 7' door size required to validate the NFRC 100 simulation by testing to NFRC 102. Research has shown that garage doors tested to ANSI/DASMA 105 result in U-factor values comparable to NFRC 100/NFRC 102. "Where required" indicates that the Exception only applies where garage doors are affected by conditioned space since there may be detached, non-conditioned structures where U-factor is not needed. We have separated the laboratory and labeling/certifying information since it applies to all doors including garage doors.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

For staff analysis of the content of ANSI/DASMA 105-2004 relative to CP#28, Section 3.6, please visit:

http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf"

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: The proposal installs an exception that is needed for garage doors.

Assembly Action: **None**

Final Hearing Results

CE65-13 Part II **AS**

Code Change No: CE66-13, Part II

Original Proposal

Section(s): C301.4 (NEW), R301.4 (NEW) (IRC N1101.10.3 (NEW)), R406 (NEW) (IRC N1106 (NEW))

Proponent: Craig Conner, Building Quality, representing self (craig.conner@mac.com), Agustin Mujica, Levitt Homes, Puerto Rico

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC-RESIDENTIAL PROVISIONS

Add new text as follows:

R301.4 (N1101.10.3) Tropical climate zone. The tropical climate zone shall be defined as:

1. Hawaii, Puerto Rico, Guam, American Samoa, U.S. Virgin Islands, Commonwealth of Northern Mariana Islands, and
2. Islands in the area between the Tropic of Cancer and the Tropic of Capricorn.

R406. (N1106) Tropic zone option. *Residential buildings* in the tropical zone shall be deemed to comply with this Chapter where the following conditions are met:

1. Not more than one half of the *occupied space* is air conditioned.
2. The *occupied space* is not heated.
3. Solar, wind, or other renewable energy source supplies at least 80 percent of the energy for service water heating.
4. Glazing in *conditioned space* has a *solar heat gain coefficient* of less than or equal to 0.40, or has an overhang with a projection factor equal to or greater than 0.30.
5. Permanently installed lighting is in accordance with Section R404.
6. The exterior roof surface complies with one of the options in Table C402.2.1.1, or the roof has insulation with an *R-value* of R-15 or greater. If present, attics above the insulation are vented and attics below the insulation are unvented.
7. Roof surfaces have a minimum slope of one quarter inch per foot of run. The finished roof does not have water accumulation areas.
8. Operable fenestration provides ventilation area equal to a minimum of 14% of the floor area in each room. Alternatively, equivalent ventilation is provided by a ventilation fan.
9. Bedrooms with walls facing two different directions have operable fenestration facing two directions.
10. Interior doors to bedrooms are capable of being secured in the open position.
11. A ceiling fan or ceiling fan rough-in is provided for bedrooms and the largest non-bedroom space.

Reason: This creates a Chapter 4 alternative for residences in the tropical climates as a new section. Tropical areas are quite different from the US mainland in climate, construction techniques, traditional construction, and energy prices. The IECC treats tropical climates as if they were simply a southern extension of the US mainland. Traditional residences, especially the less expensive residences, have evolved inexpensive ways to work with the tropical climates to provide comfortable interior spaces without the need for substantial space conditioning. Tropical electrical prices, usually over 20 cents per hWh, provide a substantial incentive for energy conservation. Solar water heating works particularly well in tropical climates.

This proposed change is meant to add a simple option for a newly defined climate zone, the "tropical zone". The area between the Tropic of Cancer and the Tropic of Capricorn is the area between 23.5° northern and southern latitude of the equator. A zone that recognizes the unusually constant and unique climate of this region would help make the ICC Codes more of an “international code”.

Traditional construction, especially with solar water heating, is usually more energy efficient than the construction style assumed in the IECC, as is shown by an analysis done for Puerto Rico.[1] Using energy efficient versions of traditional construction saves more energy and is much more cost-effective than pushing those in tropical climates to adopt mainland construction practices. Traditional tropical construction focuses on greatly reducing or eliminating the need for space conditioning by making a living space that is comfortable without space conditioning.

The requirements proposed here are based on informal conversations with those who live in tropical regions. The proponent does not live in the proposed tropical zone and will continue to solicit the input of those who do. Some items were taken from energy codes proposed or in place in the tropical regions. This is not intended as a replacement for existing topical codes, such as the energy codes recently adopted in Hawaii and Puerto Rico. This is meant as a simple climate-appropriate alternative for tropical climates.

Reason by item:
#1 Air conditioning only a portion of the residence is common in some residences and saves energy compared to air conditioning the whole occupied space.
#2 Heating is seldom needed.
#3 Consistently warm temperatures and high power costs make solar water heating very attractive. Solar water heating is widely used. Water heating is often 35% or more of the residential energy use.[1,2] Substantial energy savings come from solar water heating.
#4 Limiting solar gains and providing ventilation is the energy focus for windows. Window U-factor has little impact. Window air tightness is of little value when the important feature of the windows is their ability to be operable and provide ventilation.
#5 High efficiency lighting makes sense with tropical energy prices.
#6 This references the “cool roof” provisions. This is similar to an option in Hawaii’s code and the Puerto Rico Energy Center’s analysis. Insulation is less valuable in mild climates where the outside temperature is often comfortable as an inside temperature.
#7 Even flat roofs need to drain.
#8 Ventilation provided by tropical winds makes occupied spaces more comfortable. 14% is an option for unconditioned residences in Hawaii’s new energy code.
#9 When bedroom walls facing two directions are available, ventilation on both walls will be more effective.
#10 Interior doors should not block bedroom ventilation. This is similar to Hawaii’s new energy code and recommended by the Puerto Rico Energy Center.
#11 Ceiling fans increase comfort without conditioning the air. This is similar to Hawaii’s new energy code and recommended by the Puerto Rico Energy Center.

1. “Energy Modeling of Low Income Residencies“ by C. G. Morales & A. J. Malavé
http://library.witpress.com/pages/PaperInfo.asp?PaperID=22547
The paper above is not free. The proponents will send a Puerto Rico Energy Center presentation done for DOE that summarizes that work to anyone who requests this by email.
2. Typical Hawaiin energy use for hot water: http://www.hawaiienergy.com/16/water-heating

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: This installs energy saving options appropriate for a unique climate zone.

Assembly Action: **None**

Public Comments

Public Comment 1:

Craig Conner, Building Quality, representing self; Howard C. Wiig, Energy Analyst, Department of Business, Economic Development, and Tourism, representing State of Hawaii, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

R406. (N1106) Tropic zone option. *Residential buildings* in the tropical zone <u>at elevations below 2400 feet above sea level </u>shall be deemed to comply with this Chapter where the following conditions are met:

1. Not more than one half of the *occupied space* is air conditioned.
2. The *occupied space* is not heated.
3. Solar, wind, or other renewable energy source supplies at least 80 percent of the energy for service water heating.
4. Glazing in *conditioned space* has a *solar heat gain coefficient* of less than or equal to 0.40, or has an overhang with a projection factor equal to or greater than 0.30.
5. Permanently installed lighting is in accordance with Section R404.
6. The exterior roof surface complies with one of the options in Table C402.2.1.1, or the roof<u>/ceiling</u> has insulation with an *R-value* of R-15 or greater. If present, attics above the insulation are vented and attics below the insulation are unvented.
7. Roof surfaces have a minimum slope of one quarter inch per foot of run. The finished roof does not have water accumulation areas.
8. Operable fenestration provides ventilation area equal to a minimum of 14% of the floor area in each room. Alternatively, equivalent ventilation is provided by a ventilation fan.
9. Bedrooms with <u>exterior </u>walls facing two different directions have operable fenestration<u> on exterior walls</u> facing two directions.
10. Interior doors to bedrooms are capable of being secured in the open position.
11. A ceiling fan or ceiling fan rough-in is provided for bedrooms and the largest non-bedroom space.

(Portions of proposal not show remain unchanged)

Commenter's Reason: The climate in tropical islands is uniquely constant, with moderate temperatures year around. Parts I and II of CE66 create a tropical climate zone, which is a subset of IECC climate zone 1. Part II also creates a residential "deemed to comply" option for the tropical island climate based on their traditional residential construction.

Part II of this change was approved by the residential IECC committee with the reason that the "*options are appropriate to a unique climate zone*". Part II included the option for traditional construction that lowers energy use by taking advantage of the moderate tropical climate. The modifications to Part II in this public comment do not apply to Part I, so Part I is simply "as submitted".

These changes were made based on comments received, both at the hearing and afterwards.

1. The first modification deals with high elevations in Hawaii, where a 2400 feet above sea level limit was added. Commenters noted the difference between inland Hawaiian climates at higher elevations and the coastal Hawaiian climates. (By far the highest tropical island elevations occur in Hawaii.) Commenters noted that the traditional construction that might work well in coastal Hawaii and other islands, but would not work well at the higher Hawaiian elevations. Therefore, the "deemed to comply" option is limited to elevations below 2400 feet above sea level; because that elevation is already used in the Hawaiian energy code. In reality this has limited effect because less than 2% of the Hawaiian population lives above that level.

Two other comments resulted in changes.

2. The term "roof" was changed to "roof/ceiling" to cover both possible locations for insulation (item #6).
3. The "bedroom walls" became "exterior bedroom walls" which was implied, but not stated (item #9). Exterior walls are the best source of the tropical breezes that help keep the residences comfortable and lessen the need for energy. Other comments did not result in changes.

Overall, the largest criticism of the tropical climate zone was that it was arbitrary, unjustified and not related to the existing IECC climate zones. The existing climate zones were developed at the Pacific Northwest National Laboratory (PNNL, a US Department of Energy lab) as part of the rewrite and simplification of the IECC that become the 2006 IECC. The development of the climate zones is documented in two publications[1,2].

PNNL staff went through an extended analysis to try to group climates for the IECC. Grouping climates turned out to be difficult. After an extensive analysis PNNL stated " … boundaries were found in the Köppen classification that served as good approximations for the divisions that emerged from the … analysis .."[3] The Köppen Climate Classification is the mostly widely used system for classifying the world's climates[4]. In particular PNNL took the primary criteria for IECC zone 1 from Köppen (Koppen's tropical climate)[5].

PNNL adapted the Köppen system for use as a building energy code (IECC). Adaptations included using the political boundaries of jurisdictions (counties, occasionally states) and classifying large counties based on the locations in the county where building occurs rather than the extreme climates where few people live.

As in the existing IECC climate zones, the proposed tropical climate zone is based on Köppen's classification of climates. Köppen divided the earth's climates into five major types of climates, one of the climate types being "tropical". According to Köppen, tropical climates are characterized by constant high temperature (at sea level and low elevations) — all twelve months of the year in the proposed zone in question have average temperatures of 18 °C (64.4 °F) or higher[6]. The existing IECC zone 1 boundary and the proposed tropical climate zone are based on the Köppen temperature criteria for Köppen's "tropical zone".

Traditional tropical construction works best where temperatures are relatively constant and relatively warm. Köppen's tropical climates define a region with a large solar radiation that is relatively constant from month to month, ensuring both high temperatures and almost an absence of seasons. Typically, the temperature difference between day and night is greater than that between the warmest and the coolest month, the opposite of other climate zones[7].

There were a few other comments that are being addressed here.

Some argued that the proposed "deemed to comply" option might not be as energy efficient as the current zone 1 code. An energy analysis for Puerto Rico was reference #1 in the original proposal. Many parts of the "deemed to comply" option are taken from or adapted from the current Hawaiian energy code and/or the Puerto Rican energy code. Specifying that half the occupied space is neither cooled nor heated is a significant reduction in energy use. Specifying 80% of the water heating is solar water heating (renewable energy) saves considerable energy in a region where water heating is a big end use for energy (see reference #2 in the original comment).

Some argued that the tropical zone SHGC should be the same as the Zone 1 SHGC in the IECC, which is an SHGC of 0.25. SHGCs of 0.25 usually mean double pane windows. Due to the warm and constant outdoor temperature, these windows are not remotely cost-effective in the tropical zone. The current Puerto Rico Energy Code has a requirement for 0.40 SHGC. The Tropical Energy Code, in use in Guam and elsewhere, has no requirement for residential SHGC. A jalousie window or louvered windows, common in the tropics and often constructed locally, often have no low SHGC coating, so this is an increased requirement for most of them.

Some argued that the climate zone map in the commercial IECC should not include features that are not used in the commercial energy code. However, for both residential and commercial use the same IECC climate map is used and it is important to keep that consistency. Because both chapters use copies of the same map, they both already include features not used in their respective portions of the IECC. The climate zones 2A, 2B, 3A, 3B, 4A, 4B, 5A, and 5B are not used in residential. Similarly the "warm-humid" counties are not used in commercial. Let's keep one climate zone map.

Some commented that the term "occupied space" was unclear. The term occupied space is defined by the IRC. The term is used because some of the "occupied space" is not "conditioned space".

A "deemed to comply" option for the tropical island climate based on their traditional residential construction would provide an economical option for improving energy efficiency in the tropical island climate.

References:

1. Climate classification for building energy codes and standards: Part 1—Development Process. ASHRAE Transactions 109(1). Briggs, R.S., R.G. Lucas, and Z.T. Taylor. 2003. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
2 . Climate classification for building energy codes and standards: Part 2—Zone definitions, maps, and comparisons. ASHRAE Transactions 109(1). Briggs, R.S., R.G. Lucas, and Z.T. Taylor. 2003. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
3. From reference 1 above, page 116.
4. There are many academic papers on the "Köppen Climate Classification". A more understandable mildly humorous YouTube video is at http://www.youtube.com/watch?v=GBuQc1OL1xE
5. From reference 1 above, page 119."*The 5000 CDD10° C (9000 CDD50° F) dividing line for the lower limit of the hottest zone (also a 90.1 bin boundary) was selected because it corresponds in the United States with the dividing line between tropical and subtropical climates in the Köppen-Geiger system.*"
6. The is a short description of tropical climates in http://en.wikipedia.org/wiki/Tropical_climates
7. Weather Channel data demonstrates the constant temperatures in the tropical islands.

Google " weather channel average monthly temperature city_name state_name".
For example "weather channel average monthly temperature San Juan Puerto Rico"
Click first Google hit. Click boxes for "extreme high" and "extreme low". Compare tropical and non-tropical cities if you like.

Final Hearing Results

CE66-13, Part II AMPC1

Code Change No: CE67-13 Part II

Original Proposal

Section(s): C303.1.4.1 (NEW), Chapter 5, R303.1.4.1 (N1101.12.4) (NEW), Chapter 5

Proponent: Matt Dobson, Vinyl Siding Institute (mdobson@vinylsiding.org)

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AND PART II WILL BE HEARD BY THE RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE.

PART II – IECC-RESIDENTIAL PROVISIONS

Add new text as follows:

R303.1.4 (N1101.12.4) Insulation product rating. The thermal resistance (*R*-value) of insulation shall be determined in accordance with the U.S. Federal Trade Commission *R*-value rule (CFR Title 16, Part 460) in units of h ×ft2 × °F/Btu at a mean temperature of 75°F (24°C).

<u>**R303.1.4.1 (N1101.12.4.1) Insulated siding.** The thermal resistance (*R-value*) of insulated siding shall be determined in accordance with ASTM C1363. Installation for testing shall be in accordance with the manufacturer's installation instructions.</u>

Add new standard to Chapter 5 as follows:

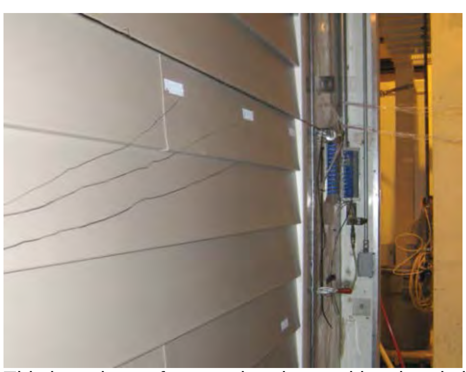
ASTM

<u>C1363 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus</u>

Reason: This additional requirement is necessary so that the testing protocol is spelled out clearly as the valid method for testing of R-value for insulated siding.

The Federal Trade Commission agrees that ASTM C1363 is the appropriate test method for insulated siding and further supported specific protocol as a part of ASTM C1363, established in ASTM D7793, is in the spirit of the home insulation rule.

Without adding this information to the energy code, manufacturers could try to enter the home insulation/insulated siding marketplace with product that has not been tested appropriately for R-value. This addition will ensure that proper, close to field condition testing, is required for any type of insulated siding to qualify as home insulation and in the energy code. This will ultimately result in a manufacturer compliance requirement and create easy enforcement for the building official and energy specialists. It will also further ensure that insulated siding's determined R-value will be legitimate in determining energy performance calculations and consumer confidence that it will provide specific energy performance.



This is a photo of a test chamber and insulated siding being tested to ASTM C1363.

Cost Impact: The code change proposal will have minimal cost impact as many insulated siding products are on the market and are certified and labeled in the way.

Public Hearing Results

For staff analysis of the content of ASTM C1363-11 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: Approved as Submitted

Committee Reason: This proposal adds requirements for a product that is currently referenced in the code.

Assembly Action: None

Final Hearing Results

CE67-13 Part II AS

Code Change No: CE283-13, Part II

Original Proposal

Section(s): C404.7 (NEW), Table C407.5.1(1), Chapter 5, R403.4.3 (NEW) (N1103.5 (NEW)), Chapter 5, IRC P2903.11 (NEW)

THIS IS A 3 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE IECC-COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE. PART III WILL BE HEARD BY THE IRC-PLUMBING COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Proponent: Gerald Van Decker, RenewABILTY Energy Inc., representing self (gerald@renewability.com), Gary Klein, Affiliated International Management, LLC, representing self, (gary@aim4sustainability.com)

PART II IECC-RESIDENTIAL PROVISIONS

Add new text as follows:

R403.4.3 (N1103.4.3) Drain water heat recovery units. Drain water heat recovery units shall comply with CSA 55.2. Drain water heat recovery units shall be in accordance with CSA 55.1. Potable water-side pressure loss of drain water heat recovery units shall be less than 3 psi (20.7 kPa) for individual units connected to one or two showers. Potable water-side pressure loss of drain water heat recovery units shall be less than 2 psi (13.8 kPa) for individual units connected to three or more showers.

Add new standards to Chapter 5 as follows:

CSA

CSA 55.1-2012 Test method for measuring efficiency and pressure loss of drain water heat recovery units

CSA 55.2-2012 Drain water heat recovery units

Reason: There are two reasons for this proposal.1) To enable developers to take credit for efficiency improvements due to the use of drain water heat recovery devices in the performance calculations in the energy code; and 2) to make comparisons of the efficiency of different units based on an existing standard.

Drain water heat recovery (DWHR) works particularly well where heated water flows down the drain at the same time as water flows in that needs to be heated; this “coincident flow” occurs in occupancies with showering and lavatory use. Performance of a DWHR unit is characterized by both efficiency and pressure loss. It is important to ensure that DWHR devices do not impose large pressure losses in the piping in order to minimize the impact on water flow in the building. Given the available DWHR efficiencies, savings are typically 10% to 35% of the energy used for heating water. Over 25,000 drain water heat recovery units have been installed in homes in Canada and the United States.

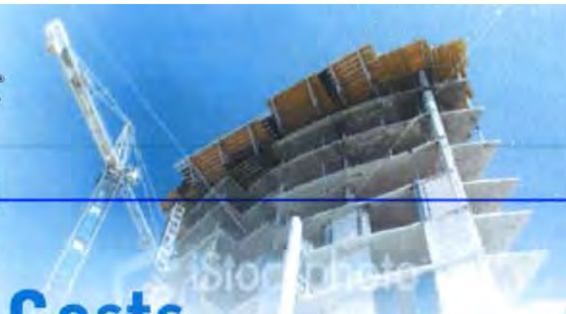
This change adds two standards for drain water heat recovery units (DWHR units). Drain water heat recovery is often a cost effective way to add to energy efficiency by recapturing hot water energy that is literally “going down the drain”. The proposed standards have already been in use by designers for 10 years and the resulting ratings are in use by a variety of energy efficiency programs. Commercial (i.e. non multi-unit residential) applications are engineered systems while multi-unit residential applications are non-engineered and straightforward.

CSA B55.2 standard is for fabrication and material quality of DWHR units. The CSA B55.1 standard is for testing and labeling of DWHR units efficiency and pressure loss at 2.5gpm (9.5lpm). These existing standards were developed through a consensus process by the Canadian Standards Association and are referenced by the Ontario Building Code.

A typical drain water heat recovery unit is shown below:

POWER-PIPE®

Drain Water Heat Recovery Systems

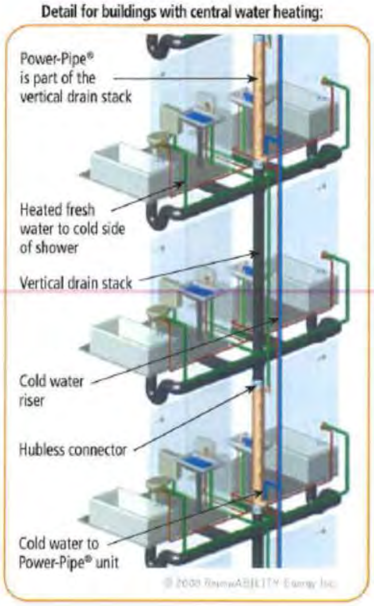


Reduce Operating Costs for Multi-Unit Residential Buildings

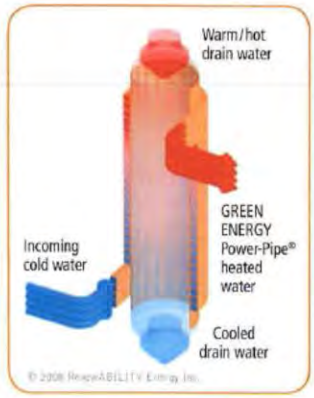
Cost-Effective Green Energy Technology

- The Power-Pipe® is **proven, practical, affordable** and in use today saving energy for thousands of residential suites.
- **Water heating is typically the second highest energy cost** in multi-unit residential buildings; in fact it can even be the highest energy cost.

Detail for buildings with central water heating:



- As building envelopes have become more efficient in recent years water heating has become an even larger portion of the remaining energy costs.
- Much of the drain water leaving a residential building carries with it valuable and recoverable heat energy.
- The all copper Power-Pipe is a double-wall heat exchanger that can **reduce water heating costs by 20-40%** by recovering heat energy from drain (waste) water in multi-residential building drain (waste) stacks.
- The patented and patent pending Power-Pipe design is the only heat exchanger that efficiently allows for up to 4 apartment suites to be plumbed without noticeable loss in water pressure... in fact this results in a **2 to 4 times faster payback** than other heat exchangers.
- The Power-Pipe is very **simple to specify and install** and its savings typically translate to a **3 to 4 year simple payback**; even faster with government or utility incentives.



How It Works

1. As drain water falls down any vertical drain stack it clings to the inner wall, rather than going down the middle of the pipe. This results in a quickly falling thin film.
2. The energy (heat) from this falling film of drain water is easily and efficiently transferred through the copper to the fresh cold water which is flowing around the drain pipe in the outer coils.
3. Cold fresh water is plumbed into the bottom of the Power-Pipe from the main cold water riser.
4. Power-Pipe heated water is then plumbed to either:
   - the cold side of up to 4 showers, for buildings with central water heating, thereby reducing hot water demand
   - the cold side of the shower and water heater, for buildings with in-suite water heaters

877-606-5559
www.renewability.com

Advantages of the Power-Pipe®

- The Power-Pipe® is **very simple to install** during new construction and it integrates with any plumbing system
- The Power-Pipe **can be retrofit** in buildings where there is access to the drain stacks and fresh water lines
- Maintenance-free, 50+ year life
- The Power-Pipe will increase effective hot water capacity, thereby reducing the risk of running out of hot water
- **Quality** is never compromised; the coils of every Power-Pipe unit consist of 100% Type L or heavier copper tube
- The Power-Pipe also provides significant cost-effective **reductions in green house gases** as a result of reduced primary energy demand
- The performance of the Power-Pipe has been **verified by the Canadian Government** *(Ministry of Natural Resources Canada and the University of Waterloo)* in independent third-party testing
- The Power-Pipe will **assist in obtaining LEED Certification** (and similar programs) for your building
- Many Governments and Utilities also offer **financial incentives** resulting in a quicker payback
- The Power-Pipe is the most proven, most used drain water heat recovery technology; many building designers have been specifying the Power-Pipe as a standard in their buildings for many years now, there are now thousands of suites in which Power-Pipes are saving money and energy daily.

Applications Include:

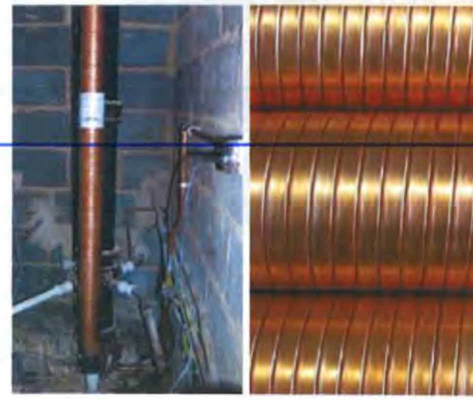
• CONDOMINIUMS	• STUDENT DORMS
• APARTMENT BUILDINGS	• HOSPITALS
• HOTELS	• PRISONS
• AFFORDABLE HOUSING	• TOWNHOUSES

Developed and manufactured by:

RenewABILITY ENERGY INC.

What We Provide:

- We provide free and full support including feasibility analysis, design consultation, CAD drawing elements, and training.
- 10 Year Warranty



Sampling of Projects

Regent Park
Toronto, Ontario
New Construction – Affordable Housing

OMHM
Montreal, Quebec
New Construction – Affordable Housing

University of Toronto
Toronto, Ontario
Student Dorm

University of Oregon
Eugene, Oregon
Student Dorm

Yee Kang Centre
Montreal, Quebec
New Construction – Affordable Housing

Bury Court
Bedford, England
Retrofit – Affordable Housing

Prison
North Bend, Oregon
Retrofit – Government Facility

University of Waterloo
Waterloo, Ontario
Student Townhouses

Adelaide Project
Toronto, Ontario
New Construction – Affordable Housing

Hotel
North Battleford, Saskatchewan
New Construction

National Defense
Halifax, Nova Scotia
Officers Residence

Eastern Oregon University
Eugene, Oregon
Student Dorm

Maison Transitionelle
Montreal, Quebec
New Construction – Affordable Housing

Benny Farms
Montreal, Quebec
LEED Platinum Status and International Award

ETS
Montreal, Quebec
Student Dorm

Cloverdale Housing Coop
Montreal, Quebec
Retrofit – Affordable Housing

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SAVINGS VERIFIED BY Natural Resources Canada

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Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, CSA B55.1 and B55.2 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

PART II – IECC – Residential
Committee Action: **Approved As Submitted**

Committee Reason: Massachusetts recognizes drain waste heat recovery units in their "stretch" code. If these units are going to be installed, then there needs to be requirements to make sure the units operate properly and provide the intended performance.

Assembly Action: **None**

Final Hearing Results

CE283-13 Part II **AS**

Code Change No: CE362-13, Part II

Original Proposal

Section(s): C403.2.5 (New), R403.2 (New) (IRC N1103.2 (New))

THIS IS A 2 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY THE IECC-COMMERCIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Proponent: Julius Ballanco, P.E, JB Engineering and Code Consulting, P.C. representing Self (JBEngineer@aol.com)

PART II IECC-RESIDENTIAL PROVISIONS

Add new text as follows:

R403.2 (N1103.2) Hot water boiler outdoor temperature setback. Hot water boilers that supply heat to the building through one- or two- pipe heating systems shall have an outdoor setback control that lowers the boiler water temperature based on the outdoor temperature.

Reason: This is one of the single most energy efficient controls for a hot water boiler. By modulating the hot water temperature in the heating system, the boiler fires less, using less energy. This is a simple control that every hot water boiler should be required to have for saving energy.

Cost Impact: This code change will not increase the cost of construction.

Public Hearing Results

Errata for this proposal is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

Part I of this code changes was heard by the Commercial Energy Conservation Code Development Committee and Part II was heard by the Residential Energy Conservation Code Development Committee.

PART II – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: This is a needed, simple energy saving technology.

Assembly Action: **None**

Final Hearing Results

CE362-13, Part II **AS**

Code Change No: RE3-13

Original Proposal

Section(s): R103.2 (IRC N1101.8)

Proponent: Craig Conner, Building Quality, representing self (craig.conner@mac.com)

Revise as follows:

R103.2 (N1101.8) Information on construction documents. Construction documents shall be drawn to scale upon suitable material. Electronic media documents are permitted to be submitted when *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include, but are not limited to, as applicable, insulation materials and their *R*-values; fenestration *U*-factors and SHGCs; area-weighted *U*-factor and SHGC calculations; mechanical system design criteria; mechanical and service water heating system and equipment types, sizes and efficiencies; ~~economizer description;~~ equipment and systems controls; ~~fan motor horsepower (hp) and controls;~~ duct sealing, duct and pipe insulation and location; ~~lighting fixture schedule with wattage and control narrative;~~ and air sealing details.

Reason: Commercial requirements don't belong in residential.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change proposal appropriately removes a provision that does not apply to the IECC-Residential provisions.

Assembly Action: **None**

Final Hearing Results

RE3-13	**AS**

Code Change No: RE14-13

Original Proposal

Section(s): R401.3 (IRC N1101.16)

Proponent: Andrei Moldoveanu, representing National Electrical Manufacturers Association (NEMA) (and_moldoveanu@nema.org**)**

R401.3 (N1101.16) Certificate (Mandatory). A permanent certificate shall be completed by the builder or registered design professional and posted on ~~or in the electrical distribution panel~~ a wall in the space where the furnace is located, a utility room, or an approved location inside the building ~~by the builder or registered design professional~~. ~~The certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels.~~ The certificate shall list the predominant *R*values of insulation installed in or on ceiling/roof, walls, foundation (slab, *basement wall,* crawlspace wall and/or floor) and ducts outside conditioned spaces; *U*-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing done on the building. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies of heating, cooling and service water heating equipment. Where a gasfired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list “gas-fired unvented room heater,” “electric furnace” or “baseboard electric heater,” as appropriate. An efficiency shall not be *listed* for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters**.**

Reason:

1. Certificates placed on or in the electrical distribution panel may become destroyed because of the location of the panel. Panels for many buildings in the Southwest portion of the United States are located outside of the building; thereby, causing certificates on or in these panels to become destroyed due to weather.
2. Safety. Additional printed material (such as the energy certificate) on electrical distribution panel makes it difficult to see the warning labels that or located on or in the panel.
3. Certificates located on or in the electrical panel are not very visible due to the location of the panels; thereby, rendering the certificate useless.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that posting the certificate on the electrical panel is not necessarily a good idea, and that this proposal provides a better approach.

Assembly Action: **None**

Final Hearing Results

RE14-13 **AS**

Code Change No: RE16-13

Original Proposal

Section(s): R401.3 (IRC N1101.16)

Proponent: Brenda A. Thompson, Clark County Development Services, Las Vegas NV, representing ICC Sustainability, Energy & High Performance Building Code Action Committee (bat@clarkcounty.gov)

Revise as follows:

R401.3 (N1101.16) Certificate (Mandatory). A permanent certificate shall be completed and posted ~~on or in the electrical distribution panel~~ by the builder or registered design professional at an approved location inside the building. Where located on an electrical distribution panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall list the predominant *R* values of insulation installed in or on ceiling/roof, walls, foundation (slab, *basement wall,* crawlspace wall and/or floor) and ducts outside conditioned spaces; *U*-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing done on the building. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies of heating, cooling and service water heating equipment. Where a gasfired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be *listed* for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters**.**

Reason: This proposal was submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the SEHPCAC has held 3 open meetings and over 30 workgroup calls which included members of the SEHPCAC as well as any interested party to discuss and debate proposed changes and public comments. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx.
Reasons for this specific proposal:

1. Certificates placed on or in the electrical distribution panel may become destroyed because of the location of the panel. Panels for many buildings in the Southwest portion of the United States are located outside of the building; thereby, causing certificates on or in these panels to become destroyed due to weather.
2. Safety. Additional printed material (such as the energy certificate) on electrical distribution panel makes it difficult to see the warning labels that or located on or in the panel.
3. Certificates located on or in the electrical panel are not very visible due to the location of the panels; thereby, rendering the certificate useless.
4. Certificates should be located where they are likely to survive over time. Perhaps that location is in a garage next to a water heater or furnace. However such arrangement is not universally common in design. Short of finding a universally acceptable location, the proposal requires the local building official to approve the locations appropriate for the local jurisdiction. The location should be an interior locations so that it isn't lost to weather induced deterioration**.**

Cost Impact: The proposal is editorial in nature and will not affect the cost of construction..

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: In conjunction with RE14-13, this is a needed stipulation that allows installation on the electrical panel, and then retains language to prevent covering the circuit directory.

Assembly Action: **None**

Final Hearing Results

RE16-13	**AS**

Code Change No: RE18-13

Original Proposal

Section(s): R402.1 (IRC N1102.1), R402.1.1 (NEW) (IRC N1102.1.1 (NEW))

Proponent: Michael D. Fischer, Kellen Company, representing the Center for the Polyurethanes Industry (mfischer@kellencompany.com)

Revise as follows:

R402.1 (N1102.1) General (Prescriptive). The *building thermal envelope* shall meet the requirements of Sections R402.1.1 through ~~R402.1.4~~. R402.5.

R402.1.1 (N1102.1.1) Vapor retarder. Wall assemblies in the *building thermal envelope* shall comply with the vapor retarder requirements of Section R702.7 of the *International Residential Code* or Section 1405.3 of the *International Building Code* as applicable.

Reason: The IRC contains detailed vapor retarder provisions that apply specified R-Values for continuous insulation for vapor and condensation control. It is important to ensure that compliance to the envelope requirements of the energy code are coordinated with other building code requirements. While such a cross-reference is not necessary for most building requirements, the vapor retarder provisions are the only place in the IRC that a specific thermal performance provision is called out. This proposal provides the necessary coordination.

Cost Impact: The proposal will not affect the cost of construction..

Note: If this change is approved, it would be shown in Chapter 11 of the IRC without the reference to the IBC as follows:

> **N1102.1.1 Vapor retarder.** Wall assemblies in the *building thermal envelope* shall comply with the vapor retarder requirements of Section R702.7.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This pointer for requirements for vapor retarders is needed in the code, because this product is often part of to the building envelope.

Assembly Action: **None**

Final Hearing Results

RE18-13	**AS**

Code Change No: RE50-13

Original Proposal

Section(s): Table R402.1.3 (IRC Table N1102.1.3)

Proponent: Don Surrena, CBO, representing National Association of Home Builders (NAHB) (dsurrena@nahb.org)

Revise as follows:

TABLE R402.1.3 (N1102.1.3)
EQUIVALENT *U*-FACTORS[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR	SKYLIGHT *U*-FACTOR	CEILING *U*-FACTOR	FRAME WALL *U*-FACTOR	MASS WALL *U*-FACTOR[b]	FLOOR *U*-FACTOR	BASEMENT WALL *U*-FACTOR	CRAWL SPACE WALL *U*-FACTOR
1	0.50	0.75	0.035	~~0.082~~ <u>0.084</u>	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	~~0.082~~ <u>0.084</u>	0.165	0.064	0.360	0.477
3	0.35	0.55	0.030	~~0.057~~ <u>0.060</u>	0.098	0.047	0.091[c]	0.136
4 except Marine	0.35	0.55	0.026	~~0.057~~ <u>0.060</u>	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	~~0.057~~ <u>0.060</u>	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	~~0.048~~ <u>0.045</u>	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	~~0.048~~ <u>0.045</u>	0.057	0.028	0.050	0.055

(Portions of table not shown remain unchanged)

Reason: The intent of these changes is not to alter the stringency of the code, but rectify the conversion from R-Value to U-Factor. Currently the R-Values and equivalent U-Factors do not match when applying a consistent calculation method.

It is important that the U-Factors and R-Values do match when small alterations are being made to the wall assemblies selected in the R-Value table. For example, a builder does not want to install R-20 as suggested in the R-Value table. Instead, the builder's preferred wall is R-15+R3.8c.i. Although the R-15+R3.8c.i. wall is thermally better than the R-20 wall, it does not meet the requirements of the Equivalent U-Factor table.

Below are a series of calculations which justify the proposed changes to the Frame Wall U-Factor values:

Climate Zone 1 and 2 Wall U-Factor Calculation Spreadsheet

Wall Thermal Resistance by Component	2x4 Wall R-13 Batt		
	R-Value Studs	R-Value Cavity	Assembly Value
Wall - Outside Winter Air Film[A]	0.17		
Siding - Vinyl[A]	0.62		
Continuous Insulation	0		
OSB - 7/16"[A]	0.62		
SPF Stud/Cavity Insulation	4.375	13	
1/2" Drywall [A]	0.45		
Inside Air Film[A]	0.68		
Studs at 16" o.c. [A]	25%	75%	
Total Wall R-Values	6.92	15.54	**11.85**
Total Wall U-Values	0.145	0.064	**0.084**
[A]2009 ASHRAE Handbook of Fundamentals			

Climate Zones 3-5 Wall U-Factor Calculation Spreadsheet

Wall Thermal Resistance by Component	2x4 Wall R-13+R5			2x6 Wall R-20		
	R-Value Studs	R-Value Cavity	Assembly U-Factor	R-Value Studs	R-Value Cavity	Assembly U-Factor
Wall - Outside Winter Air Film[A]	0.17			0.17		
Siding - Vinyl[A]	0.62			0.62		
Continuous Insulation	5			0		
OSB - 7/16"[A]	0.62			0.62		
SPF Stud/Cavity Insulation	4.375	13		6.875	20	
1/2" Drywall [A]	0.45			0.45		
Inside Air Film[A]	0.68			0.68		
Studs at 16" o.c. [A]	25%	75%		25%	75%	
Total Wall R-Values	11.92	20.54	**17.39**	9.42	22.54	**16.71**
Total Wall U-Factor	0.084	0.049	**0.057**	0.106	0.044	**0.060**
[A]2009 ASHRAE Handbook of Fundamentals						

Climate Zones 6-8 Wall U-Factor Calculation Spreadsheet

Wall Thermal Resistance by Component	2x4 Wall R-13+R-10 c.i.			2x6 Wall R-20+R-5 c.i.		
	R-Value Studs	R-Value Cavity	Assembly Value	R-Value Studs	R-Value Cavity	Assembly Value
Wall - Outside Winter Air Film[A]	0.17			0.17		
Siding - Vinyl[A]	0.62			0.62		
Continuous Insulation	10			5		
OSB - 7/16"[A]	0.62			0.62		
SPF Stud/Cavity Insulation	4.375	13		6.875	20	
1/2" Drywall [A]	0.45			0.45		
Inside Air Film[A]	0.68			0.68		
Studs at 16" o.c. [A]	25%	75%		25%	75%	
Total Wall R-Values	16.92	25.54	**22.65**	14.42	27.54	**22.43**
Total Wall U-Values	0.059	0.039	**0.044**	0.069	0.036	**0.045**
[A]2009 ASHRAE Handbook of Fundamentals						

Referenced Standards: None

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal provides a consistent, comprehensive code change for frame wall U-Factors for all climate zones. The values are consistent with previous actions (RE44-RE47).

Assembly Action: **None**

Final Hearing Results

RE50-13	**AS**

Code Change No: RE53-13

Original Proposal

Section(s): R402.2.1 (IRC N1102.2.1)

Proponent: Ellen Eggerton, representing Virginia Building and Code Officials Association

Revise as follows:

R402.2.1 (N1102.2.1) Ceilings with attic spaces. ~~When~~ Where Section R402.1.1 would require R38 in the ceiling, installing R30 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R38 whenever the full height of uncompressed R30 insulation extends over the wall top plate at the eaves. Similarly, where Section R402.1.1 would require R49 in the ceiling, installing R38 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R49 whenever the full height of uncompressed R38 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the U-factor alternative approach in Section R402.1.3 and the total UA alternative in Section R402.1.4.

Reason: Revised language clarifies how to interpret the "alternative" ceiling insulation requirement. It has come to VBCOA's attention that some code officials have interpreted R402.1.1 as permitting R38 over the wall top plate when using "raised heel" or "energy" trusses, but where R49 could be installed in the interior of the attic where height permits, R49 would in fact be required in those areas. The amendment seeks to clarify that R38 may be used throughout the entire attic, where a full R38 can be installed over the top plate. This approach is consistent with US DOE analysis of heat flow through insulated attics (ca. 1996), accounting for actual insulation thicknesses and framing members.

Cost Impact: Depending on how this particular provision had been previously enforced, impact may be to reduce overall installed insulation materials in attics and associated costs, with no appreciable difference in heat flow rate through this part of the thermal envelope.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change proposal provides language that clarifies the committee's understanding of the present intent of the code.

Assembly Action: **None**

Final Hearing Results

RE53-13	**AS**

Code Change No: RE60-13

Original Proposal

Section(s): R402.2.7 (IRC N1102.2.7), Table R402.4.1.1 (IRC Table N1102.4.1.1)

Proponent: Joseph Lstiburek, Building Science Corporation, representing self (joe@buildingscience.com)

Revise as follows:

R402.2.7 (N1102.2.7) Floors. Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

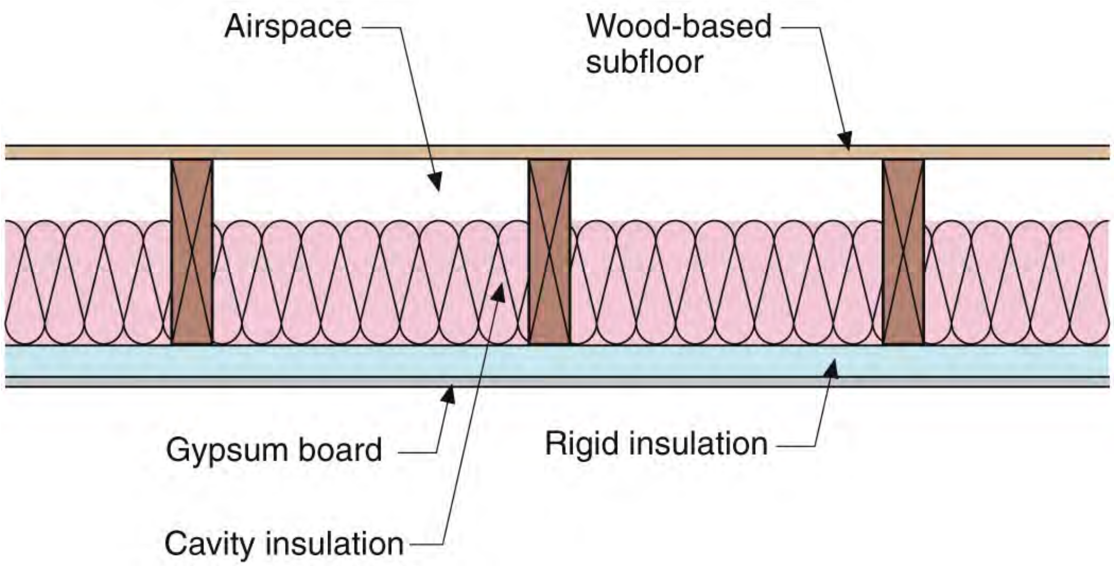
> **Exception:** The floor framing cavity insulation shall be permitted to be in contact with the topside of sheathing or continuous insulation installed on the bottom side of floor framing when combined with insulation that meets or exceeds the minimum Wood Frame Wall R-value in Table 402.1.1 and extends from the bottom to the top of all perimeter floor framing members.

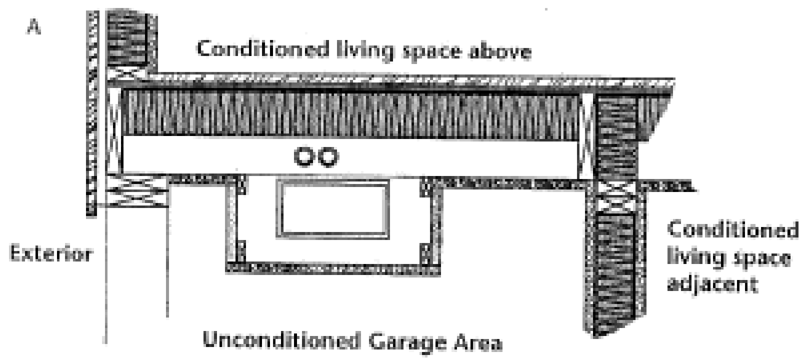
TABLE 402.4.1.1 (N1102.4.1.1)
AIR BARRIER AND INSULATION INSTALLATION

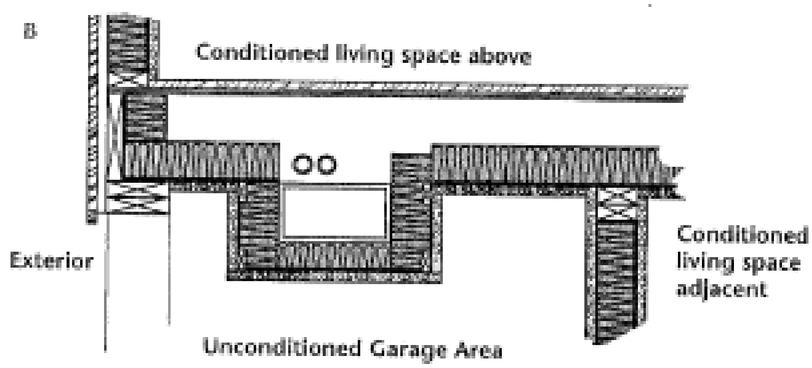
COMPONENT	CRITERIA
Floors (including above-garage and cantilevered floors)	~~Insulation~~ Floor framing cavity insulation shall be installed to maintain permanent contact with underside of subfloor decking or floor framing cavity insulation shall be permitted to be in contact with the topside of sheathing or continuous insulation installed on the bottom side of floor framing and extends from the bottom to the top of all perimeter floor framing members. The air barrier shall be installed at any exposed edge of insulation.

(Portions of Table not shown remain unchanged)

Reason: Requiring insulation in floors to be in direct contact with the underside of subfloor decking is one insulating option. Another option is to have an airspace between the floor sheathing and the top of the cavity insulation where this cavity insulation is in direct contact with the topside of sheathing or continuous insulation installed on the underside of the floor framing and is combined with perimeter insulation that meets or exceeds the R-value requirements for walls. This second option leads to fewer cold spots yet does not change the heat loss as long as the cavity insulation is in direct contact with a sheathing below it or continuous insulation below it. It also facilitates services to be enclosed within the thermal envelope. Examples of these configurations are illustrated below:







Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change provides a straightforward solution to a practical problem. The method has been tried and shown to work.

Assembly Action: **None**

Final Hearing Results

RE60-13	**AS**

Code Change No: RE63-13

Original Proposal

Section(s): Table R402.1.1 (IRC Table N1102.1.1), R402.2.13 (NNEW) (IRC N1102.2.13 (NEW))

Proponent: Jeremiah Williams, representing U.S. Department of Energy (jeremiah.williams@ee.doe.gov)

Revise as follows:

TABLE R402.1.1 (N1102.1.1)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT

(Portions of Table not shown remain unchanged)

h. First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. ~~If structural sheathing covers 40 percent or less of the exterior, continuous insulation *R*-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.~~

R402.2.13 (N1102.2.13) Walls with partial structural sheathing. Where Section R402.1.1 would require continuous insulation on exterior walls and structural sheathing covers 40 percent or less of the gross area of all exterior walls, the continuous insulation *R*-value shall be permitted to be reduced by an amount necessary to result in a consistent total sheathing thickness, but not more than R-3, on areas of the walls covered by structural sheathing. This reduction shall not apply to the *U*-factor alternative approach in Section R402.1.3 and the total UA alternative in Section R402.1.4.

Reason: This is a clarification not intended to change the meaning of the code. Moving the relevant text out of the footnote and into a separate code section allows for a more thorough description of the sheathing reduction allowance.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal clarifies the issue of structural sheathing with continuous insulation presently contained in footnote h of Table R402.1.1. The information is appropriately placed in the body of code text.

Assembly Action: **None**

Final Hearing Results

RE63-13 **AS**

Code Change No: RE68-13

Original Proposal

Section(s): R402.3.5 (IRC N1102.3.5)

Proponent: Daniel J. Walker, P.E., Thomas Associates, Inc., representing the National Sunroom Association (dwalker@thomasamc.com)

Revise as follows:

R402.3.5 (N1102.3.5) Sunroom ~~*U*-factor~~ Fenestration. All *sunrooms* enclosing conditioned space shall meet the fenestration requirements of this code.

> **Exception:** For *sunrooms* with *thermal isolation* and enclosing *conditioned space*, ~~in Climate Zones 4 through 8,~~ the following exceptions to the fenestration requirements of this code shall apply:
>
> 1. In Climate Zones 2 through 8 ~~T~~the maximum fenestration *U*-factor shall be 0.45; and
> ~~2.~~ ~~T~~the maximum skylight *U*-factor shall be 0.70.
> 2. In Climate Zones 1 through 3 the maximum SHGC shall be 0.30.

New fenestration separating the *sunroom* with *thermal isolation* from *conditioned space* shall meet the *building thermal envelope* requirements of this code.

Reason: The requirements for thermally isolated sunrooms was changed in the previous code cycle to relax the requirements in recognition of the lower energy consumption of these structures due to their occasional / seasonal use. The change proposed at this time would smooth the U-factor requirements since the previous change left the requirements discontinuous by requiring a lower U-factor in Climate Zones 2 and 3 than in the higher climate zones, which does not make sense. This change would set the U-factor requirements the same for all the climate zones where requirements exist, and would correct the discontinuity in the code between the requirements in Climate Zones 2, 3 and 4.

The proposal also seeks to set relaxed SHGC requirements for thermally isolated sunrooms in Climate Zones 1 through 3 because there is no practical way for the typically larger glazing used in sunrooms to meet the lower SHGC values prescribed by Table R402.1.1 unless very dark glass is used. Consumers purchase sunrooms to create a comfortable enclosed area that provides a view of the outdoors. Extremely dark glass is contrary to the very purpose of a sunroom.

Cost Impact: The proposed change would not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R402.3.5 (N1102.3.5) Sunroom fenestration. All *sunrooms* enclosing conditioned space shall meet the fenestration requirements of this code.

> **Exception:** For *sunrooms* with *thermal isolation* and enclosing *conditioned space*, the following exceptions to the fenestration requirements of this code shall apply:
>
> 1. In Climate Zones 2 through 8 the maximum fenestration *U*-factor shall be 0.45;
> 2. The maximum skylight *U*-factor shall be 0.70.
> ~~2. In Climate Zones 1 through 3 the maximum SHGC shall be 0.30.~~

Committee Reason: This exception to allow fenestration U-Factor in sunrooms essentially fixes an inconsistency in the code in Climate Zones 2 and 3 given that U-Factors in these two climate zones were lowered in the last code cycle, for the 2012 Code. The modification was made at the proponent's request to remove changes to SHGC values from the issue, and simply deal with U-factor.

Assembly Action: **None**

Final Hearing Results

RE68-13	AM

Code Change No: RE83-13

Original Proposal

Section(s): Table R402.4.1.1 (IRC Table N1102.4.1.1)

Proponent: Ellen Eggerton, representing Virginia Building and Code Officials Association

Revise as follows:

TABLE R402.4.1.1 (N1102.4.1.1)
AIR BARRIER AND INSULATION INSTALLATION

COMPONENT	CRITERIA[a]
Walls	Cavities within corners and headers shall be insulated by completely filling the cavity with a material having a thermal resistance of R3 per inch minimum. ~~and~~ The junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.

(Portions of Table not shown remain unchanged)

Reason: The current text says, "Corners and headers shall be insulated …" All headers and corners under all circumstances? Insulated to what level? This provision is a carryover of the 2009 IECC requirement. Varying answers to these questions have already lead to varying interpretations of the code requirements, uneven enforcement, and confusion in the regulated community. This proposal intends to allay some of that confusion by specifying that headers and corners must be insulated when there is an available cavity (e.g., a two-ply 2x header in a 2x4 wall leaves no cavity to fill) and by providing a practical definition of what *insulated* means in this context. Typical insulating materials like fiberglass and rigid foam can easily achieve R3 per inch.

Cost Impact: There will be a cost impact from this proposal to the extent that this requirement was not previously enforced due to ambiguity in the requirement. Regardless, the quantities of insulation being installed are small, but there may be many of these areas to insulate, depending on the size, design, and layout of the proposed residential building.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

First sentence in "Criteria" column:

Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance of R3 per inch minimum.

Committee Reason: This a practical approach for an air barrier in corners and headers of frame walls. The modification is made to qualify where sealing is needed

Assembly Action: **None**

Final Hearing Results

RE83-13	**AM**

Code Change No: RE84-13

Original Proposal

Section(s): Table R402.4.1.1 (IRC Table N1102.4.1.1)

Proponent: Joseph Lstiburek, Building Science Corporation, representing self (joe@buildingscience.com)

Revise as follows:

TABLE 402.4.1.1 (N1102.4.1.1)
AIR BARRIER AND INSULATION INSTALLATION

<table>
<tr><th>COMPONENT</th><th><u>INSULATION INSTALLATION CRITERIA</u></th></tr>
<tr><td>Floors (including above garage and cantilevered floors)</td><td><u>Floor framing cavity</u> insulation shall be installed to maintain permanent contact with underside of subfloor decking <u>or floor framing cavity insulation shall be permitted to be in contact with the topside of sheathing or continuous insulation installed on the bottom side of floor framing and extends from the bottom to the top of all perimeter floor framing members.</u>
The air barrier shall be installed at any exposed edge of insulation.</td></tr>
</table>

(Portions of Table not shown remain unchanged)

Reason: Requiring insulation in floors to be in direct contact with the underside of subfloor decking is one insulating option. Another option is to have an airspace between the floor sheathing and the top of the cavity insulation where this cavity insulation is in direct contact with the topside of sheathing or continuous insulation installed on the underside of the floor framing and is combined with perimeter insulation that meets or exceeds the R-value requirements for walls. This second option leads to fewer cold spots yet does not change the heat loss as long as the cavity insulation is in direct contact with a sheathing below it or continuous insulation below it. It also facilitates services to be enclosed within the thermal envelope.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change is consistent with the text approved in RE60-13.

Assembly Action: **None**

Final Hearing Results

RE84-13	**AS**

Code Change No: RE85-13

Original Proposal

Section(s): Table R402.4.1.1 (IRC Table N1102.4.1.1)

Proponent: Shaunna Mozingo, City of Cherry Hills Village, representing Colorado Chapter of ICC, Inc.
smozingo@coloradocode.net

Delete and substitute as follows:

~~**TABLE 402.4.1.1 (N1102.4.1.1)**~~
~~**AIR BARRIER AND INSULATION INSTALLATION**~~

TABLE 402.4.1.1 (N1102.4.1.1)
AIR BARRIER AND INSULATION INSTALLATION

COMPONENT	**AIR BARRIER CRITERIA**	**INSULATION INSTALLATION CRITERIA**
General Requirements	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material..
Ceiling / attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Knee walls shall be sealed.	Corners and headers shall be insulated. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.	
Rim joists	Rim joists shall include the air barrier.	Rim joists shall be insulated.
Floors (including above garage and cantilevered floors)	The air barrier shall be installed at any exposed edge of insulation.	Insulation shall be installed to maintain permanent contact with underside of subfloor decking.
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.	Where provided in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.	

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
Narrow cavities		Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.	
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the drywall.	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated.
Plumbing and wiring		Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower / tub on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate them from the showers and tubs.	Exterior walls adjacent to showers and tubs shall be insulated.
Electrical / phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.	
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.	
Fireplace	An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors	

a. In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

Reason: Reason: Table R402.4.1.1 in the 2012 IECC and 2009 IECC has contained a table that included insulation and air barrier requirements within the same criteria. This has created confusion with the trades in the construction of residential housing. This change adds an additional column to the table and separates air barrier criteria and insulation criteria. This change adds clarity for the trades.

No substantive changes were made in the narrative criteria descriptions with the exception of separating sentences which contain criteria for both insulation and air barrier into two narratives; one for insulation and one for air barrier criteria.

The "air barrier and thermal barrier" component from Table R402.4.1.1 in the 2009 and 2012 IECC was renamed as "general requirements" but the criteria from the previous "air barrier and thermal barrier" component row has not changed with the exception of separating insulation and air barrier criteria.

Cost Impact: The code change proposal will not increase the cost of construction. No additional costs.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The separation of air barrier criteria from insulation criteria is useful to the inspector and the builder, in order make the code easier to understand and apply. This proposal makes no changes to the code, it is a re-format.

Assembly Action: **None**

Final Hearing Results

RE85-13 **AS**

Code Change No: RE86-13

Original Proposal

Section(s): Table R402.4.1.1 (IRC Table N1102.4.1.1), R402.4.2 (IRC N1102.4.2)

Proponent: Thomas Stroud, Senior Manager, Codes & Standards, representing Hearth, Patio & Barbecue Association (stroud@hpba.org)

Revise as follows:

TABLE R402.4.1.1 (N1102.4.1.1)
AIR BARRIER AND INSULATION INSTALLATION

COMPONENT	CRITERIA[a]
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.
Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.
Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.
Rim joists	Rim joists shall be insulated and include the air barrier.
Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.
Crawl space walls	Where provided in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls. Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, ~~and~~ fire place chases and flue shafts opening to exterior or unconditioned space shall be sealed.
Narrow cavities	Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated, and sealed to the drywall.
Plumbing and wiring	Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.

Shower/tub on exterior wall	Exterior walls adjacent to showers and tubs shall be insulated and the air barrier installed separating them from the showers and tubs.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.
~~Fireplace~~	~~An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors.~~

a. In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

R402.4.2 (N1102.4.2) Fireplaces. New wood-burning fireplaces shall have tight fitting flue dampers <u>or doors</u>, and outdoor combustion air. <u>When using tight-fitting doors on UL 127 fireplaces, they must be tested and listed for the fireplace.</u>

Reason: In 2012 Table R402.4.1.1 Fireplace criteria states an air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors. In Section R402.4.2 it states new wood-burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air. We interpret this to mean traditional, field-fabricated, “masonry fireplaces” in accordance with 2009 IRC Section R1001, and constructed of concrete or solid clay-masonry units; NOT “factory-built,” UL 127 fireplaces in accordance with IRC Section R1004. Because of requirements in the IECC that require all fireplaces to be provided with gasketed doors, a great deal of controversy has resulted. Most factory-built fireplaces are not listed for use with sealed glass doors and installing such doors on fireplaces that are not tested for these doors could cause overheating of the fireplace resulting in a fire hazard. Without testing, the effect of the doors will be an unknown. In this regard, the intent of Section R402.4.2 is to mitigate air leakage during periods of non-use, but not where the conditions of fireplace installation are in violation of the UL 127 listing.

Regarding the requirement for an air barrier on “fireplace walls”, this is an unclear statement and is clarified by the addition in *Shafts, Penetrations* that the air sealing is to be on the chase and not on the fireplace. This will address chase sealing details that are needed and gives clarification to address framed wall construction.

Cost Impact: These code changes will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R402.4.2 (N1102.4.2) Fireplaces. New wood-burning fireplaces shall have tight fitting flue dampers or doors, and outdoor combustion air. When using tight-fitting doors on <u>factory-built fireplaces listed and labeled in accordance with</u> UL 127 ~~fireplaces~~, ~~they must~~ <u>the doors shall</u> be tested and listed for the fireplace. <u>Where using tight-fitting doors on masonry fireplaces, the doors shall be listed and labeled in accordance with UL907.</u>

Committee Reason: Factory-built fireplaces must be specifically tested for gasketed doors. This is a safety issue that needs to be addressed in the code. The modification adds a testing standard for tight-fitting doors on masonry fireplaces, to address safety issues.

Assembly Action: **None**

Final Hearing Results

RE86-13 **AM**

Code Change No: RE91-13

Original Proposal

Section(s): R402.4.1.2 (IRC N1102.4.1.2), Chapter 5

Proponent: Theresa A. Weston, PhD., representing DuPont Building Innovations (theresa.a.weston@usa.dupont.com)

Revise as follows:

R402.4.1.2 (N1102.4.1.2) Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8. Testing shall be conducted in <u>accordance with ASTM E 779 or ASTM E 1827</u> ~~with a blower door~~ <u>and reported</u> at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open;
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open.Add new reference standards:

Add new standards to Chapter 5 as follows:

<u>E779-10 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization</u>

<u>E1827-11 Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door</u>

Reason: This proposal adds appropriate standard blower door test methods to the code. The code currently does not reference a test method standard. The specification of standard test methods should improve the reliability of the data by which code compliance is determined.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code ASTM E1827-11 Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.
Standard ASTM E779-03 is currently referenced in the IECC-Commercial Provisions, Chapter 5. Update to the latest edition, 2010 will be considered in a code change proposal for administrative update of standards. See the hearing order for the Administrative Code Committee.

Public Hearing Results

For staff analysis of the content of ASTM E779-10 and ASTM E1827-11 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This proposal adds appropriate standards for blower door test methods to the code.

Assembly Action: **None**

Final Hearing Results

RE91-13	**AS**

Code Change No: RE103-13

Original Proposal

Section(s): R403.1.1 (IRC N1103.1.1)

Proponent: Dr. Thomas D. Culp, Birch Point Consulting LLC, representing self (culp@birchpointconsulting.com)

Revise as follows:

R403.1.1 (N1103.1.1) Programmable thermostat. Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain *zone* temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed by the manufacturer with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).

Reason: When this requirement was added to the 2009 IECC, the last sentence about initial programmed set points was really intended for manufacturer design, so that the thermostat would be ready to go "out of the box". However, there have been reports that this sentence adds extra compliance work for code officials who have to spend time checking and in some cases programming the thermostat set points. This proposal clarifies that this requirement is the manufacturer's responsibility, so that ultimately all thermostats on the market will come already in compliance with this section.

Cost Impact: None, or possible decrease in compliance time / costs.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The original intent of this section of the code was the thermostat being preset by the manufacturer.

Assembly Action: **None**

Final Hearing Results

RE103-13	**AS**

Code Change No: RE105-13

Original Proposal

Section(s): R403.1.1 (IRC N1103.1.1)

Proponent: Ellen Eggerton, representing Virginia Building and Code Officials Association

Revise as follows:

R403.1.1 (N1103.1.1) Programmable thermostat. ~~Where the primary heating system is a forced air furnace, at least one thermostat per~~ The thermostat controlling the primary heating or cooling system of the dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain *zone* temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).

Reason: This suggested change recognizes that forced air heating and air conditioning systems are not the only systems that may benefit from programmable thermostats. Hydronic, radiant electric, and solar thermal systems could also be programmed for night or "unoccupied" setback periods. The proposal concurrently clarifies that the primary heating or cooling system, at minimum, is the system that should receive the programmable thermostat. This clarification is necessary for those residential dwelling units that have multiple systems; e.g., first floor / second floor forced air systems, or radiant electric systems with thermostats in each room. Which system must have a programmable thermostat? It is the "primary" system, typically the one serving the largest area of the dwelling, but subject to reasonable interpretation by the Building Official. Impact of this proposal may be to reduce installation of unnecessary programmable thermostats in multiple H/AC systems.

Cost Impact: If the non-forced air system would otherwise have a non-programmable thermostat installed, then this proposal will increase the cost of construction. However, programmable thermostats are becoming more standard in the marketplace for new residential construction, so the cost impact is effectively zero. Cost differentials when purchasing a programmable vs. non-programmable thermostat are minimal.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This appropriately places the requirement for a programmable thermostat on all types of HVAC systems. Forced air systems are not the only system that would benefit from a programmable thermostat.

Assembly Action: **None**

Final Hearing Results

RE105-13	**AS**

Code Change No: RE107-13

Original Proposal

Section(s): R403.2.1 (IRC N1103.2.1)

Proponent: Shaunna Mozingo, City of Cherry Hills Village, representing Colorado Chapter of ICC, Inc. smozingo@coloradocode.net

Revise as follows:

R403.2.1 (N1103.2.1) Insulation (Prescriptive). Supply and return ducts in attics shall be insulated to a minimum of R-8. ~~All other ducts~~ Supply and return ducts in other portions of the building shall be insulated to a minimum of R-6.

Exception: Ducts or portions thereof located completely inside the building thermal envelope.

Reason: The requirement as written is commonly misinterpreted to say that all supply ducts in attics are insulated to R-8 and all other ducts in attics, including bathroom exhausts, returns, etc are insulated to R-6 when in fact, the intent was that the supply ducts in attics get R-8 and the supplies in other unconditioned spaces in the building, such as garages, ventilated crawl spaces, etc, get R-6. Also, the ducts should not be limited to supplies but should include return ducts as well. This intent is called out much more clearly in the commercial section of the code.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R403.2.1 (N1103.2.1) Insulation (Prescriptive). Supply and return ducts in attics shall be insulated to a minimum of R-8 where 3 inch diameter and greater and R-6 where less than 3 inch diameter. All other ducts supply and return ducts in other portions of the building shall be insulated to a minimum of R-6 where 3 inch diameter and greater and R-4.2 where less than 3 inch diameter.

Committee Reason: This proposed change reflects the original intent of the code that "all other ducts" was meant to mean supply and return ducts, not bathroom exhausts, etc. The modification is to reflect the fact that energy losses in smaller ducts are less.

Assembly Action: **None**

Final Hearing Results

RE107-13	**AM**

Code Change No: RE109-13

Original Proposal

Section(s): R403.2 (IRC N1103.2), R403.2.2 (IRC N1103.2.2), R403.2.3 (NEW) (IRC N1103.2.3 (NEW)), R403.2.4 (NEW) (IRC N1103.2.4 (NEW))

Proponent: Craig Conner, Building Quality representing self (craig.conner@mac.com)

Revise as follows:

R403.2 (N1103.2) Ducts. Ducts and air handlers shall be in accordance with Sections R403.2.1 through ~~R403.2.3~~ R403.2.5.

R403.2.2 (N1103.2.2) Sealing (Mandatory). Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with either the International Mechanical Code or International Residential Code, as applicable.

Exceptions:

1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

~~Duct tightness shall be verified by either of the following:~~

1. ~~Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.~~
2. ~~Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m2) of conditioned floor area.~~

   ~~**Exception**: The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.~~

R403.2.3 (N1103.2.3) Duct testing (Mandatory). Ducts shall be pressure tested to determine air leakage by one of the following methods:

1. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be measured with a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. All registers shall be taped or otherwise sealed during the test.

   Exception: A duct air leakage test shall not be required where the ducts and air handlers are located entirely within the building thermal envelope.

A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*.

R403.2.4 (N1103.2.4) Duct leakage (Prescriptive). The total leakage of the ducts, where measured in accordance with Section R403.2.3, shall be as follows:

1. Postconstruction test: The total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area.
2. Rough-in test: The total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area where the air handler is installed at the time of the test. Where the air handler is not installed at the time of the test, the total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m^2) of conditioned floor area.

~~R403.2.3~~ R403.2.5 (~~N1103.2.3~~ N1103.2.5) Building cavities (Mandatory). Building framing cavities shall not be used as ducts or plenums.

Reason: This is exactly the online draft DOE posted. DOE put it well in their reason statement as posted online with the change above:

"The proposal simply changes the duct leakage requirements from mandatory to prescriptive, while retaining the testing requirement and duct construction specifications. Changing the duct leakage rate from mandatory to prescriptive will allow builders the option of trading improvements in other building components for less stringent pressure test results or vice versa. This provides flexibility in meeting the requirements and options for recovering from an unexpected test failure. "

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: By moving the duct leakage requirements from mandatory to prescriptive the code is allowing tradeoff for improvements in other building components; thus the code is more flexible.

Assembly Action: **None**

Final Hearing Results

RE109-13 **AS**

Code Change No: RE111-13

Original Proposal

Section(s): R403.2.2 (IRC N1103.2.2)

Proponent: Vickie Lovell InterCode Inc. representing DuctMate Industries (vickie@intercodeinc.com)

Revise as follows:

R403.2.2 (N1103.2.2) Sealing (Mandatory). Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with either the *International Mechanical Code* or *International Residential Code*, as applicable.

Exceptions:

1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. ~~Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~ For ducts having a static pressure classification of less than 2 inches of water column (500 Pa), additional closure systems shall not be required for continuously welded joints and seams, and locking-type joints and seams of other than the snap-lock and button-lock types.

Duct tightness shall be verified by either of the following:

1. Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.
2. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m^2) of conditioned floor area.

   Exception: The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

Reason: This proposed text is derived from a revision to the International Mechanical Code that was proposed by the PMG Code Action Committee in M151-12 and was approved by the voting membership in Portland for the 2015 IMC. That reason statement is supplied below:

"Unless sealant or a gasket is used, snap-lock and button-lock type seams will leak significantly. The current exception attempted to prevent unnecessary sealing for joints and seams that leak very little or not at all, but it went too far by including all locking type joints and seams. Some locking joints are leakproof such as mechanically folded seams used for spiral seam duct, but this cannot be said for all locking joints."

The identical proposal is being submitted to the 2015 IECC commercial requirements for consistency.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This is an important clarification regarding ducts that can be allowed and how to treat them to ensure integrity of the system.

Assembly Action: **None**

Final Hearing Results

RE111-13	**AS**

Code Change No: RE117-13

Original Proposal

Section(s): R403.2.2 (IRC N1103.2.2)

Proponent: Donald J. Vigneau, AIA, Northeast Energy Efficiency Partnerships, Inc. (NEEP) (dvigneau@neep.org)

Revise as follows:

R403.2.2 (N1103.2.2) Sealing (Mandatory). Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with either the International Mechanical Code or International Residential Code, as applicable.

Exceptions:

1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. Continuously welded and locking-type longitudinal seams in ducts operating at a static pressure less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Duct tightness shall be verified by either of the following options;

1.~~2~~. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handling enclosure, All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm per 100 square feet (9.29 m^2) of conditioned floor area.

2.~~1~~. Post-construction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handling enclosure, All register boots shall be taped or otherwise sealed during the test.

Exception: The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

Reason: Reversing the order of the required testing options places the first option in a preferential position, to lead the user in selection of these required test options. Rough-in testing is the optimum time for the test, as it allows maximum opportunity to inspect the duct sealing, identify and rectify leaks in the sealed joints, and allow for inspections when the completeness of the ductwork assembly can be verified and before concealed spaces are closed in. The remaining openings for terminals and connections can readily be checked at building appliance and equipment installation inspections customarily accomplished shortly before a final inspection.

Reversing the order increases the probability that problems in the duct sealing not only can be more easily found, but also corrected at the best possible time for easy access and reduced costs for the corrections. No revisions to the existing options text is required; only re-numbering.

Note: This is the second code change proposal submitted on the same code section. Each submittal covers different subsections of the code section requirements and the two proposals are not related.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed change removes an exception that is not related to energy conservation.

Assembly Action: **None**

Final Hearing Results

RE117-13	**AS**

Code Change No: RE118-13

Original Proposal

Section(s): R403.2.2 (IRC N1103.2.2)

Proponent: Donald J. Vigneau, AIA, Northeast Energy Efficiency Partnerships, Inc. (NEEP) (dvigneau@neep.org)

Revise as follows:

R403.2.2 (N1103.2.2) Sealing (Mandatory). Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with either the International Mechanical Code or International Residential Code, as applicable.

Exceptions:

1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. Continuously welded and locking-type longitudinal seams in ducts operating at a static pressure less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Duct tightness shall be verified by either of the following options;

1. ~~2~~. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handling enclosure, All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm per 100 square feet (9.29 m^2) of conditioned floor area.
2. ~~1~~. Post-construction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handling enclosure, All register boots shall be taped or otherwise sealed during the test.

Exception: The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

Reason: Reversing the order of the required testing options places the first option in a preferential position, to lead the user in selection of these required test options. Rough-in testing is the optimum time for the test, as it allows maximum opportunity to inspect the duct sealing, identify and rectify leaks in the sealed joints, and allow for inspections when the completeness of the ductwork assembly can be verified and before concealed spaces are closed in. The remaining openings for terminals and connections can readily be checked at building appliance and equipment installation inspections customarily accomplished shortly before a final inspection.

Reversing the order increases the probability that problems in the duct sealing not only can be more easily found, but also corrected at the best possible time for easy access and reduced costs for the corrections. No revisions to the existing options text is required; only re-numbering.

Note: This is the second code change proposal submitted on the same code section. Each submittal covers different subsections of the code section requirements and the two proposals are not related.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The reverse order of items 1 and 2 provides a more logical format that assists the contractor's understanding of the provisions.

Assembly Action: **None**

Final Hearing Results

RE118-13	**AS**

Code Change No: RE125-13, Part I

Original Proposal

Section(s): R403.4.1 (IRC N1103.4.1), R403.4.1.1 (NEW) (IRC N1103.4.1.1 (NEW)), R403.4.1.2 (NEW) (IRC N1103.4.1.2 (NEW)), Chapter 5, IPC [E] 607.2.1, [E] 607.2.1.1 (NEW), [E] 607.2.1.1.1 (NEW), [E] 607.2.1.1.2 (NEW), IPC Chapter 14, IRC P2905 (NEW), IRC P2905.1 (NEW)

Proponent: Gary Klein, Affiliated International Management, LLC Gary Klein (Gary@aim4sustainability.com)

THIS IS A 3 PART CODE CHANGE. PARTS I AND II WILL BE HEARD BY THE IECC RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AS 2 SEPARATE CODE CHANGES. PART III WILL BE HEARD BY THE IRC-PM COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I IECC-RESIDENTIAL PROVISIONS

Revise as follows:

R403.4.1 (IRC N1103.4.1) ~~Circulating~~ ~~hot~~ Heated water circulation and temperature maintenance systems (Mandatory)~~.~~ ~~Circulating hot water systems shall be provided with an automatic or readily *accessible* manual switch that can turn off the hot-water circulating pump when the system is not in use.~~ Heated water circulation systems shall be in accordance with Section R403.4.1.1. Heat trace temperature maintenance systems shall be in accordance with Section R403.4.1.2. Automatic controls, temperature sensors and pumps shall be *accessible*. Manual controls shall be *readily accessible*.

R403.4.1.1 (IRC N1103.4.1.1) Circulation systems. Heated water circulation systems shall be provided with a circulation pump. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Gravity and thermo-syphon circulation systems shall be prohibited. Circulation system pump controls shall be demand activated. The controls shall start the pump upon sensing the presence of a user of a fixture or appliance, receiving a signal from the action of an action of a user of a fixture or appliance or sensing the flow of heated water to a fixture or appliance. The controls shall limit the water temperature increase in the return water piping to not more than 10ºF (5.6 ºC) greater than the initial temperature of the water in the return piping and shall limit the return water temperature to 102ºF (38.9ºC).

R403.4.1.2 (IRC N1103.4.1.2) Heat trace systems. Electric heat trace systems shall comply with IEEE 515.1. Controls for such systems shall be able to automatically adjust the energy input to the heat tracing to maintain the desired water temperature in the piping in accordance with the times when heated water is used in the occupancy.

Add new standards to Chapter 5 (IRC Chapter 44) as follows:

The Institute of Electrical and Electronic Engineers, Inc.
3 Park Avenue
New York, NY 1016-5997

IEEE

515.1-2012 IEEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Commercial Applications

Reason: There are 2 primary reasons for this proposed change. 1) Correlate the language in the IECC, the IRC and the IPC; 2) Clarify the requirements for heated water circulation systems and for heat trace systems, if they are installed. The proposed changes do not require the use of circulation or heat trace.

The current code language is not the same in the IECC and the IPC. It should be. It should also be the same in the IRC since the heated water systems do not know what occupancy they are in.

The current language allows for continuously operating circulation pumps, which creates inefficiency in the hot water distribution system. It also does not address the use of heat trace in both codes and there is currently no requirement that the heat trace be suitable for the application. The consequence is that water heating energy consumption is increased.

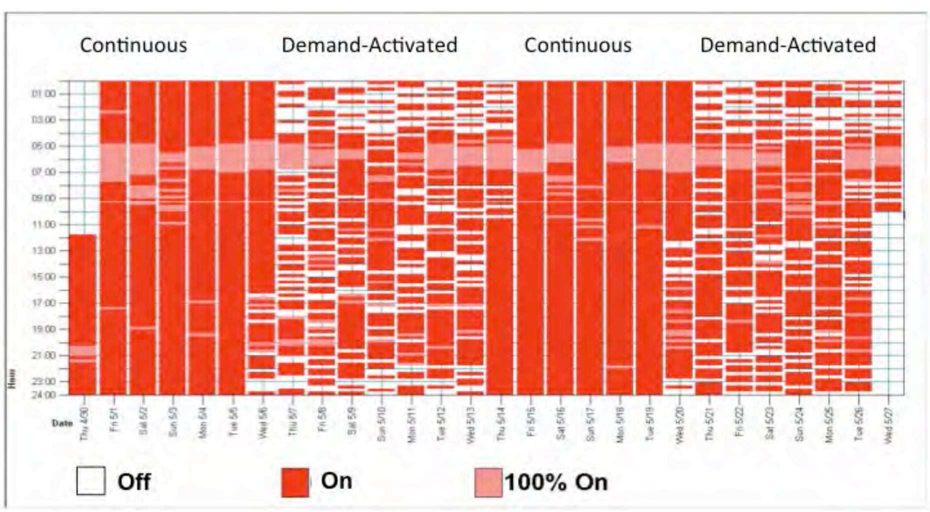
Figure 1 shows that demand activated circulation is significantly more energy efficient than any other type of heated water circulation system. The annual energy needed to keep the loop hot with water heated electrically or with natural gas are shown separately from the energy needed for the pump. The majority of the energy is lost in keeping the water in the loop at the desired temperature (all of it if there is a gravity loop). A small loop, 100 feet including the supply and the return was analyzed. The savings ranges from 87.5 percent when compared to a recirculation system that runs only 2-hours per day to 99 percent when compared to a recirculation system that runs only 24-hours per day. The operating costs and savings remain proportional as the length of the circulation loop and the flow rate of the pump increase.

Figure 1 Annual Energy Requirements for Demand Activated Circulation and Standard Recirculation

	Standard Recirculation						**Demand Activated Circulation**
	Daily Hours of Operation						
	24	12	8	6	4	2	0.25
Loop Heat Losses							
Natural Gas (therms)	292	146	97	73	49	24	3
Electric (kWh)	6,388	3,194	2,129	1,597	1,065	532	67
Pump Energy (kWh)	438	219	146	110	73	37	8

Figure 2 shows the differences in run-time at the water heater (or boiler) between a continuously pumped recirculation loop and one that has a demand activated pump control. Blank space (white) means the water heater was off. Red means some percent of run-time between zero and continuous. Pink means the water heater or boiler was running continuously. The test results come from studies done by Southern California Gas Company on a sample of more than 300 multi-family buildings with central water heaters and recirculation systems. Most systems tested were built before insulation was required on hot water recirculation loops. Savings ranged from 10-30 percent of the water heating energy use and 84 percent of the pump electricity use. The costs for installing the retrofit were paid back in just about one year. In new construction, the marginal costs would be recovered in just a few months

Figure 2 Run-time of Water Heater with Two Different Pump Controls



Why is demand-activated circulation such an efficient strategy? The 2012 IECC, IPC and IRC require that the hot water piping in automatic temperature maintenance systems in new buildings be insulated with pipe insulation. This means the water in the circulation loop will stay hot for a very long time – up to 45 minutes for ¾ inch nominal pipe up to 2 hours for 2-inch nominal pipe – even if the circulating pump is shut off. If this is the case, why run the pump when the water is still hot? Why run the pump when no one is in the building or when no one is demanding hot water? The only time it makes sense to run the pump is shortly before hot water is needed: hence the requirement that the pump be controlled on-demand.

The requirements for heat trace are partly to ensure that the systems can be operated in the most energy efficient manner consistent with providing heated water to the occupancy. The reference standards are included to ensure that installed systems are safe for the intended application. The energy consequences of using heat trace are very reasonable. Figure 3 presents the energy requirements for a heat trace system with the same hot water supply piping as the circulation systems shown in Figure 1. The energy requirements of keeping the trunk line hot – the same as keeping the supply portion of the loop hot in a circulating system – are 701 kWh per year, assuming 12 hours at high temp (115F) and 12 hours at economy temp (105F). This is equivalent to operating the loop about 3 hours per day, but with hot water available 24/7 in the supply trunk! This is a significant savings when water heating is done electrically or with a similarly expensive fuel. If the branches are also traced, we can deliver heated water even more quickly to the fixtures using only 1,682 kWh per year, which is the same energy as running the loop a little more than 6 hours a day.

Figure 3. Annual Energy Needed for Electric Heat Trace Systems

Heat Trace			
	(kWh per year)		
	Trunk	Br	T-Br
Supply Heat Losses			
High Temp	394	552	946
Economy Temp	307	429	736
Total Electricity	701	981	1,682

Cost impact: The proposal does not require either circulation or heat trace; however if either is selected, it clarifies the requirements for installation. Most recirculation systems today are installed with some form of control, usually a timer, a bandwidth thermostat (aquastat) or both. Some come with more sophisticated controls, such as programmable or are connected to an energy management system. In some cases, switching from these control strategies to demand activated controls will cost less. In other cases, the demand-activated controls will cost more.

Analysis: A review of the standards proposed for inclusion in the code, UL 515 and CSA 22.2 No 130-03 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2013.

Public Hearing Results

For staff analysis of the content of IEEE 515.1-2012 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

PART I – IECC – Residential
Committee Action: **Approved as Modified**

Modify the proposal as follows:

R403.4.1.1 (IRC N1103.4.1.1) Circulation systems. Heated water circulation systems shall be provided with a circulation pump. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Gravity and thermo-syphon circulation systems shall be prohibited. ~~Circulation system pump controls shall be demand activated. The controls shall start the pump upon sensing the presence of a user of a fixture or appliance, receiving a signal from the action of an action of a user of a fixture or appliance or sensing the flow of heated water to a fixture or appliance. The controls shall limit the water temperature increase in the return water piping to not more than 10ºF (5.6 ºC) greater than the initial temperature of the water in the return piping and shall limit the return water temperature to 102ºF (38.9ºC).~~ Controls for circulating hot water system pumps shall start the pump based on the identification of a demand for hot water within the occupancy. The controls shall automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is no demand for hot water.

R403.4.1.2 (IRC N1103.4.1.2) Heat trace systems. Electric heat trace systems shall comply with IEEE 515.1 or UL 515. Controls for such systems shall be able to automatically adjust the energy input to the heat tracing to maintain the desired water temperature in the piping in accordance with the times when heated water is used in the occupancy.

Add standard to Chapter 14 as follows:

UL

515-2011 Electrical Resistance Heat Tracing for Commercial and Industrial Applications including revisions through November 30, 2011

Committee Reason: The originally proposed control technology was too specific. The modified wording allows for different types of control technology. The UL 515 standard was added because most manufacturers are certifying heat trace products to the UL standard. The overall proposal was approved because the committee generally agreed that it costs too much to operate a circulation system all the time.

Assembly Action: **None**

Final Hearing Results

RE125-13, Part I	**AM**

Code Change No: RE136-13, Part I

Original Proposal

Section(s): R403.4.2 (NEW) (IRC N1103.4.2 (NEW)), IPC 202, IPC [E]607.2.1.1 (NEW), IRC P2905 (NEW), IRC P2905.1 (NEW)

THIS IS A 3 PART CODE CHANGE PROPOSAL. PARTS I AND II WILL BE HEARD BY THE IECC-RESIDENTIAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE AS 2 SEPARATE CODE CHANGES. PART III WILL BE HEARD BY THE IRC-PM COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Proponent: Gary Klein, Affiliated International Management, LLC, representing self, gary@aim4sustainability.com

PART I – IECC-RESIDENTIAL PROVISIONS

Add new text as follows:
R403.4.2 (IRC N1101.4.2) Demand recirculation systems. A water distribution system having one or more recirculation pumps that pump water from a heated water supply pipe back to the heated water source through a cold water supply pipe shall be a *demand recirculation water system.* Pumps shall have controls that comply with both of the following:

1. The control shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture or sensing the flow of hot or tempered water to a fixture fitting or appliance.
2. The control shall limit the water temperature increase in the cold water piping to not more than 10ºF (5.6 ºC) greater than the initial temperature of the water in the piping and limits the temperature entering the cold water piping to 102ºF (38.9 ºC).

Reason: The purpose of this code change proposal is to clarify the requirements for installing circulation pumps in applications that use a cold water supply pipe to circulate the water back to the water heater. Demand recirculation water systems are significantly more energy efficient than other recirculation systems and are inherently safer when the cold water supply is used as the return.

Figure 1 shows that demand activated circulation is significantly more energy efficient than any other type of heated water circulation system. The annual energy needed to keep the loop hot with water heated electrically or with natural gas are shown separately from the energy needed for the pump. The majority of the energy is lost in keeping the water in the loop at the desired temperature (all of it if there is a gravity loop). A small loop, 100 feet including the supply and the return was analyzed. The savings ranges from 87.5 percent when compared to a recirculation system that runs only 2-hours per day to 99 percent when compared to a recirculation system that runs only 24-hours per day. The operating costs and savings remain proportional as the length of the circulation loop and the flow rate of the pump increase.

Figure 1 Annual Energy Requirements for Demand Activated Circulation and Standard Recirculation

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	24	12	8	6	4	2	0.25
Loop Heat Losses							
Natural Gas (therms)	292	146	97	73	49	24	3
Electric (kWh)	6,388	3,194	2,129	1,597	1,065	532	67
Pump Energy (kWh)	438	219	146	110	73	37	8

The inherently better safety comes from the fact that the controls specified for demand recirculation water systems limit the flow of water from the hot water supply into the cold water supply to only minutes a day and because they limit the temperature of the water that is allowed to go into the cold water supply. There are five other control strategies for heated water recirculation systems (thermosyphon (gravity), continuous pumping, timer controlled, bandwidth temperature sensor (aquastat) controlled and a combination of timer and bandwidth temperature sensor (aquastat) controlled and none of them has the ability to meet these stringent requirements.

The requirements of this section should be identical in both the IECC and the IPC, since the language for the controls does not depend on occupancy

For more information and background on issues related to hot water distribution and for a more detailed analysis in support of this proposal please go to http://www.aim4sustainability.com Follow the link on the home page to Codes.

Cost impact: This proposal will not increase the cost of construction, as it does not require the use of demand recirculation water systems. In addition, the ability to use cold-water supply piping as a return pipe may reduce the cost of installing a circulation loop.

Public Hearing Results

PART I – IECC – Residential
Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides clarity on how demand recirculation systems that return water though a cold water pipe back to the source should operate.

Assembly Action: **None**

Public Comments

Public Comment 2:

Greg Towsley, Grundfos representing self, requests As Modified by this Public Comment.

Modify the proposal as follows:

R403.4.2 (IRC N1101.4.2) Demand recirculation systems. A water distribution system having one or more recirculation pumps that pump water from a heated water supply pipe back to the heated water source through a cold water supply pipe shall be a demand recirculation water system. Pumps shall have controls that comply with both of the following:

1. The control shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture, or sensing the flow of hot or tempered water to a fixture fitting or appliance.
2. The control shall limit the ~~water temperature increase in the cold water piping to not more than 10ºF (5.6 ºC) greater than the initial temperature of the water in the piping and limits the~~ temperature of the water entering the cold water piping ~~102ºF (38.9 ºC)~~ 104°F (40°C).

Commenter's Reason: The addition of the comma after fixture clarifies that there are three (3) options on how the pump will start. Eliminating the requirement of a temperature rise allows for innovation and reduces restriction of technology from only one design. Most thermostats available in the market are designed for 104°F, not 102°F.

Final Hearing Results

RE136-13, Part I	**AMPC2**

Code Change No: RE142-13

Original Proposal

Section(s): R403.6 (IRC N1103.6)

Proponent: Brian Dean, Energy Efficient Codes Coalition; Garrett Stone, Brickfield Burchette Ritts & Stone, PC; Jeff Harris, Alliance to Save Energy; Harry Misuriello, American Council for an Energy-Efficient Economy; and Bill Prindle, Energy Efficient Codes Coalition.

Revise as follows:

R403.6 (N1103.6) Equipment sizing <u>and efficiency rating</u> (Mandatory). Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other *approved* heating and cooling calculation methodologies. <u>New or replacement heating and cooling equipment shall have an efficiency rating equal to or greater than the minimum required by federal law for the geographic location where the equipment is installed</u>

Reason: The purpose of this code change is to codify the requirement that HVAC equipment must satisfy federal minimum requirements for the location. This proposal does not establish new requirements since it simply requires that equipment meet the federal standard, but it allows the code official to enforce the requirements. This proposal improves the effectiveness of the code by reinforcing a practice that should already be taking place in plan review and inspection -- verification of the efficiency rating of heating and cooling equipment. Although federal rules set the minimum efficiency levels for manufacturers, only code officials can determine whether equipment actually installed in buildings meets or exceeds the federal minimums. The EECC has offered a similar proposal for service hot water equipment under section R403.4.

This proposal is more important now than in the past because federal minimums are expected to shift away from single nationwide efficiency levels to regionally-based efficiency levels that will vary from state to state. It is possible, whether by accident or bad intent, to see equipment that would meet federal requirements in one jurisdiction used in other states or regions in which it does not meet the regional requirement. Although this verification may already be taking place, the proposal above is intended to make it a specific requirement in all buildings. This is an important opportunity for federal, state and local governments to work together to ensure that equipment installed meets federal minimums for the location.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This provision would ensure that minimum efficiency equipment be installed in the code.

Assembly Action: **None**

Final Hearing Results

RE142-13 **AS**

Code Change No: RE163-13

Original Proposal

Section(s): R405.4.2 (IRC N1105.4.2), R405.4.2.1 (NEW) (IRC N1105.4.2.1 (NEW)), R405.2.2 (NEW) (IRC N1105.4.2.2 (NEW))

Proponent: Robby Schwarz EnergyLogic Inc., representing EnergyLogic, Inc. (robby@nrglogic.com)

Revise as follows:

R405.4.2 (N1105.4.2) Compliance report. Compliance software tools shall generate a report that documents that the *proposed design* complies with Section R405.3. A compliance report on the *proposed design* shall be submitted with the application for the building permit. Upon completion of the building, a compliance report based upon the as-built condition of the building, shall be submitted to the *code official* before a certificate of occupancy is issued by the *code official*. Batch sampling of buildings to determine energy code compliance for all buildings in the batch shall be prohibited.

Compliance reports shall include information in accordance with Sections R405.4.2.1 and R405.4.2.2. ~~The compliance documentation shall include the following information:~~ Where the *proposed design* of a building could be built on different sites where the cardinal orientation of the building on each site is different, compliance of the *proposed design* for the purposes of the application for the building permit, shall be based upon the worst case orientation, worst case configuration, worst case building air leakage and worse case duct leakage. Such worse case parameters shall be used as inputs to the compliance software for energy analysis.

1. ~~Address or other identification of the residence;~~
2. ~~An inspection checklist documenting the building component characteristics of the *proposed design* as listed in Table R405.5.2(1). The inspection checklist shall show results for both the *standard reference design* and the *proposed design,* and shall document all inputs entered by the user necessary to reproduce the results;~~
3. ~~Name of individual completing the compliance report; and~~
4. ~~Name and version of the compliance software tool.~~

R405.4.2.1 (N1105.4.2.1) Compliance report for permit application. A compliance report submitted with the application for building permit shall include all of the following:

1. Building street address, or other building site identification.
2. A statement indicating that the *proposed design* complies with Section R405.3.
3. An inspection checklist documenting the building component characteristics of the *proposed design* as indicated in Table R405.5.2(1). The inspection checklist shall show results for both the *standard reference design* and the *proposed design* with all user inputs to the compliance software to generate the results.
4. A site-specific energy analysis report that is in compliance with Section R405.3
5. Name of the individual performing the analysis and generating the report.
6. Name and version of the compliance software tool.

R405.4.2.2 (N1105.4.2.2) Compliance report for certificate of occupancy. A compliance report submitted for obtaining the certificate of occupancy shall include all of the following:

1. Building street address, or other building site identification

2. A statement indicating that the as-built building complies with Section R405.3.
3. A certificate indicating that the building passes the performance matrix for code compliance and the energy saving features of the buildings.
4. A site-specific energy analysis report that is in compliance with Section R405.3.
5. Name of the individual performing the analysis and generating the report.
6. Name and version of the compliance software tool.

~~**Exception:** Multiple orientations. When an otherwise identical building model is offered in multiple orientations, compliance for any orientation shall be permitted by documenting that the building meets the performance requirements~~

Reason: Jurisdictions, Builders, third party inspection companies and others are not clear of the process for completing and utilizing the simulated performance path. With all pathways through the energy code one must in essence declare how they will meet the intent of the code. For the prescriptive path they simply say they are going prescriptive, for the UA trade off path they submit a document such as a RESCheck report, and for the simulated performance path they must currently submit a document demonstrating that the annual energy cost of the proposed design are less than or equal to the same home if it were built with the reference design specification. It becomes unclear how one demonstrates that they have carried out their proposed design. The revisions proposed for this section clearly outlines a process by which the proposed design is submitted, inspections take place, and additional analysis is preformed to ensure that the proposed design was achieved or bettered for the purposes of compliance.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal provides clarity for interested parties to understand what the process is for utilizing the performance path.

Assembly Action: **None**

Final Hearing Results

RE163-13 **AS**

Code Change No: RE188-13

Original Proposal

Section(s): R202 (NEW) (IRC N1101.9 (NEW)), R401.2 (IRC N1101.15), R406 (NEW) (IRC N1106 NEW)

Proponent: Eric Makela, Britt Makela Group, Inc., David Goldstein, National Resource Defense Council (Eric@BrittMakela.com)

Revise as follows:

R401.2 (N1101.15) Compliance. Projects shall comply with Sections identified as "mandatory" and with either sections identified as "prescriptive", ~~or~~ the performance approach in Section R405~~.~~ or an Energy Rating Index (ERI) approach in Section R406.

SECTION R406 (N1106)
ENERGY RATING INDEX COMPLIANCE ALTERNATIVE

R406.1 (N1106.1) Scope. This section establishes criteria for compliance using an Energy Rating Index analysis.

R406.2 (N1106.2) Mandatory requirements. Compliance with this section requires that the mandatory provisions identified in Section R401.2 and R403.4.2 be met. The building thermal envelope shall be greater than or equal to levels of efficiency and Solar Heat Gain Coefficient in Table 402.1.1 or 402.1.3 of the 2009 *International Energy Conservation Code.*

> **Exception:** Supply and return ducts not completely inside the building thermal envelope shall be insulated to a minimum of R-6.

R406.3 (N1106.3) Energy rating index. The energy rating index (ERI) shall be a numerical integer value that is based on a linear scale constructed such that the *ERI reference design* has an Index value of 100 and a residential building that uses no net purchased energy has an Index value of 0. Each integer value on the scale shall represent a one percent (1%) change in the total energy use of the *rated design* relative to the total energy use of the *ERI reference design*. The ERI shall consider all energy used in the residential building.

R406.3.1 (N1106.3.1) ERI reference design. The *ERI reference design* shall be configured such that is it meets the minimum requirements of the 2006 *International Energy Conservation Code* prescriptive requirements

The proposed residential building shall be shown to have an annual total normalized Modified Loads that are less than or equal to the annual total Loads of the *ERI reference design.*

R406.4 (N1106.4) ERI based compliance. Compliance based on an ERI analysis requires that the *rated design* be shown to have an ERI less than or equal to the appropriate value listed in Table R406.3, when compared to the *ERI reference design*.

TABLE R406.4 (N1106.4)
MAXIMUM ENERGY RATING INDEX

Climate Zone	Energy Rating Index
1	52
2	52
3	51
4	54
5	55
6	54
7	53
8	53

R406.5 (N1106.5) Verification by approved agency. Verification of compliance with Section R406 shall be completed by an *approved* third party.

R406.6 (N1106.6) Documentation. Documentation of the software used to determine the energy rating index and the parameters for the residential building shall be in accordance with Sections R406.6.1 through R406.6.3.

R406.6.1 (N1106.6.1) Compliance software tools. Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the *code official.*

R406.6.2 (N1106.6.2) Compliance report. Compliance software tools shall generate a report that documents that the energy rating index of the *rated design* complies with Sections R406.3 and R406.4. The compliance documentation shall include the following information:

1. Address or other identification of the residential building;
2. An inspection checklist documenting the building component characteristics of the *rated design*. The inspection checklist shall show results for both the *ERI reference design* and the *rated design,* and shall document all inputs entered by the user necessary to reproduce the results;
3. Name of individual completing the compliance report; and
4. Name and version of the compliance software tool.

   Exception: Multiple orientations. When an otherwise identical building model is offered in multiple orientations, compliance for any orientation shall be permitted by documenting that the building meets the performance requirements in each of the four cardinal (north, east, south and west) orientations.

R406.6.3 (N1106.6.3) Additional documentation. The *code official* shall be permitted to require the following documents:

1. Documentation of the building component characteristics of the *ERI reference design.*
2. A certification signed by the builder providing the building component characteristics of the *rated design.*
3. Documentation of the actual values used in the software calculations for the *rated design.*

R406.7 (N1106.7) Calculation software tools. Calculation software, where used, shall be in accordance with Sections R406.7.1through R406.7.3.

R406.7.1 (N1106.7.1)Minimum capabilities. Calculation procedures used to comply with this section shall be software tools capable of calculating the energy rating index as described in Section R406.3, and shall include the following capabilities:

1. Computer generation of the *ERI reference design* using only the input for the *rated design.* The calculation procedure shall not allow the user to directly modify the building component characteristics of the *ERI reference design.*
2. Calculation of whole-building, as a single *zone,* sizing for the heating and cooling equipment in the *ERI reference design* residence in accordance with Section R403.6.
3. Calculations that account for the effects of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilating and air-conditioning equipment based on climate and equipment sizing.
4. Printed *code official* inspection checklist listing each of the *rated design* component characteristics determined by the analysis to provide compliance, along with their respective performance ratings.

R406.7.2 (N1106.7.2) Specific approval. Performance analysis tools meeting the applicable sections of Section R406 shall be *approved.* Tools are permitted to be *approved* based on meeting a specified threshold for a jurisdiction. The *code official* shall approve tools for a specified application or limited scope.

R406.7.3 (N1106.7.3) Input values. When calculations require input values not specified by Sections R402, R403, R404 and R405, those input values shall be taken from an *approved* source.

Add new definitions as follows:

RATED DESIGN. A description of the proposed building used to determine the energy rating index.

ERI REFERENCE DESIGN. A version of the *rated design* that meets the minimum requirements of the 2006 *International Energy Conservation Code.*

Reason: The residential provisions of the IECC allows for varying methods for demonstrating compliance with the code. This includes both a prescriptive and simulated performance option in addition to allowing efficiency programs that are designed to go above the minimum code levels as “deemed to comply” programs. These above code programs must be approved by the code official to be used in the jurisdiction. Alternative programs that depend on an Energy Rating Index (ERI) have been approved as an alternative code or above code program in at least 6 states and in over 130 jurisdictions. These types of programs typically take the form of a Home Energy Rating System (HERS) program. Under the current code there is no guidance on setting Energy Rating Index scores, which will lead to inconsistent application of these types of programs based on climate zones.

The goal of this proposal is to introduce an Energy Rating Index with established rating numbers into the code that will allow alternative programs to be designed to meet these criteria. The proposal provides guidelines for the development of the index, documentation provided to ensure compliance and a requirement that an approved 3rd party verify that the building complies with the applicable Energy Rating Index. The reference house is based on a home built to the 2006 IECC which is consistent with ERI based programs.

The 2009 IECC residential envelope requirements have been set as the least efficient level of efficiency for potential trade-offs to ensure that minimum levels of efficiency that have proven to be cost effective are installed in all buildings and that some flexibility is allowed in the approach to alternative designs. This proposal also requires complying with the applicable mandatory requirements to be consistent with the Above Code section in the IECC. And because energy losses in the domestic hot water distribution system fall outside the scope of the energy rating index as it can be calculated with 2013 methodology, current code provisions relating to hot water pipe insulation are mandatory as well. We anticipate that these requirements can be folded into the energy rating index for the 2018 IECC and thus removed from the mandatory sections then.

This proposal is intended to produce substantial additional energy savings compared to the current or proposed levels of prescriptive requirements in the 2015 IECC while allowing considerably greater flexibility to builders using a method with which a large segment of the market is already familiar. This flexibility is likely to result in lower construction costs for any given level of energy efficiency. Builders who do not make use of this proposed method are still able to comply with the Code can still use any of the existing compliance pathways.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal, while providing 20% more stringency, provides a system that has considerably more flexibilitty for achieving energy efficiency. Rating systems are becoming a more common approach, with straightforward options that are being more widely used in the construction marketplace.

Assembly Action: **None**

Final Hearing Results

RE188-13	**AS**

Code Change No: SP19-13

Original Proposal

Section(s): 303.1; IECC C404.7; IECC R403.9

Proponent: Jennifer Hatfield, J. Hatfield & Associates, PL, representing the Association of Pool & Spa Professionals (jhatfield@apsp.org)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE ISPSC COMMITTEE, Part II WILL BE HEARD BY THE IECC-CE COMMITTEE, PART III WILL BE HEARD BY THE IECC-RE COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I - ISPSC

Revise as follows:

303.1 ~~General~~ Pool and spa energy consumption. The energy consumption of ~~requirements for~~ pools and ~~inground permanently~~ ~~installed~~ *permanent residential spas* shall be controlled by the requirements ~~as specified~~ in Sections 303.~~2~~ 1.1 through 303.1.4. ~~and APSP 15. The energy requirements for residential portable electric spas shall be in accordance with APSP 14.~~

303.1.1 Residential pools and permanent residential spas. *Residential swimming pools* and *permanent residential spas* shall be in accordance with APSP-15.

303.1.2 Heaters. The electric power to heaters shall be ~~equipped~~ ~~with~~ controlled by a~~n~~ readily accessible ~~external~~ on-off switch that is mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. ~~to allow the heater to be shutoff without adjusting the thermostat setting.~~ ~~Such switch shall be provided with ready access~~. Gas-fired heaters shall not be equipped with ~~continuous pilot burners~~ continuously-burning ignition pilots.

> ~~**Exception:** Portable residential spas and portable residential exercise spas.~~

303.1.3 Time switches. Time switches or other control methods that can automatically turn off and on heaters and pump~~s~~ motors according to a preset schedule shall be installed ~~with~~ for ~~on~~ ~~all~~ heaters and pump motors. Heaters and~~,~~ pump~~s and~~ motors that have built-in time~~rs~~ switches shall be ~~deemed~~ in compliance with this section ~~requirement~~.

> **Exceptions:**
>
> 1. Where public health standards require 24-hour pump operation.
> 2. Pumps that operate solar- or waste-heat recovery pool heating systems.
> 3. ~~Portable residential spas and portable residential exercise spas.~~

303.1.4 Covers. Outdoor heated pools and outdoor ~~inground permanently-installed~~ *permanent residential spas* shall be provided with a vapor retardant cover, a liquid cover or other *approved* vapor retardant means in accordance with 104.11.

> **Exception:** Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required.

303.2 Portable residential spas. The energy consumption of electric-powered *portable residential spas* shall be controlled by the requirements of APSP 14.

PART II - IECC-COMMERCIAL PROVISIONS

Revise as follows:

C404.7 Pools and spa energy consumption ~~inground permanently installed spas.~~ (Mandatory). ~~Pools and inground permanently installed spas shall comply with Sections C404.7.1 through C404.7.3.~~ The energy consumption of pools and ~~inground~~ permanent residential spas shall be controlled by the requirements in Sections C404.7.1 through C404.7.4.

C404.7.1 Heaters. The electric power to ~~all~~ heaters shall be ~~equipped~~ ~~with~~ controlled by a~~n~~ readily accessible ~~external~~ on-off switch that is mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. ~~to allow the heater to be shutoff without adjusting the thermostat setting.~~ ~~Such switch shall be provided with ready access~~. Gas-fired heaters shall not be equipped with ~~continuous pilot burners~~ continuously-burning ignition pilots..

> ~~**Exception:** Portable residential spas and portable residential exercise spas.~~

C404.7.2 Time switches. Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed ~~with~~ for ~~on~~ ~~all~~ heaters and pump motors. Heaters and~~,~~ pump~~s and~~ motors that have built-in tim~~ers~~ switches shall be ~~deemed~~ in compliance with this section ~~requirement~~.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. ~~Where~~ Pumps that ~~are required to~~ operate solar- and waste-heat-recovery pool heating systems.

C404.7.3 Covers. Outdoor heated pools and outdoor ~~inground permanently-installed~~ permanent residential spas shall be provided with a vapor retardant cover, a liquid cover or other *approved* vapor retardant means.

> **Exception:** ~~A vapor-retardant cover is not required for pools deriving over 70 percent of the energy for heating from site-recovered energy, such as a heat pump or solar energy source computed over an operating season.~~ Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required.

C404.8 Portable residential spas. The energy consumption of electric-powered portable residential spas shall be controlled by the requirements of APSP 14.

Part III - IECC-Residential Provisions

Revise as follows:

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R403.9 Pools and spa energy consumption ~~inground permanently installed spas.~~ (Mandatory). ~~Pools and inground permanently installed spas shall comply with Sections R403.9.1 through R403.9.3.~~ The energy consumption of pools and ~~inground~~ permanent residential spas shall be controlled by the requirements in Sections R403.9.1 through R403.9.4.

R403.9.1 Heaters. The electric power to heaters shall be ~~equipped~~ ~~with~~ controlled by ~~an~~ readily accessible ~~external~~ on-off switch that is mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. ~~to allow the heater to be shutoff without adjusting the thermostat setting.~~ ~~Such switch shall be provided with ready access~~. Gas-fired heaters shall not be equipped with ~~continuous pilot burners~~ continuously-burning ignition pilots.

R403.9.2 Time switches. Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed ~~with~~ for ~~on~~ ~~all~~ heaters and pump motors. Heaters and~~,~~ pump~~s and~~ motors that have built-in tim~~ers~~ switches shall be ~~deemed~~ in compliance with this section ~~requirement~~.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. ~~Where~~ Pumps that ~~are required to~~ operate solar- and waste-heat-recovery pool heating systems.

R403.9.3 Covers. Outdoor heated pools and outdoor ~~inground permanently-installed~~ permanent residential spas shall be provided with a vapor retardant cover, a liquid cover or other *approved* vapor retardant means.

Exception: ~~A vapor-retardant cover is not required for pools deriving over 70 percent of the energy for heating from site-recovered energy, such as a heat pump or solar energy source computed over an operating season.~~ Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required.

R403.10 Portable residential spas. The energy consumption of electric-powered portable residential spas shall be controlled by the requirements of APSP 14.

Reason:
PART I: This code change provides for the following:

1. All parts work to provide consistent language with pool and spa energy provisions found in the ISPSC and IECC. Some portions have been added here that were already included in the ISPSC and vice versa on part II and III of this proposal below.
2. Clarifies APSP-15 only applies to residential pools and inground spas.
3. Changes wording to use defined terms, as found in Chapter 2 of the ISPSC.
4. Clarifications regarding on-off switches for heaters.
6. Consistent verbiage within the time switch requirements.
7. Provides for clarity that the cover requirements are only for outdoor pools.
8. Provides for options when it comes to pool and spa covers to ensure one can comply with more intricately designed pools and spas (shape, size/infinity pools/etc.). Otherwise if only one type of method can be used then the code is limiting the design of any pool or spa. The "typical" rectangle pool is no longer the norm.

PART II Reason: This code change provides for the following:

1. All parts work to provide consistent language with pool and spa energy provisions found in the ISPSC and IECC. Some portions have been added here that were already included in the ISPSC and vice versa on part II and III of this proposal below.
2. Changes wording to use defined terms, as found in Chapter 2 of the ISPSC.
3. Clarifications regarding on-off switches for heaters.
4. Consistent verbiage within the time switch requirements.
5. Provides for clarity that the cover requirements are only for outdoor pools.
6. Provides for options when it comes to pool and spa covers to ensure one can comply with more intricately designed pools and spas (shape, size/infinity pools/etc.). Otherwise if only one type of method can be used then the code is limiting the design of any pool or spa. The "typical" rectangle pool is no longer the norm.
7. Provides for a new subsection to address portable residential spas in the rare case they would be used for more than a four story building and therefore fall under the commercial code.

PART III Reason: This code change provides for the following:

1. All parts work to provide consistent language with pool and spa energy provisions found in the ISPSC and IECC. Some portions have been added here that were already included in the ISPSC and vice versa on part II and III of this proposal below.
2. Clarifies APSP-15 only applies to residential pools and inground spas.
3. Changes wording to use defined terms, as found in Chapter 2 of the ISPSC.
4. Clarifications regarding on-off switches for heaters.
5. Consistent verbiage within the time switch requirements.
6. Provides for clarity that the cover requirements are only for outdoor pools.
7. Provides for options when it comes to pool and spa covers to ensure one can comply with more intricately designed pools and spas (shape, size/infinity pools/etc.). Otherwise if only one type of method can be used then the code is limiting the design of any pool or spa. The "typical" rectangle pool is no longer the norm.
8. Provides for a new subsection to address portable residential spas, requiring their compliance with the APSP-14 energy standard, consistent with the ISPSC.

Cost impact: These code change proposals will not increase the cost of construction.

Public Hearing Results

The code change is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information.

PART I – ISPSC

Heard by the ISPSC Committee

Committee Action: Disapproved

Committee Reason: The proposal was disapproved because it does not give credit to heaters that have on-off switches integral to the product. Shutting off power to some controls might cause the control to revert back to factory settings. Covers are only required for outdoor pools and spas. Indoor pools and spas should also have covers. Liquid covers are relatively new but there are no standards for this type of product. A standard for this product should be available before it is required by the code.

Assembly Action: None

PART II – IECC - Commercial

Heard by the IECC-Commercial Provisions Committee

Committee Action: Approved as Modified

Modify the proposal as follows:

C404.7 Pools and permanent spa energy consumption (Mandatory). The energy consumption of pools and permanent ~~residential~~ spas shall be controlled by the requirements in Sections C404.7.1 through C404.7.4.

C404.7.1 Heaters. The electric power to heaters shall be controlled by a readily accessible on-off switch that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously-burning ignition pilots.

C404.7.2 Time switches. Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.

Exceptions:
1. Where public health standards require 24-hour pump operation.
2. Pumps that operate solar- and waste-heat-recovery pool heating systems.

C404.7.3 Covers. Outdoor heated pools and outdoor permanent ~~residential~~ spas shall be provided with a vapor retardant cover~~, a liquid cover~~ or other *approved* vapor retardant means.

Exception: Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered

energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required.
C404.8 Portable ~~residential~~ spas (Mandatory). The energy consumption of electric-powered portable ~~residential~~ spas shall be controlled by the requirements of APSP 14.

Committee Reason: The reason for making the modification is that this limits the energy requirements to permanent spas only. The reason for approving the overall proposal is that the proposal coordinates the energy requirements between the IECC and the ISPSC.

Assembly Action: None

PART III – IECC – Residential

Heard by the IECC-Residential Provisions Committee

Committee Action: Approved as Modified

Modify the proposal as follows:

R403.9 (N1104.9) Pools and permanent spa energy consumption (Mandatory). The energy consumption of pools and permanent residential spas shall be controlled by the requirements in Sections R403.9.1 through R403.~~9.4~~ 9.3.

> **Exception: ~~R403.9.1 Residential pools and permanent residential spas.~~** Heaters and time switches for swimming pools and permanent spas that are accessory to detached one- and two- family dwellings and townhouses 3 stories or less in height above ground plane and that are available only to the household and its guests shall be in accordance with APSP-15.

R403.9.~~2~~ 1 (N1104.9.~~2~~ 1) Heaters. The electric power to heaters shall be controlled by a readily accessible on-off switch that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously-burning ignition pilots.

R403.9.~~3~~ 2 (N1104.9.~~3~~ 2) Time switches. Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for ~~on all~~ heaters and pump motors. Heaters and~~,~~ pump~~s and~~ motors that have built-in time switches shall be in compliance with this section.

> **Exceptions:**
>
> 1. Where public health standards require 24-hour pump operation.
> 2. Pumps that operate solar- and waste-heat-recovery pool heating systems.

R403.~~9.4~~ 9.3 (N1104.~~9.4~~ 9.3) Covers. Outdoor heated pools and outdoor ~~permanent~~ residential spas shall be provided with a vapor retardant cover~~, a liquid cover~~ or other *approved* vapor retardant means.

> **Exception:** Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required

Committee Reason: For the modification, the committee agreed with the testimony from the proponent of floor modification that heaters and time switches for pools and spas accessory to IRC-type buildings do not need to comply with the same, more stringent, requirements for commercial applications. For the overall proposal, the committee agreed with the proponent's reason statement.

Assembly Action: None

Public Comments

PART I

Public Comment:

Jennifer Hatfield, J. Hatfield & Associates, PL, representing the Association of Pool & Spa Professionals requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

303.1 Energy consumption of pools and permanent spas. The energy consumption of pools and *permanent ~~residential~~ spas* shall be controlled by the requirements in Sections 303.1.1 through 303.1.~~4~~3.

~~**303.1.1 Residential pools and permanent residential spas.** *Residential swimming pools* and *permanent residential spas* shall be in accordance with APSP-15.~~

303.1.~~2~~1 Heaters. The electric power to heaters shall be controlled by a readily accessible on-off switch that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously-burning ignition pilots.

303.1.~~3~~2 Time switches. Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in timer switches shall be deemed in compliance with this section.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Pumps that operate solar- or waste-heat recovery pool heating systems.

303.1.~~4~~3 Covers. Outdoor heated pools and outdoor *permanent ~~residential~~ spas* shall be provided with a vapor retardant cover~~, a liquid cover~~ or other *approved* vapor retardant means in accordance with Section 104.11.

Exception: Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required.

303.2 Portable ~~residential~~ spas. The energy consumption of electric-powered *portable ~~residential~~ spas* shall be controlled by the requirements of APSP 14.

303.3 Residential pools and permanent residential spas. The energy consumption of *residential swimming pools* and *permanent residential spas* shall be controlled in accordance with the requirements of APSP 15.

Commenter's Reason: As it stands now there are inconsistent energy efficiency requirements between the IECC and ISPSC, which is why this three part public comment is essential to ensure that these codes are consistent with ANSI approved APSP Standards. Otherwise code officials, owners, manufacturers and installers will be faced with conflicting and possibly incompatible language. The public comment addresses the ISPSC committee's concerns, some of which was addressed in the IECC parts of the proposal in Dallas by floor modification after the input received by the ISPSC committee under Part I. This public comment implements those IECC changes to the ISPSC (Part I) portion of the proposal, but makes further clarifications to all parts to ensure the two I-codes have consistent energy efficient requirements for pools and spas.

Specifically in regards to Part I of the proposal, the public comment addresses the ISPSC committees reason for disapproval by a) adding in the integral on and off switches for heaters (already done in the IECC), b) removing the specific reference to a liquid cover, and allowing the AHJ to determine what other "approved vapor retardant means" can be used consistent with Chapter 1 (already done in the IECC), and 3) clarifying which provisions apply to public as opposed to residential *pools or permanent spas or portable spas.* This last aspect is critical to ensure it is only residential pools and spas that must meet the APSP Standard, as intended by the Standard, and the remaining portions are for both public and residential.

Part II of the proposal simply modifies the committee action by correcting a section reference. Part III of the proposal clarifies what provisions apply to public versus residential *pools as opposed to permanent spas or portable spas* – ensuring consistency between the respective Codes and the APSP Standard, following the proposed modifications under Part I.

PART II

Public Comment 1:

Jennifer Hatfield, J. Hatfield & Associates, PL, representing the Association of Pool & Spa Professionals requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

C404.7 Energy consumption of pools and permanent spas (Mandatory). The energy consumption of pools and permanent spas shall be controlled by the requirements in Sections C404.7.1 through C404.7.~~4~~3.

Commenter's Reason: This public comment simply modifies the committee action by fixing a section reference. There is not a Section C404.7.4.

Public Comment 2:

Edward R. Osann, Natural Resources Defense Council on behalf of self (eosann@nrdc.org) requests Approval as Modified by this Public Comment

Further modify the proposal as follows:

C404.7.3 Covers. ~~Outdoor~~ Heated pools and outdoor permanent spas shall be provided with a vapor retardant cover or other *approved* vapor retardant means.

> **Exception:** Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required.

Commenter's Reason: Without explanation or justification, the proposal as submitted would weaken current code language by removing the requirement that a pool cover be provided for all heated pools, whether located indoors or out. There is important value provided by a cover for an indoor pool, including humidity management, which has important energy implications. The modification in this comment would restore the current requirement that new heated indoor pools be provided with a vapor retardant cover.

PART III

Public Comment 1:

Jennifer Hatfield, J. Hatfield & Associates, PL, representing the Association of Pool & Spa Professionals requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R403.9 (N1104.9)) Pools and permanent spa energy consumption (Mandatory). The energy consumption of pools and permanent ~~residential~~ spas shall be controlled by the requirements in Sections R403.9.1 through R403.9.3.

> ~~**Exception:** Heaters and time switches for swimming pools and permanent spas that are accessory to detached one- and two-family dwellings and townhouses 3 stories or less in height above ground plane and that are available only to the household and its guests shall be in accordance with APSP-15.~~

R403.9.3 (N1104.9.3) Covers. Outdoor heated pools and outdoor <u>permanent</u> ~~residential~~ spas shall be provided with a vapor retardant cover or other *approved* vapor retardant means.

> **Exception:** Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required

R403.10 (N110~~3~~<u>4</u>.10) Portable ~~residential~~ spas (Mandatory). The energy consumption of electric-powered portable ~~residential~~ spas shall be controlled by the requirements of APSP 14.

<u>**R403.11 (N1104.11) Residential pools and permanent residential spas.** Residential swimming pools and permanent residential spas that are accessory to detached one- and two- family dwellings and townhouses 3 stories or less in height above grade plane and that are available only to the household and its guests shall be in accordance with APSP-15.</u>

Commenter's Reason: This public comment simply clarifies what provisions apply to public versus residential pools as opposed to permanent spas or portable spas, also ensuring consistency between the respective codes.

Public Comment 2:

Edward R. Osann, Natural Resources Defense Council on behalf of self (eosann@nrdc.org) requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R403.9.3 (N1104.9.3) Covers. ~~Outdoor~~ Heated pools and outdoor residential spas shall be provided with a vapor retardant cover or other *approved* vapor retardant means.

> **Exception:** Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source, covers or other vapor retardant means shall not be required

Commenter's Reason: Without explanation or justification, the proposal as submitted would weaken current code language by removing the requirement that a pool cover be provided for all heated pools, whether located indoors or out. There is important value provided by a cover for an indoor pool, including humidity management, which has important energy implications. The modification in this comment would restore the current requirement that new heated indoor pools be provided with a vapor retardant cover.

Final Hearing Results

SP19-13 Part I	**AMPC**
SP19-13 Part II	**AMPC1**
SP19-13 Part III	**AMPC1**

Code Change No: ADM2-13

Original Proposal

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE. PART II WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee and Virginia Building and Code Officials Association (bajnaic@chesterfield.gov)

PART I – IBC

Revise the International Building Code as follows:

IBC [A] 101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, relocation, enlargement, replacement, *repair*, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.

> **Exception:** Detached one- and two-family *dwellings* and multiple single-family *dwellings* (*townhouses*) not more than three *stories* above *grade plane* in height with a separate *means of egress*, and their accessory structures not more than three stories above grade plane in height, shall comply with the *International Residential Code*.

PART II – IRC

Revise the International Residential Code as follows:

IRC SECTION R202
DEFINITIONS

ACCESSORY STRUCTURE. A structure ~~not greater than 3,000 square feet (279 m2) in floor area, and not over two stories in height, the use of which~~ that is ~~customarily~~ accessory to and incidental to that of the dwelling(s) and which is located on the same *lot*.

IRC R101.2 Scope. The provisions of the International Residential Code for One- and Two-family Dwellings shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures not more than three stories above grade plane in height.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 6 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

After a thorough investigation on the history of the code change that introduced a 3,000 square foot limitation on accessory structure, the BCAC discovered that there was no technical justification provided by the original proponent to limit the size of an accessory structure. After some extensive discussion, the BCAC decided that specifying a limitation on the size of the accessory structure should be a decision left to the building official as determined by local zoning ordinances.

Cost Impact: None

Public Hearing Results

PART I - IADMIN
Committee Action: Approved as Submitted

Committee Reason: Adding the three story limitation is needed for coordination between the scope in the IBC and IRC. Three stories is an appropriate limit for accessory structures.

Assembly Action: None

PART II – IRC
HEARD BY IRC COMMITTEE

Committee Action: Approved as Submitted

Committee Reason: The committee approved this proposed code change because they felt that it allows the local zoning ordinances to determine the allowable size of accessory structures.

Assembly Action: None

Final Hearing Results

ADM2-13, Part I	**AS**
ADM2-13, Part II	**AS**

Code Change No: ADM18-13

Original Proposal

Section: PART I - IBC: [A] 103.2; IEBC: [A] 103.2; IFC: [A] 103.2; IFGC: [A] 103.2; IMC: [A] 103.2; IPC: [A] 103.2; IPMC: [A] 103.2; IPSDC: [A] 103.2; IWUIC: [A] 103.2;
PART II - IRC: R103.2;
PART III - ISPSC 103.2.

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE AS ONE CODE CHANGE. PART II WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. PART III WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

THIS CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE AS ONE CODE CHANGE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMMITTEE.

Proponent: Thomas Peterson, Box Elder County, representing the Utah Chapter of ICC (tpeterson@boxeldercounty.org)

PART II – IRC

Revise the International Residential Code as follows:

IRC R103.2 Appointment. The building official shall be appointed by ~~the chief appointing authority of~~ the jurisdiction.

Reason: The process in which a jurisdiction hires or by whom a Building/Code Official is appointed, should not be dictated by ICC and should be left up to the Jurisdiction in which he/she is being employed.

Cost Impact: No cost

Public Hearing Results

PART I - IADMIN
Committee Action: **Disapproved**

Committee Reason: The current language is consistent with jurisdiction ordinances. Removal of the phrase "the chief appointing authority of" would cause confusion as to who is the jurisdiction.

Assembly Action: **None**

PART II – IRC
HEARD BY IRC COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that who specifically makes the appointment should be left up to the jurisdiction.

Assembly Action: **None**

PART III – ISPSC
HEARD BY THE ISPSC COMMITTEE

Committee Action: **Disapproved**

Committee Reason: A jurisdiction is an area. An area cannot appoint a code official. The current text is proper.

Assembly Action: **None**

Public Comment(s)

Part I - Public Comment:

Thomas Peterson, Box Elder County, representing self, requests Approval as Submitted.

Commenter's Reason: This code change was approved by the Residential Committee; it was disapproved by the Admin committee on the premise that if we remove the phrase "the chief appointing authority of" would cause confusion as to who is the jurisdiction. The Jurisdiction is clearly defined in the code and would not cause confusion in that regard. The ISPSC committee disapproved this code change with the following reason; "A jurisdiction is an area. An area cannot appoint a code official. The current text is proper." While I agree with their definition of a "jurisdiction" I also understand that every jurisdiction has elected officials that set policy for that specific jurisdiction. It is those elected officials responsibility to determine who and how one is hired in that jurisdiction, not ICC's.

Part III - Public Comment:

Thomas Peterson, Box Elder County, representing self, requests Approval as Submitted.

Commenter's Reason: This code change was approved by the Residential Committee; it was disapproved by the Admin committee on the premise that if we remove the phrase "the chief appointing authority of" would cause confusion as to who is the jurisdiction. The Jurisdiction is clearly defined in the code and would not cause confusion in that regard. The ISPSC committee disapproved this code change with the following reason; "A jurisdiction is an area. An area cannot appoint a code official. The current text is proper."

While I agree with their definition of a "jurisdiction" I also understand that every jurisdiction has elected officials that set policy for that specific jurisdiction. It is those elected officials responsibility to determine who and how one is hired in that jurisdiction, not ICC's.

Final Hearing Results

ADM18-13, Part I	**D**
ADM18-13, Part II	**AS**
ADM18-13, Part III	**D**

Code Change No: ADM21-13

Original Proposal

Section: PART I - IBC 104.8; IEBC 104.8; IFC 103.4, 103.4.1; IFGC 103.4; IMC 103.4; IPC 103.4; IPSDC 103.4; IPMC 103.4; IWUIC 104.3; IZC 104.7;
PART II - IRC 104.8;
PART III - ISPSC 103.4

THIS IS A 3 PART CODE CHANGE. PARTS I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE AS ONE CODE CHANGE. PART II WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. PART III WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Mike Metheny, City of Aspen Colorado, representing Colorado Chapter Code Change Committee

PART I – IBC; IEBC; IFC; IFCG; IMC; IPC; IPSDC; IPMC; IWUIC; IZC

Revise the International Building Code as follows:

IBC [A] 104.8 Liability. The building official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be civilly or criminally rendered liable personally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

IBC [A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by legal representative of the jurisdiction until the final termination of the proceedings. The building official or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

Revise the International Existing Building Code as follows:

IEBC [A] 104.8 Liability. The code official, member of the Board of Appeals, or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civilly or criminally liable personally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

IEBC [A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for cost in any action, suit, or proceeding that is instituted in pursuance of the provisions of this code.

Revise the International Fire Code as follows:

IFC [A] 103.4 Liability. The fire code official, member of the board of appeals, officer or employee charged with the enforcement of this code, while acting for the jurisdiction, in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered <u>civilly or criminally</u> liable personally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.

IFC [A] 103.4.1 Legal defense. Any suit <u>or criminal complaint</u> instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The fire code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code; and any officer of the department of fire prevention, acting in good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of official duties in connection therewith.

Revise the International Fuel Gas Code as follows:

IFCG [A] 103.4 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered <u>civilly or criminally</u> liable personally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.

<u>IFGC [A] 103.4.1 Legal defense.</u> Any suit <u>or criminal complaint</u> instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code.

Revise the International Mechanical Code as follows:

IMC [A] 103.4 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered <u>civilly or criminally</u> liable personally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.

<u>IMC [A] 103.4.1 Legal defense.</u> Any suit <u>or criminal complaint</u> instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code.

Revise the International Plumbing Code as follows:

IPC [A] 103.4 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered <u>civilly or criminally</u> liable personally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

<u>IPC [A] 103.4.1 Legal defense.</u> Any suit <u>or criminal complaint</u> instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

Revise the International Private Sewage Disposal Code as follows:

IPSDC [A] 103.4 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civilly or criminally liable personally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

IPSDC [A] 103.4.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

Revise the International Property Maintenance Code as follows:

IPMC [A] 103.4 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction, in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civilly or criminally liable personally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.

IPMC [A] 103.4.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code.

Revise the International Wildland-Urban Interface Code as follows:

IWUIC [A] 104.3 Liability of the code official. The code official, member of the board of appeals or employee charged with the enforcement of this code, acting in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civilly or criminally personally liable for damages that may accrue to persons or property as a result of an act or by reason of an act or omission in the discharge of such duties.

IWUIC [A] 104.3.1 Legal defense. A suit or criminal complaint brought against the code official or employee because of such act or omission performed by the code official or employee in the enforcement of any provision of such codes or other pertinent laws or ordinances implemented through the enforcement of this code or enforced by the code enforcement agency shall be defended by this jurisdiction until final termination of such proceedings, and any judgment resulting there from shall be assumed by this jurisdiction. The code enforcement agency or its parent jurisdiction shall not be held as assuming any liability by reason of the inspections authorized by this code or any permits or certificates issued under this code.

Revise the International Zoning Code as follows:

IZC [A] 104.7 Liability. The code official, or designee, charged with the enforcement of this code, acting in good faith and without malice in the discharge of the duties described in this code, shall not be personally civilly or criminally liable for any damage that may accrue to persons or property as a result of an act or by reason of an act or omission in the discharge of such duties.

IFGC [A] 104.7.1 Legal defense. A suit or criminal complaint brought against the code official or employee because such act or omission performed by the code official or employee in the enforcement of any provision of such codes or other pertinent laws or ordinances implemented through the enforcement of this code or enforced by the enforcement agency shall be defended by the jurisdiction until final termination of such proceedings, and any judgment resulting therefrom shall be assumed by the jurisdiction.

This code shall not be construed to relieve from or lessen the responsibility of any person owning, operating or controlling any building or parcel of land for any damages to persons or property caused by defects, nor shall the enforcement agency or its jurisdiction be held as assuming any such liability by reason of the reviews or permits issued under this code

PART II – IRC

Revise the International Residential Code as follows:

IRC R104.8 Liability. The building official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civilly or criminally liable personally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

IRC R104.8.1 Legal defense. Any suit or criminal complaint instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by legal representative of the jurisdiction until the final termination of the proceedings. The building official or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

PART III – ISPSC

Revise the International Swimming Pool and Spa Code as follows:

ISPSC 103.4 Liability. The *code official*, member of the board of appeals or employee charged with the enforcement of this code, while acting for the *jurisdiction* in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civilly or criminally liable personally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

ISPSC 103.4.1 Legal defense. Any suit or criminal complaint instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by legal representative of the jurisdiction until the final termination of the proceedings. The *code official* or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

Reason: An Inspector in Colorado was charged with criminally negligent homicide as well as in a civil case as a result of a carbon monoxide poisoning that occurred in 2008. The inspector found that he was not afforded sovereign immunity for criminal charges even though he was acting in good faith and without malice in the discharge of the duties required by the codes. The jurisdiction was forced to go to City Council to request supplemental funding for his defense. The cost to the jurisdiction in defending the case was in excess of $260,000. The criminal case was eventually dismissed based on a motion that the statute of limitations had run. The criminal case was dismissed on its merits. As code officials we need to know that immunity extends to both criminal and civil actions while discharging our duties and providing for public safety and welfare.

The addition of the title to split the requirements in two parts is for consistency with the IFC.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing Results

PART I - IADMIN
Committee Action: Approved as Submitted

Committee Reason: The addition of "or criminal complaint" protects code officials during performance of their jobs. The existing language of "lawful discharge of duties" would protect the jurisdiction from being liable if the code official was taking bribes or performing illegal acts.

Assembly Action: None

PART II – IRC
HEARD BY IRC COMMITTEE

Committee Action: Approved as Submitted

Committee Reason: The committee approved this proposed code change because they felt that it is important to clearly state the code officials' personal liability and the recourse to personal defense. This is consistent with previous action taken on ADM21 Part I.

Assembly Action: None

PART III – ISPSC
HEARD BY THE ISPSC COMMITTEE

Committee Action: Approved as Submitted

Committee Reason: Employees of building departments are doing the best that they can do every day. Such employees should be personally protected against civil and criminal actions while performing their duties.

Assembly Action: None

Final Hearing Results

ADM21-13, Part I	**AS**
ADM21-13, Part II	**AS**
ADM21-13, Part III	**AS**

Code Change No: ADM22-13

Original Proposal

Section: PART I – IBC: [A] 104.10, [A] 105.1, [A] 106.1, [A] 107.3.4, [A] 110.1, [A] 115.2, 202, 901.5, 1004.3, 1703.4.1, 1703.6, 1703.6.1, 1704.2, 1704.2.4, 1707.1, 1803.6, 3306.8, 3401.2, G104.1, J106.1, K102.3;
ICCPC: [A] 103.3.1, [A] 103.3.1.1, [A] 103.3.1.2, [A] 103.3.1.3, [A] 103.3.1.4, [A] 103.3.1.5, [A] 103.3.1.6, [A] 103.3.1.7, [A] 103.3.1.8, [A] 103.3.1.9, [A] 103.3.4.1.4, [A] 103.3.1.4.6, [A] 103.3.4.2.3, [A] 103.3.8.3, [A] 103.3.9.1.4, [A] 103.3.9.2.3, [A] 103.3.10.1;
IEBC: [A] 104.6, [A] 104.10, [A] 105.1, [A] 106.6, [A] 110.2, [A] 111.3, [A] 114.2, [A] 115.3, [A] 115.4, [A] 116.5, [A] 117.1, [A] 117.3;
IFC: [A] 104.3, [A] 104.3.1, [A] 104.7.2, [A] 105.1.1, [A] 109.2, [A] 109.3.1, [A] 109.3.2, [A] 110.4, [A] 111.2, [A] 112.1;
IFGC: [A] 102.3, [A] 104.4, [A] 105.1, [A] 106.1, [A] 106.3, [A] 108.5, [A] 108.7.2;
IMC: [A] 102.3, [A] 104.4, [A] 105.1, [A] 106.1, [A] 106.3, [A] 108.5, [A] 108.7.2;
IPC: [A] 102.3, [A] 104.4, [A] 105.1, [A] 106.1, [A] 106.3, [A] 108.5, [A] 108.7.2;
IPSDC: [A] 102.5, [A] 104.4, [A] 105.1, [A] 108.5, [A] 108.7.2;
IPMC: [A] 101.2, [A] 102.2, [A] 104.3, [A] 105.1, [A] 107.2, [A] 107.6, [A] 108.2, [A] 108.2.1, [A] 108.3, [A] 108.4, [A] 108.5, [A] 108.6, [A] 109.5, [A] 110.1, [A] 110.3, [A] 112.2;
IWUIC: [A] 101.6, [A] 105.1, [A] 105.2, [A] 109.2.2, [A] 109.3, [A] 109.4.1, [A] 109.4.5.2, [A] 109.4.5.2.1, [A] 109.4.5.3, [A] 109.4.5.4, [A] 113.2, [A] 114.2;
IZC: [A] 103.3, [A] 107.7.3, [A] 109.1
PART II – IECC: C108.2;
PART III – IECC: R108.2;
PART IV – IRC: R104.6, R105.1, R110.3, R111.3, R114.1;
PART V – ISPSC 102.3, 104.6, 104.8, 105.1, 105.2, 107.5, 107.7.2;

THIS IS A 5 PART CODE CHANGE. PARTS I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE AS ONE CODE CHANGE. PART II WILL BE HEARD BY THE ENERGY CONSERVATION CODE-COMMERCIAL COMMITTEE. PART III WILL BE HEARD BY THE ENERGY CONSERVATION CODE-RESIDENTIAL COMMITTEE. PART IV WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. PART V WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing Washington Association of Building Officials, Technical Code Development Committee (pbrazil@reidmiddleton.com)

PART I – IBC; ICCPC; IEBC; IFC; IFCG; IMC; IPC; IPSDC; IPMC; IWUIC; IZC

Revise the International Building Code as follows:

IBC SECTION 202
DEFINITIONS

IBC [A] REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A *registered design professional* engaged by the owner <u>or the owner's authorized agent</u> to review and coordinate certain aspects of the project, as determined by the *building official*, for compatibility with the design of the building or structure, including submittal documents prepared by others, deferred submittal documents and phased submittal documents.

Revise the International Building Code as follows:

IBC [A] 104.10 Modifications. Wherever there are practical difficulties involved in carrying out the provisions of this code, the *building official* shall have the authority to grant modifications for individual cases, upon application of the owner or the owner's ~~representative~~ authorized agent, provided the *building official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, accessibility, life and fire safety, or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the department of building safety.

IBC [A] 105.1 Required. Any owner or owner's authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the *building official* and obtain the required *permit*.

IBC [A] 106.1 Live loads posted. Where the live loads for which each floor or portion thereof of a commercial or industrial building is or has been designed to exceed 50 psf (2.40 kN/m^2), such design live loads shall be conspicuously posted by the owner or the owner's authorized agent in that part of each story in which they apply, using durable signs. It shall be unlawful to remove or deface such notices.

IBC [A] 107.3.4 Design professional in responsible charge. When it is required that documents be prepared by a *registered design professional*, the *building official* shall be authorized to require the owner or the owner's authorized agent to engage and designate on the building *permit* application a *registered design professional* who shall act as the *registered design professional in responsible charge*. If the circumstances require, the owner or the owner's authorized agent shall designate a substitute registered design professional in responsible charge who shall perform the duties required of the original *registered design professional in responsible charge*. The building official shall be notified in writing by the owner or the owner's authorized agent if the *registered design professional in responsible charge* is changed or is unable to continue to perform the duties.
The *registered design professional in responsible charge* shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building.

IBC [A] 110.1 General. Construction or work for which a permit is required shall be subject to inspection by the *building official* and such construction or work shall remain accessible and exposed for inspection purposes until *approved*. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid. It shall be the duty of the ~~*permit* applicant~~ owner or the owner's authorized agent to cause the work to remain accessible and exposed for inspection purposes. Neither the *building official* nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

IBC [A] 115.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property involved, ~~or to~~ the owner's authorized agent, or ~~to~~ the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order, and the conditions under which the cited work will be permitted to resume.

Revise the International Building Code as follows:

IBC 901.5 Acceptance tests. Fire protection systems shall be tested in accordance with the requirements of this code and the *International Fire Code*. When required, the tests shall be conducted in the presence of the building official. Tests required by this code, the *International Fire Code* and the standards listed in this code shall be conducted at the expense of the owner or the owner's ~~representative~~ authorized agent. It shall be unlawful to occupy portions of a structure until the required fire protection systems within that portion of the structure have been tested and approved.

Revise the International Building Code as follows:

IBC 1004.3 (IFC [B] 1004.3) Posting of occupant load. Every room or space that is an assembly occupancy shall have the occupant load of the room or space posted in a conspicuous place, near the main exit or exit access doorway from the room or space. Posted signs shall be of an approved legible permanent design and shall be maintained by the owner or the owner's authorized agent.

Revise the International Building Code as follows:

IBC 1703.4.1 Research and investigation. Sufficient technical data shall be submitted to the *building official* to substantiate the proposed use of any material or assembly. If it is determined that the evidence submitted is satisfactory proof of performance for the use intended, the *building official* shall approve the use of the material or assembly subject to the requirements of this code. The costs, reports and investigations required under these provisions shall be paid by the ~~applicant~~ owner or the owner's authorized agent.

IBC 1703.6 Evaluation and follow-up inspection services. Where structural components or other items regulated by this code are not visible for *inspection* after completion of a prefabricated assembly, the ~~applicant~~ owner or the owner's authorized agent shall submit a report of each prefabricated assembly. The report shall indicate the complete details of the assembly, including a description of the assembly and its components, the basis upon which the assembly is being evaluated, test results and similar information and other data as necessary for the *building official* to determine conformance to this code. Such a report shall be *approved* by the *building official*.

IBC 1703.6.1 Follow-up inspection. The ~~applicant~~ owner or the owner's authorized agent shall provide for *special inspections* of fabricated items in accordance with Section 1704.2.5.

IBC 1704.2 Special Inspections. Where application is made for construction as described in this section, the owner or the *registered design professional in responsible charge* acting as the owner's authorized agent shall employ one or more *approved agencies* to perform inspections during construction on the types of work listed under Section 1705. These inspections are in addition to the inspections specified in Section 110.

Exceptions:

1. *Special inspections* are not required for construction of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. Unless otherwise required by the *building official*, *special inspections* are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.
3. Special inspections are not required for portions of structures designed and constructed in accordance with the cold-formed steel light-frame construction provisions of Section 2211.7 or the conventional light-frame construction provisions of Section 2308.

IBC 1704.2.4 Report requirement. Special inspectors shall keep records of inspections. The special inspector shall furnish inspection reports to the *building official*, and to the *registered design professional in responsible charge*. Reports shall indicate that work inspected was or was not completed in conformance to *approved construction documents*. Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the *building official* and to the *registered design professional in responsible charge* prior to the completion of that phase of the work. A final report documenting required *special inspections* and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon prior to the start of work by the ~~applicant and~~ owner or the owner's authorized agent to the *building official*.

IBC 1707.1 General. In the absence of *approved* rules or other *approved* standards, the *building official* shall make, or cause to be made, the necessary tests and investigations; or the *building official* shall accept duly authenticated reports from *approved agencies* in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.11. The cost of all tests and other investigations required under the provisions of this code shall be borne by the ~~applicant~~ owner or the owner's authorized agent.

Revise the International Building Code as follows:

IBC 1803.6 Reporting. Where geotechnical investigations are required, a written report of the investigations shall be submitted to the *building official* by the owner or owner's authorized agent at the time of *permit* application. This geotechnical report shall include, but need not be limited to, the following information:

1. A plot showing the location of the soil investigations.
2. A complete record of the soil boring and penetration test logs and soil samples.
3. A record of the soil profile.
4. Elevation of the water table, if encountered.
5. Recommendations for foundation type and design criteria, including but not limited to: bearing capacity of natural or compacted soil; provisions to mitigate the effects of expansive soils; mitigation of the effects of liquefaction, differential settlement and varying soil strength; and the effects of adjacent loads.
6. Expected total and differential settlement.
7. Deep foundation information in accordance with Section 1803.5.5.
8. Special design and construction provisions for foundations of structures founded on expansive soils, as necessary.
9. Compacted fill material properties and testing in accordance with Section 1803.5.8.
10. Controlled low-strength material properties and testing in accordance with Section 1803.5.9.

Revise the International Building Code as follows:

IBC 3306.8 Repair, maintenance and removal. Pedestrian protection required by this chapter shall be maintained in place and kept in good order for the entire length of time pedestrians are subject to being endangered. The *owner* or the *owner's* authorized agent, upon the completion of the construction activity, shall immediately remove walkways, debris and other obstructions and leave such public property in as good a condition as it was before such work was commenced.

Revise the International Building Code as follows:

IBC 3401.2 Maintenance. Buildings and structures, and parts thereof, shall be maintained in a safe and sanitary condition. Devices or safeguards which are required by this code shall be maintained in conformance with the code edition under which installed. The owner or the owner's ~~designated~~ authorized agent shall be responsible for the maintenance of buildings and structures. To determine compliance with this subsection, the building official shall have the authority to require a building or structure to be reinspected. The requirements of this chapter shall not provide the basis for removal or abrogation of fire protection and safety systems and devices in existing structures.

Revise the International Building Code as follows:

IBC G104.1 Required. Any person, owner or owner's authorized agent who intends to conduct any development in a flood hazard area shall first make application to the *building official* and shall obtain the required *permit*.

Revise the International Building Code as follows:

IBC J106.1 Maximum slope. The slope of cut surfaces shall be no steeper than is safe for the intended use, and shall be no steeper than two units horizontal to one unit vertical (50-percent slope) unless the owner or <u>the owner's</u> authorized agent furnishes a geotechnical report justifying a steeper slope.

Exceptions:

1. A cut surface shall be permitted to be at a slope of 1.5 units horizontal to one unit vertical (67-percent slope) provided that all of the following are met:

1.1. It is not intended to support structures or surcharges.
1.2. It is adequately protected against erosion.
1.3. It is no more than 8 feet (2438 mm) in height.
1.4. It is approved by the building code official.
1.5. Ground water is not encountered.

2. A cut surface in bedrock shall be permitted to be at a slope of one unit horizontal to one unit vertical (100-percent slope).

Revise the International Building Code as follows:

IBC K102.3 Maintenance. Electrical systems, equipment, materials and appurtenances, both existing and new, and parts thereof shall be maintained in proper operating condition in accordance with the original design and in a safe, hazard-free condition. Devices or safeguards that are required by this code shall be maintained in compliance with the code edition under which installed. The owner or the owner's ~~designated~~ <u>authorized</u> agent shall be responsible for the maintenance of the electrical systems and equipment. To determine compliance with this provision, the *building official* shall have the authority to require that the electrical systems and equipment be reinspected.

Revise the International Code Council Performance Code as follows:

ICCPC [A] 103.3.1 Building owner's <u>or the owner's authorized agent</u> responsibility.

ICCPC [A] 103.3.1.1 Design professional. The owner <u>or the owner's authorized agent</u> shall have the responsibility of retaining and furnishing the services of a design professional, who shall be in responsible charge of preparing and coordinating a complete and comprehensive set of design documents and other services required to prepare reports and other documents in accordance with this code. If the services required by this section are not provided, the use of this code is prohibited.

ICCPC [A] 103.3.1.2 Principal design professional. When the project requires the services of multiple design professionals, a principal design professional shall be retained and furnished, who shall have the contractual responsibility and authority over all required design professional disciplines to prepare and coordinate a complete and comprehensive set of design documents for the project.

ICCPC [A] 103.3.1.3 Peer review. The owner <u>or the owner's authorized agent</u> shall be responsible for retaining and furnishing the services of a design professional or recognized expert, who will perform as a peer reviewer, when required and approved by the code official. See Section 103.3.6.3 of this code.

ICCPC [A] 103.3.1.4 Costs. The costs of all special services, including contract review, when required by the code official, shall be borne by the owner <u>or the owner's authorized agent</u>.

ICCPC [A] 103.3.1.5 Document retention. The owner <u>or the owner's authorized agent</u> shall retain on the premises all documents and reports required by this code and make them available to the code official upon request.

ICCPC [A] 103.3.1.6 Maintenance. The owner <u>or the owner's authorized agent</u> is responsible to operate and maintain a building, structure or facility designed and built under this code in accordance with the bounding conditions and the operations and maintenance manual.

ICCPC [A] 103.3.1.7 Changes. The owner <u>or the owner's authorized agent</u> shall be responsible to ensure that any change to the facility, process or system does not increase the hazard level beyond that originally designed without approval and that all changes shall be documented in accordance with this code.

ICCPC [A] 103.3.1.8 Special expert. Where the scope of work is limited or focused in an area that does not require the services of a design professional or the special knowledge and skills associated with the practice of architecture or engineering, a special expert may be employed by the owner <u>or the owner's authorized agent</u> as the person in responsible charge of the limited or focused activity. It is the intent of this code that the individual shall possess the qualification characteristics required in Appendix D.

ICCPC [A] 103.3.1.9 Occupant requirements. The owner <u>or the owner's authorized agent</u> is responsible and accountable to ensure that all occupants and employees who are required to take certain actions or perform certain functions in accordance with a performance-based design possess the required knowledge and skills and are empowered to perform those actions.

ICCPC [A] 103.3.4.1.4 Deed restriction. Design features with bounding conditions that require continued maintenance or supervision by the owner <u>or the owner's authorized agent</u> throughout the life of the building, facility or process as conditions of compliance with the objectives of this code, shall be recorded as a deed restriction until released by the code official. When required by the code official, the deed restriction shall be modified to reflect specific changes.

ICCPC [A] 103.3.4.1.6 Emergency response capabilities. Design documentation shall clearly describe the level of response expected by emergency responders under the direct control of the owner <u>or the owner's authorized agent</u>. Emergency response capabilities, staffing levels, training requirements and equipment availability shall be documented as a bounding condition.

ICCPC [A] 103.3.4.2.3 Operations and maintenance manual. The operations and maintenance manual shall identify system and component commissioning requirements and the required interactions between these systems. The manual shall identify for the facility owner <u>or the owner's authorized agent</u> and the facility operator those actions that need to be performed on a regular basis to ensure that the components of the performance-based design are in place and operating properly. Furthermore, the operations and maintenance manual shall identify the restrictions or limitations placed upon the use and operation of the facility in order to stay within the bounding conditions of the performance-based design. The operations and maintenance manual shall be submitted at the time of the design documents submittal, unless the code official approves another time based upon the type of project and data needed for a composite review. The operations and maintenance manual shall address but not be limited to the following:

1. Description of critical systems.
2. Description of required system interactions.
3. Occupant responsibilities.
4. Occupant and staff training requirements.
5. Periodic operational requirements.
6. Periodic maintenance requirements.
7. Periodic testing requirements.
8. Limitations on facility operations (due to bounding conditions).
9. Report format for recording maintenance and operation data.
10. System and component commissioning requirements.

ICCPC [A] 103.3.8.3 Deed restrictions. Design features with bounding conditions determined by the design professional to require continued operation and maintenance by the owner <u>or the owner's authorized agent</u> throughout the life of the building as conditions of compliance with the objectives of this code shall be recorded as a deed restriction as required by the code official until released by the code official.

ICCPC [A] 103.3.9.1.4 Revocation and renewal. Failure of the building owner or the owner’s authorized agent to demonstrate to the code official that the building is being operated and maintained in compliance with Sections 103.3.1.6 and 103.3.9.1 is cause to revoke or not renew a certificate of occupancy.

ICCPC [A] 103.3.9.2.3 Revocation and renewal. Failure of the owner or the owner’s authorized agent to demonstrate compliance with this section is cause to revoke or not renew the certificate of compliance.

ICCPC [A] 103.3.10 Maintenance.

ICCPC [A] 103.3.10.1 Owner~~’s~~ or the owner’s authorized agent responsibility. The owner or the owner’s authorized agent is responsible for maintaining the building or facility in accordance with the approved documents.

Revise the International Existing Building Code as follows:

IEBC [A] 104.6 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the *code official* has reasonable cause to believe that there exists in a structure or upon a premises a condition which is contrary to or in violation of this code which makes the structure or premises unsafe, *dangerous*, or hazardous, the *code official* is authorized to enter the structure or premises at reasonable times to inspect or to perform the duties imposed by this code, provided that if such structure or premises be occupied that credentials be presented to the occupant and entry requested. If such structure or premises be unoccupied, the *code official* shall first make a reasonable effort to locate the owner, the owner’s authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the *code official* shall have recourse to the remedies provided by law to secure entry.

IEBC [A] 104.10 Modifications. Wherever there are practical difficulties involved in carrying out the provisions of this code, the *code official* shall have the authority to grant modifications for individual cases upon application of the owner or owner’s authorized representative, provided the *code official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety, or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the Department of Building Safety.

IEBC [A] 105.1 Required. Any owner or owner’s authorized agent who intends to *repair*, add to, alter, relocate, demolish, or change the occupancy of a building or to *repair*, install, add, alter, remove, convert, or replace any electrical, gas, mechanical, or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the *code official* and obtain the required permit.

IEBC [A] 106.6 Design professional in responsible charge. When it is required that documents be prepared by a registered design professional, the *code official* shall be authorized to require the owner or the owner’s authorized agent to engage and designate on the building permit application a registered design professional who shall act as the *registered design professional in responsible charge*. If the circumstances require, the owner or the owner’s authorized agent shall designate a substitute *registered design professional in responsible charge* who shall perform the duties required of the original *registered design professional in responsible charge*. The *code official* shall be notified in writing by the owner or the owner’s authorized agent if the *registered design professional in responsible charge* is changed or is unable to continue to perform the duties. The *registered design professional in responsible charge* shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building. Where structural observation is required, the inspection program shall name the individual or firms who are to perform structural observation and describe the stages of construction at which structural observation is to occur.

IEBC [A] 110.2 Certificate issued. After the *code official* inspects the building and finds no violations of the provisions of this code or other laws that are enforced by the Department of Building Safety, the *code official* shall issue a certificate of occupancy that shall contain the following:.

1. The building permit number.
2. The address of the structure.
3. The name and address of the owner or the owner's authorized agent.
4. A description of that portion of the structure for which the certificate is issued.
5. A statement that the described portion of the structure has been inspected for compliance with the requirements of this code for the occupancy and division of occupancy and the use for which the proposed occupancy is classified.
6. The name of the *code official*.
7. The edition of the code under which the permit was issued.
8. The use and occupancy in accordance with the provisions of the *International Building Code*.
9. The type of construction as defined in the *International Building Code*.
10. The design occupant load and any impact the *alteration* has on the design occupant load of the area not within the scope of the work.
11. If fire protection systems are provided, whether the fire protection systems are required.
12. Any special stipulations and conditions of the building permit.

IEBC [A] 111.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or when such utility connection has been made without the approval required by Section 111.1 or 111.2. The *code official* shall notify the serving utility and, wherever possible, the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

IEBC [A] 114.2 Issuance. The stop work order shall be in writing and shall be given to the owner or the owner's authorized agent of the property involved ~~or to the owner's agent~~, or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the cited work will be permitted to resume.

IEBC [A] 115.3 Notice. If an *unsafe* condition is found, the *code official* shall serve on the owner, the owner's authorized agent, or person in control of the structure a written notice that describes the condition deemed *unsafe* and specifies the required *repairs* or improvements to be made to abate the *unsafe* condition, or that requires the *unsafe* building to be demolished within a stipulated time. Such notice shall require the person thus notified to declare immediately to the *code official* acceptance or rejection of the terms of the order.

IEBC [A] 115.4 Method of service. Such notice shall be deemed properly served if a copy thereof is delivered to the owner or the owner's authorized agent personally; sent by certified or registered mail addressed to the owner or the owner's authorized agent at the last known address with the return receipt requested; or delivered in any other manner as prescribed by local law. If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner upon the owner's authorized agent or upon the person responsible for the structure shall constitute service of notice upon the owner.

IEBC [A] 116.5 Costs of emergency repairs. Costs incurred in the performance of emergency work shall be paid by the jurisdiction. The legal counsel of the jurisdiction shall institute appropriate action against the owner of the premises or the owner's authorized agent where the unsafe structure is or was located for the recovery of such costs.

IEBC [A] 117.1 General. The *code official* shall order the owner of any premises or the owner's authorized agent upon which is located any structure that in the *code official's* judgment is so old, dilapidated, or has become so out of *repair* as to be *dangerous*, unsafe, insanitary, or otherwise unfit for human habitation or occupancy, and such that it is unreasonable to *repair* the structure, to demolish and remove such structure; or if such structure is capable of being made safe by *repairs*, to *repair* and make safe and sanitary or to demolish and remove at the owner's or the owner's authorized agent's option; or where there has been a cessation of normal construction of any structure for a period of more than two years, to demolish and remove such structure.

IEBC [A] 117.3 Failure to comply. If the owner or the owner's authorized agent of a premises fails to comply with a demolition order within the time prescribed, the *code official* shall cause the structure to be demolished and removed, either through an available public agency or by contract or arrangement with private persons, and the cost of such demolition and removal shall be charged against the real estate upon which the structure is located and shall be a lien upon such real estate.

Revise the International Fire Code as follows:

IFC [A] 104.3 Right of entry. Whenever it is necessary to make an inspection to enforce the provisions of this code, or whenever the *fire code official* has reasonable cause to believe that there exists in a building or upon any premises any conditions or violations of this code which make the building or premises unsafe, dangerous or hazardous, the *fire code official* shall have the authority to enter the building or premises at all reasonable times to inspect or to perform the duties imposed upon the *fire code official* by this code. If such building or premises is occupied, the *fire code official* shall present credentials to the occupant and request entry. If such building or premises is unoccupied, the *fire code official* shall first make a reasonable effort to locate the *owner*, the owner's authorized agent or other person having charge or control of the building or premises and request entry. If entry is refused, the *fire code official* has recourse to every remedy provided by law to secure entry.

IFC [A] 104.3.1 Warrant. When the *fire code official* has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an *owner*, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the *fire code official* for the purpose of inspection and examination pursuant to this code.

IFC [A] 104.7.2 Technical assistance. To determine the acceptability of technologies, processes, products, facilities, materials and uses attending the design, operation or use of a building or premises subject to inspection by the *fire code official*, the *fire code official* is authorized to require the *owner* or owner's authorized agent to provide, without charge to the jurisdiction, a technical opinion and report. The opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the *fire code official* and shall analyze the fire safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to recommend necessary changes. The *fire code official* is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

IFC [A] 105.1.1 Permits required. Any property owner or owner's authorized agent who intends to conduct an operation or business, or install or modify systems and equipment which is regulated by this code, or to cause any such work to be done, shall first make application to the *fire code official* and obtain the required permit.

IFC [A] 109.2 Owner/occupant responsibility. Correction and abatement of violations of this code shall be the responsibility of the *owner* or the owner's authorized agent. If an occupant creates, or allows to be created, hazardous conditions in violation of this code, the occupant shall be held responsible for the abatement of such hazardous conditions.

IFC [A] 109.3.1 Service. A notice of violation issued pursuant to this code shall be served upon the *owner*, the owner's authorized agent, operator, occupant or other person responsible for the condition or violation, either by personal service, mail or by delivering the same to, and leaving it with, some person of responsibility upon the premises. For unattended or abandoned locations, a copy of such notice of violation shall be posted on the premises in a conspicuous place at or near the entrance to such premises and the notice of violation shall be mailed by certified mail with return receipt requested or a certificate of mailing, to the last known address of the *owner*, the owner's authorized agent, or occupant ~~or both~~.

IFC [A] 109.3.2 Compliance with orders and notices. A notice of violation issued or served as provided by this code shall be complied with by the *owner*, the owner's authorized agent, operator, occupant or other person responsible for the condition or violation to which the notice of violation pertains.

IFC [A] 110.4 Abatement. The *owner*, the owner's authorized agent, operator or occupant of a building or premises deemed unsafe by the *fire code official* shall abate or cause to be abated or corrected such unsafe conditions either by repair, rehabilitation, demolition or other *approved* corrective action.

IFC [A] 111.2 Issuance. A stop work order shall be in writing and shall be given to the *owner* of the property, or to the *owner's* authorized agent, or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order, and the conditions under which the cited work is authorized to resume.

IFC [A] 112.1 Authority to disconnect service utilities. The *fire code official* shall have the authority to authorize disconnection of utility service to the building, structure or system in order to safely execute emergency operations or to eliminate an immediate hazard. The *fire code official* shall notify the serving utility and, whenever possible, the *owner* or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action if not notified prior to disconnection. The *owner*, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

Revise the International Fuel Gas Code as follows:

IFGC [A] 102.3 Maintenance. Installations, both existing and new, and parts thereof shall be maintained in proper operating condition in accordance with the original design and in a safe condition. Devices or safeguards which are required by this code shall be maintained in compliance with the code edition under which they were installed. The owner or the owner's authorized ~~designated~~ agent shall be responsible for maintenance of installations. To determine compliance with this provision, the code official shall have the authority to require an installation to be reinspected.

IFGC [A] 104.4 Right of entry. Whenever it is necessary to make an inspection to enforce the provisions of this code, or whenever the code official has reasonable cause to believe that there exists in a building or upon any premises any conditions or violations of this code that make the building or premises unsafe, dangerous or hazardous, the code official shall have the authority to enter the building or premises at all reasonable times to inspect or to perform the duties imposed upon the code official by this code. If such building or premises is occupied, the code official shall present credentials to the occupant and request entry. If such building or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the building or premises and request entry. If entry is refused, the code official has recourse to every remedy provided by law to secure entry.
When the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent, ~~or~~ occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to promptly permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

IFGC [A] 105.1 Modifications. Whenever there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases, upon application of the owner or owner's authorized agent ~~representative~~, provided that the code official shall first find that special individual reason makes the strict letter of this code impractical and that such modification is in compliance with the intent and purpose of this code and does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the Department of Inspection.

IFGC [A] 106.1 Where required. An owner, owner's authorized agent or contractor who desires to erect, install, enlarge, alter, repair, remove, convert or replace an installation regulated by this code, or to cause such work to be done, shall first make application to the code official and obtain the required permit for the work.
Exception: Where *appliance* and *equipment* replacements and repairs are required to be performed in an emergency situation, the permit application shall be submitted within the next working business day of the Department of Inspection.

IFGC [A] 106.3 Application for permit. Each application for a permit, with the required fee, shall be filed with the code official on a form furnished for that purpose and shall contain a general description of the proposed work and its location. The application shall be signed by the owner or an owner's authorized agent. The permit application shall indicate the proposed *occupancy* of all parts of the building and of that portion of the site or lot, if any, not covered by the building or structure and shall contain such other information required by the code official.

IFGC [A] 108.5 Stop work orders. Upon notice from the code official that work is being done contrary to the provisions of this code or in a dangerous or unsafe manner, such work shall immediately cease. Such notice shall be in writing and shall be given to the owner of the property, the owner's authorized agent, or the person doing the work. The notice shall state the conditions under which work is authorized to resume. Where an emergency exists, the code official shall not be required to give a written notice prior to stopping the work. Any person who shall continue any work on the system after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be liable for a fine of not less than [AMOUNT] dollars or more than [AMOUNT] dollars.

IFGC [A] 108.7.2 Authority to disconnect service utilities. The code official shall have the authority to require disconnection of utility service to the building, structure or system regulated by the technical codes in case of emergency where necessary to eliminate an immediate hazard to life or property. The code official shall notify the serving utility, and wherever possible, the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, the owner or occupant of the building, structure or service system shall be notified in writing, as soon as practicable thereafter.

Revise the International Mechanical Code as follows:

IMC [A] 102.3 Maintenance. Mechanical systems, both existing and new, and parts thereof shall be maintained in proper operating condition in accordance with the original design and in a safe and sanitary condition. Devices or safeguards which are required by this code shall be maintained in compliance with the code edition under which they were installed. The owner or the owner's authorized ~~designated~~ agent shall be responsible for maintenance of mechanical systems. To determine compliance with this provision, the code official shall have the authority to require a mechanical system to be reinspected.

The inspection for maintenance of HVAC systems shall be done in accordance with ASHRAE/ACCA/ANSI Standard 180.

IMC [A] 104.4 Right of entry. Whenever it is necessary to make an inspection to enforce the provisions of this code, or whenever the code official has reasonable cause to believe that there exists in a building or upon any premises any conditions or violations of this code which make the building or premises unsafe, insanitary, dangerous or hazardous, the code official shall have the authority to enter the building or premises at all reasonable times to inspect or to perform the duties imposed upon the code official by this code. If such building or premises is occupied, the code official shall present credentials to the occupant and request entry. If such building or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the building or premises and request entry. If entry is refused, the code official has recourse to every remedy provided by law to secure entry.

When the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to promptly permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

IMC [A] 105.1 Modifications. Whenever there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases upon application of the owner or owner's authorized agent ~~representative~~, provided that the code official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the mechanical inspection department.

IMC [A] 106.1 When required. An owner, owner's authorized agent or contractor who desires to erect, install, enlarge, alter, repair, remove, convert or replace a mechanical system, the installation of which is regulated by this code, or to cause such work to be done, shall first make application to the code official and obtain the required permit for the work.
Exception: Where *equipment* and *appliance* replacements or repairs must be performed in an emergency situation, the permit application shall be submitted within the next working business day of the department of mechanical inspection.

IMC [A] 106.3 Application for permit. Each application for a permit, with the required fee, shall be filed with the code official on a form furnished for that purpose and shall contain a general description of the proposed work and its location. The application shall be signed by the owner or ~~an~~ the owner's authorized agent. The permit application shall indicate the proposed *occupancy* of all parts of the building and of that portion of the site or lot, if any, not covered by the building or structure and shall contain such other information required by the code official.

IMC [A] 108.5 Stop work orders. Upon notice from the code official that mechanical work is being done contrary to the provisions of this code or in a dangerous or unsafe manner, such work shall immediately cease. Such notice shall be in writing and shall be given to the owner of the property, or to the owner's authorized agent, or to the person doing the work. The notice shall state the conditions under which work is authorized to resume. Where an emergency exists, the code official shall not be required to give a written notice prior to stopping the work. Any person who shall continue any work on the system after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be liable for a fine of not less than [AMOUNT] dollars or more than [AMOUNT] dollars.

IMC [A] 108.7.2 Authority to order disconnection of energy sources. The code official shall have the authority to order disconnection of energy sources supplied to a building, structure or mechanical system regulated by this code, when it is determined that the mechanical system or any portion thereof has become hazardous or unsafe. Written notice of such order to disconnect service and the causes therefor shall be given within 24 hours to the owner, the owner's authorized agent and occupant of such building, structure or premises, provided, however, that in cases of immediate danger to life or property, such disconnection shall be made immediately without such notice. Where energy sources are provided by a public utility, the code official shall immediately notify the serving utility in writing of the issuance of such order to disconnect.

Revise the International Plumbing Code as follows:

IPC [A] 102.3 Maintenance. All plumbing systems, materials and appurtenances, both existing and new, and all parts thereof, shall be maintained in proper operating condition in accordance with the original design in a safe and sanitary condition. All devices or safeguards required by this code shall be maintained in compliance with the code edition under which they were installed.
The owner or the owner's authorized ~~designated~~ agent shall be responsible for maintenance of plumbing systems. To determine compliance with this provision, the code official shall have the authority to require any plumbing system to be reinspected.

IPC [A] 104.4 Right of entry. Whenever it is necessary to make an inspection to enforce the provisions of this code, or whenever the code official has reasonable cause to believe that there exists in any building or upon any premises any conditions or violations of this code that make the building or premises unsafe, insanitary, dangerous or hazardous, the code official shall have the authority to enter the building or premises at all reasonable times to inspect or to perform the duties imposed upon the code official by this code. If such building or premises is occupied, the code official shall present credentials to the occupant and request entry. If such building or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the building or premises and request entry. If entry is refused, the code official shall have recourse to every remedy provided by law to secure entry.
When the code official shall have first obtained a proper inspection warrant or other remedy provided by law to secure entry, no owner, owner's authorized agent, ~~or~~ occupant or person having charge, care or control of any building or premises shall fail or neglect, after proper request is made as herein provided, to promptly permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

IPC [A] 105.1 Modifications. Whenever there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases, upon application of the owner or owner's ~~representative~~ authorized agent, provided the code official shall first find that special individual reason makes the strict letter of this code impractical and the modification conforms to the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the plumbing inspection department.

IPC [A] 106.1 When required. Any owner, owner's authorized agent or contractor who desires to construct, enlarge, alter, repair, move, demolish or change the *occupancy* of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the code official and obtain the required permit for the work.

IPC [A] 106.3 Application for permit. Each application for a permit, with the required fee, shall be filed with the code official on a form furnished for that purpose and shall contain a general description of the proposed work and its location. The application shall be signed by the owner or an owner's authorized agent. The permit application shall indicate the proposed *occupancy* of all parts of the building and of that portion of the site or lot, if any, not covered by the building or structure and shall contain such other information required by the code official.

IPC [A] 108.5 Stop work orders. Upon notice from the code official, work on any plumbing system that is being done contrary to the provisions of this code or in a dangerous or unsafe manner shall immediately cease. Such notice shall be in writing and shall be given to the owner of the property, or to the owner's authorized agent, or to the person doing the work. The notice shall state the conditions under which work is authorized to resume. Where an emergency exists, the code official shall not be required to give a written notice prior to stopping the work. Any person who shall continue any work in or about the structure after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be liable to a fine of not less than [AMOUNT] dollars or more than [AMOUNT] dollars.

IPC [A] 108.7.2 Authority to disconnect service utilities. The code official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by the technical codes in case of an emergency, where necessary, to eliminate an immediate danger to life or property. Where possible, the owner or an owner's authorized agent and occupant of the building, structure or service system shall be notified of the decision to disconnect utility service prior to taking such action. If not notified prior to disconnecting, the owner, an owner's authorized agent or occupant of the building, structure or service systems shall be notified in writing, as soon as practical thereafter.

Revise the International Private Sewage Disposal Code as follows:

IPSDC [A] 102.5 Maintenance. *Private sewage disposal systems*, materials and appurtenances, both existing and new, and all parts thereof shall be maintained in proper operating condition in accordance with the original design in a safe and sanitary condition. Devices or safeguards that are required by this code shall be maintained in compliance with the code edition under which they were installed. The owner or the owner's authorized ~~designated~~ agent shall be responsible for maintenance of *private sewage disposal systems*. To determine compliance with this provision, the code official shall have the authority to require reinspection of any *private sewage disposal system*.

IPSDC [A] 104.4 Right of entry. Whenever it is necessary to make an inspection to enforce the provisions of this code, or whenever the code official has reasonable cause to believe that there exists in any building or upon any premises any conditions or violations of this code that make the building or premises unsafe, insanitary, dangerous or hazardous, the code official shall have the authority to enter the building or premises at all reasonable times to inspect or to perform the duties imposed on the code official by this code. If such building or premises is occupied, the code official shall present credentials to the occupant and request entry. If such building or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the building or premises and request entry. If entry is refused, the code official has recourse to every remedy provided by law to secure entry.
When the code official shall have first obtained a proper inspection warrant or other remedy provided by law to secure entry, no owner, owner's authorized agent or occupant or person having charge, care or control of any building or premises shall fail or neglect, after proper request is made as herein provided, to promptly permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

IPSDC [A] 105.1 Modifications. Whenever there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases, upon application of the owner or owner's ~~representative~~ authorized agent provided that the code official shall first find that special individual reason makes the strict letter of this code impractical, the modification is in conformity with the intent and purpose of this code and such modification does not lessen health and fire- and life-safety requirements. The details of action granting modifications shall be recorded and entered in the files of the Private Sewage Disposal Inspection Department.

IPSDC [A] 108.5 Stop work orders. Upon notice from the code official, work on any *private sewage disposal system* that is being done contrary to the provisions of this code or in a dangerous or unsafe manner shall immediately cease. Such notice shall be in writing and shall be given to the owner of the property, to the owner's authorized agent or to the person doing the work. The notice shall state the conditions under which work is authorized to resume. Where an emergency exists, the code official shall not be required to give a written notice prior to stopping the work. Any person who shall continue any work on the system after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be liable to a fine of not less than [AMOUNT] dollars or more than [AMOUNT] dollars.

IPSDC [A] 108.7.2 Authority to disconnect service utilities. The code official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by the technical codes in case of emergency, where necessary, to eliminate an immediate danger to life or property.

Where possible, the owner, the owner's authorized agent and occupant of the building, structure or service system shall be notified of the decision to disconnect utility service prior to taking such action. If not notified prior to disconnecting, the owner or occupant of the building, structure or service systems shall be notified in writing as soon as is practical thereafter.

Revise the International Property Maintenance Code as follows:

IPMC [A] 101.2 Scope. The provisions of this code shall apply to all existing residential and nonresidential structures and all existing *premises* and constitute minimum requirements and standards for *premises*, structures, equipment and facilities for light, *ventilation*, space, heating, sanitation, protection from the elements, life safety, safety from fire and other hazards, and for safe and sanitary maintenance; the responsibility of *owners*, an owner's authorized agent, *operator*s and *occupants*; the *occupancy* of existing structures and *premises*, and for administration, enforcement and penalties.

IPMC [A] 102.2 Maintenance. Equipment, systems, devices and safeguards required by this code or a previous regulation or code under which the structure or *premises* was constructed, altered or repaired shall be maintained in good working order. No *owner*, owner's authorized agent, *operator* or *occupant* shall cause any service, facility, equipment or utility which is required under this section to be removed from or shut off from or discontinued for any occupied dwelling, except for such temporary interruption as necessary while repairs or alterations are in progress. The requirements of this code are not intended to provide the basis for removal or abrogation of fire protection and safety systems and devices in existing structures. Except as otherwise specified herein, the *owner* or the *owner's* authorized ~~designated~~ agent shall be responsible for the maintenance of buildings, structures and *premises*.

IPMC [A] 104.3 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or whenever the *code official* has reasonable cause to believe that there exists in a *structure* or upon a *premises* a condition in violation of this code, the *code official* is authorized to enter the structure or *premises* at reasonable times to inspect or perform the duties imposed by this code, provided that if such *structure* or *premises* is occupied the *code official* shall present credentials to the *occupant* and request entry. If such structure or *premises* is unoccupied, the *code official* shall first make a reasonable effort to locate the *owner*, the owner's authorized agent or other person having charge or control of the *structure* or *premises* and request entry. If entry is refused, the *code official* shall have recourse to the remedies provided by law to secure entry.

IPMC [A] 105.1 Modifications. Whenever there are practical difficulties involved in carrying out the provisions of this code, the *code official* shall have the authority to grant modifications for individual cases upon application of the *owner* or *owner'*s authorized agent ~~representative~~, provided the *code official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the department files.

IPMC [A] 107.2 Form. Such notice prescribed in Section 107.1 shall be in accordance with all of the following:

1. Be in writing.
2. Include a description of the real estate sufficient for identification.
3. Include a statement of the violation or violations and why the notice is being issued.
4. Include a correction order allowing a reasonable time to make the repairs and improvements required to bring the *dwelling unit* or structure into compliance with the provisions of this code.
5. Inform the property *owner* or the owner's authorized agent of the right to appeal.
6. Include a statement of the right to file a lien in accordance with Section 106.3.

IPMC [A] 107.6 Transfer of ownership. It shall be unlawful for the *owner* of any *dwelling unit* or structure who has received a compliance order or upon whom a notice of violation has been served to sell, transfer, mortgage, lease or otherwise dispose of such *dwelling unit* or structure to another until the provisions of the compliance order or notice of violation have been complied with, or until such *owner* or the owner's authorized agent shall first furnish the grantee, transferee, mortgagee or lessee a true copy of any compliance order or notice of violation issued by the *code official* and shall furnish to the *code official* a signed and notarized statement from the grantee, transferee, mortgagee or lessee, acknowledging the receipt of such compliance order or notice of violation and fully accepting the responsibility without condition for making the corrections or repairs required by such compliance order or notice of violation.

IPMC [A] 108.2 Closing of vacant structures. If the structure is vacant and unfit for human habitation and *occupancy*, and is not in danger of structural collapse, the *code official* is authorized to post a placard of condemnation on the *premises* and order the structure closed up so as not to be an attractive nuisance. Upon failure of the *owner* or the owner's authorized agent to close up the *premises* within the time specified in the order, the *code official* shall cause the *premises* to be closed and secured through any available public agency or by contract or arrangement by private persons and the cost thereof shall be charged against the real estate upon which the structure is located and shall be a lien upon such real estate and may be collected by any other legal resource.

IPMC [A] 108.2.1 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards set forth in Section 102.7 in case of emergency where necessary to eliminate an immediate hazard to life or property or when such utility connection has been made without approval. The *code official* shall notify the serving utility and, whenever possible, the *owner* or the owner's authorized agent and *occupant* of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection the *owner*, the owner's authorized agent or *occupant* of the building structure or service system shall be notified in writing as soon as practical thereafter.

IPMC [A] 108.3 Notice. Whenever the *code official* has *condemned* a structure or equipment under the provisions of this section, notice shall be posted in a conspicuous place in or about the structure affected by such notice and served on the *owner*, the owner's authorized agent or the person or persons responsible for the structure or equipment in accordance with Section 107.3. If the notice pertains to equipment, it shall also be placed on the *condemned* equipment. The notice shall be in the form prescribed in Section 107.2.

IPMC [A] 108.4 Placarding. Upon failure of the *owner* or the owner's authorized agent or person responsible to comply with the notice provisions within the time given, the *code official* shall post on the *premises* or on defective equipment a placard bearing the word "Condemned" and a statement of the penalties provided for occupying the *premises*, operating the equipment or removing the placard.

IPMC [A] 108.5 Prohibited occupancy. Any occupied structure *condemned* and placarded by the *code official* shall be vacated as ordered by the *code official*. Any person who shall occupy a placarded *premises* or shall operate placarded equipment, and any *owner*, the owner's authorized agent or any person responsible for the *premises* who shall let anyone occupy a placarded *premises* or operate placarded equipment shall be liable for the penalties provided by this code.

IPMC [A] 108.6 Abatement methods. The *owner*, the owner's authorized agent, *operator* or *occupant* of a building, *premises* or equipment deemed unsafe by the *code official* shall abate or cause to be abated or corrected such unsafe conditions either by repair, rehabilitation, demolition or other *approved* corrective action.

IPMC [A] 109.5 Costs of emergency repairs. Costs incurred in the performance of emergency work shall be paid by the jurisdiction. The legal counsel of the jurisdiction shall institute appropriate action against the *owner* of the *premises* or the owner's authorized agent where the unsafe structure is or was located for the recovery of such costs.

IPMC [A] 110.1 General. The *code official* shall order the *owner* of any *premises* or the owner's authorized agent, upon which is located any structure, which in the *code official* judgment after review is so deteriorated or dilapidated or has become so out of repair as to be dangerous, unsafe, insanitary or otherwise unfit for human habitation or occupancy, and such that it is unreasonable to repair the structure, to demolish and remove such structure; or if such structure is capable of being made safe by repairs, to repair and make safe and sanitary, or to board up and hold for future repair or to demolish and remove at the *owner's* option; or where there has been a cessation of normal construction of any structure for a period of more than two years, the *code official* shall order the *owner* or the owner's authorized agent to demolish and remove such structure, or board up until future repair. Boarding the building up for future repair shall not extend beyond one year, unless *approved* by the building official.

IPMC [A] 110.3 Failure to comply. If the *owner* of a *premises* or the owner's authorized agent, fails to comply with a demolition order within the time prescribed, the *code official* shall cause the structure to be demolished and removed, either through an available public agency or by contract or arrangement with private persons, and the cost of such demolition and removal shall be charged against the real estate upon which the structure is located and shall be a lien upon such real estate.

IPMC [A] 112.2 Issuance. A stop work order shall be in writing and shall be given to the *owner* of the property, to the *owner's* authorized agent, or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the cited work is authorized to resume.

Revise the International Wildland-Urban Interface Code as follows:

IWUIC [A] 101.6 Maintenance. All buildings, structures, landscape materials, vegetation, *defensible space* or other devices or safeguards required by this code shall be maintained in conformance to the code edition under which installed. The owner or the owner's authorized ~~designated~~ agent shall be responsible for the maintenance of buildings, structures, landscape materials and vegetation.

IWUIC [A] 105.1 Practical difficulties. When there are practical difficulties involved in carrying out the provisions of this code, the code official is authorized to grant modifications for individual cases on application in writing by the owner or a ~~duly~~ owner's authorized ~~representative~~ agent. The code official shall first find that a special individual reason makes enforcement of the strict letter of this code impractical, the modification is in conformance to the intent and purpose of this code, and the modification does not lessen any fire protection requirements or any degree of structural integrity. The details of any action granting modifications shall be recorded and entered into the files of the code enforcement agency.

IWUIC [A] 105.2 Technical assistance. To determine the acceptability of technologies, processes, products, facilities, materials and uses attending the design, operation or use of a building or premises subject to the inspection of the code official, the code official is authorized to require the owner, the owner's authorized agent, or the person in possession or control of the building or premises to provide, without charge to the jurisdiction, a technical opinion and report. The opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the code official and the or the owner's authorized agent and shall analyze the fire safety of the design, operation or use of the building or premises, the facilities and appurtenances situated thereon and fuel management for purposes of establishing fire hazard severity to recommend necessary changes.

IWUIC [A] 109.2.2 Service of orders and notices. Orders and notices authorized or required by this code shall be given or served on the owner, the owner's authorized agent, operator, occupant or other person responsible for the condition or violation either by verbal notification, personal service, or delivering the same to, and leaving it with, a person of suitable age and discretion on the premises; or, if no such person is found on the premises, by affixing a copy thereof in a conspicuous place on the door to the entrance of said premises and by mailing a copy thereof to such person by registered or certified mail to the person's last known address.

Orders or notices that are given verbally shall be confirmed by service in writing as herein provided.

IWUIC [A] 109.3 Right of entry. Whenever necessary to make an inspection to enforce any of the provisions of this code, or whenever the code official has reasonable cause to believe that there exists in any building or on any premises any condition that makes such building or premises unsafe, the code official is authorized to enter such building or premises at all reasonable times to inspect the same or to perform any duty authorized by this code, provided that if such building or premises is occupied, the code official shall first present proper credentials and request entry; and if such building or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent, or other persons having charge or control of the building or premises and request entry. If such entry is refused, the code official shall have recourse to every remedy provided by law to secure entry. Owners, the owner's authorized agent, occupants or any other persons having charge, care or control of any building or premises, shall, after proper request is made as herein provided, promptly permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

IWUIC [A] 109.4.1 General compliance. Orders and notices issued or served as provided by this code shall be complied with by the owner, the owner's authorized agent, operator, occupant or other person responsible for the condition or violation to which the corrective order or notice pertains.

If the building or premises is not occupied, such corrective orders or notices shall be complied with by the owner or the owner's authorized agent.

IWUIC [A] 109.4.5.2 Notice. Where an unsafe condition is found, the code official shall serve on the owner, owner's authorized agent or person in control of the building, structure or premises, a written notice that describes the condition deemed unsafe and specifies the required repairs or improvements to be made to abate the unsafe condition, or that requires the unsafe structure to be demolished within a stipulated time. Such notice shall require the person thus notified, or their designee, to declare within a stipulated time to the code official acceptance or rejection of the terms of the order.

IWUIC [A] 109.4.5.2.1 Method of service. Such notice shall be deemed properly served if a copy thereof is (a) delivered to the owner or the owner's authorized agent personally; (b) sent by certified or registered mail addressed to the owner or the owner's authorized agent at the last known address with the return receipt requested; or (c) delivered in any other manner as prescribed by local law. If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner upon the owner's authorized agent or upon the person responsible for the structure shall constitute service of notice upon the owner.

IWUIC [A] 109.4.5.3 Placarding. Upon failure of the owner, the owner's authorized agent, or person responsible to comply with the notice provisions within the time given, the code official shall post on the premises or on defective equipment a placard bearing the word "UNSAFE" and a statement of the penalties provided for occupying the premises, operating the equipment or removing the placard.

IWUIC [A] 109.4.5.4 Abatement. The owner, the owner's authorized agent, operator or occupant of a building, structure or premises deemed unsafe by the code official shall abate or correct or cause to be abated or corrected such unsafe conditions either by repair, rehabilitation, demolition or other *approved* corrective action.

IWUIC [A] 113.2 Authority to disconnect service utilities. The code official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards set forth in Section 102.4 in case of emergency where necessary to eliminate an immediate hazard to life or property or when such utility connection has been made without the release required by Section 113.1. The code official shall notify the serving utility and whenever possible the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action if not notified prior to disconnection. The owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

IWUIC [A] 114.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property involved, to the owner's authorized agent or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the cited work will be permitted to resume.

Revise the International Zoning Code as follows:

IZC [A] 103.3 Maintenance. All buildings or uses, both existing and new, and all parts thereof, shall be maintained. The owner or owner's authorized ~~designated~~ agent shall be responsible for the maintenance of buildings and parcels of land. To determine compliance with this section, the code official shall be permitted to cause any structure or use to be inspected.

IZC [A] 107.7.3 Variance review criteria. The board of adjustment shall be permitted to approve, approve with conditions or deny a request for a variance. Each request for a variance shall be consistent with the following criteria:

1. Limitations on the use of the property due to physical, topographical and geologic features.
2. The grant of the variance will not grant any special privilege to the property owner or the owner's authorized agent.
3. The applicant can demonstrate that without a variance there can be no reasonable use of the property.
4. The grant of the variance is not based solely on economic reasons.
5. The necessity for the variance was not created by the property owner or the owner's authorized agent.
6. The variance requested is the minimum variance necessary to allow reasonable use of the property.
7. The grant of the variance will not be injurious to the public health, safety or welfare.
8. The property subject to the variance request possesses one or more unique characteristics generally not applicable to similarly situated properties.

IZC [A] 109.1 Hearings. Upon receipt of an application in proper form, the code official shall arrange to advertise the time and place of public hearing. Such advertisement shall be given by at least one publication in a newspaper of general circulation within the jurisdiction. Such notice shall state the nature of the request, the location of the property, and the time and place of hearing. Reasonable effort shall also be made to give notice by regular mail of the time and place of hearing to each surrounding property owner or the owner's authorized agent; the extent of the area to be notified shall be set by the code official. A notice of such hearing shall be posted in a conspicuous manner on the subject property.

PART II – IECC-COMMERCIAL

Revise the International Energy Conservation Code-Commercial as follows:

IECC C108.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property involved, or to the owner's authorized agent, or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order, and the conditions under which the cited work will be permitted to resume.

PART III – IECC-RESIDENTIAL

Revise the International Energy Conservation Code-Residential as follows:

IECC R108.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property involved, or to the owner's authorized agent, or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order, and the conditions under which the cited work will be permitted to resume.

PART IV – IRC

Revise the International Residential Code as follows:

IRC R104.6 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the *building official* has reasonable cause to believe that there exists in a structure or upon a premises a condition which is contrary to or in violation of this code which makes the structure or premises unsafe, dangerous or hazardous, the *building official* or designee is authorized to enter the structure or premises at reasonable times to inspect or to perform the duties imposed by this code, provided that if such structure or premises be occupied that credentials be presented to the occupant and entry requested. If such structure or premises be unoccupied, the *building official* shall first make a reasonable effort to locate the owner, the owner's authorized agent, or other person having charge or control of the structure or premises and request entry. If entry is refused, the *building official* shall have recourse to the remedies provided by law to secure entry.

IRC R105.1 Required. Any owner or owner's authorized agent who intends to construct, enlarge, alter, repair, move, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the *building official* and obtain the required *permit*.

IRC R110.3 Certificate issued. After the *building official* inspects the building or structure and finds no violations of the provisions of this code or other laws that are enforced by the department of building safety, the *building official* shall issue a certificate of occupancy which shall contain the following:

1. The building *permit* number.
2. The address of the structure.
3. The name and address of the owner or the owner's authorized agent.
4. A description of that portion of the structure for which the certificate is issued.
5. A statement that the described portion of the structure has been inspected for compliance with the requirements of this code.
6. The name of the *building official*.
7. The edition of the code under which the *permit* was issued.
8. If an automatic sprinkler system is provided and whether the sprinkler system is required.
9. Any special stipulations and conditions of the building *permit*.

IRC R111.3 Authority to disconnect service utilities. The *building official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards set forth in Section R102.4 in case of emergency where necessary to eliminate an immediate hazard to life or property or when such utility connection has been made without the approval required by Section R111.1 or R111.2. The *building official* shall notify the serving utility and whenever possible the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action if not notified prior to disconnection. The owner, the owner's authorized agent, or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

IRC R114.1 Notice to owner or the owner's authorized agent. Upon notice from the *building official* that work on any building or structure is being prosecuted contrary to the provisions of this code or in an unsafe and dangerous manner, such work shall be immediately stopped. The stop work order shall be in writing and shall be given to the owner of the property involved, or to the owner's authorized agent or to the person doing the work and shall state the conditions under which work will be permitted to resume.

PART V – ISPSC

Revise the International Swimming Pool and Spa Code as follows:

ISPSC 102.3 Maintenance. All *aquatic vessel* and related mechanical, electrical and plumbing systems, both existing and new, and all parts thereof, shall be maintained in proper operating condition in accordance with the original design in a safe and sanitary condition. All devices or safeguards required by this code shall be maintained in compliance with the code edition under which they were installed.

The *owner* or the *owner's* authorized ~~designated~~ agent shall be responsible for maintenance of all systems. To determine compliance with this provision, the *code official* shall have the authority to require any system to be reinspected.

ISPSC 104.6 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the *code official* has reasonable cause to believe that there exists in a structure or upon a premises a condition which is contrary to or in violation of this code which makes the structure or premises unsafe, dangerous or hazardous, the *code official* is authorized to enter the structure or premises at reasonable times to inspect or to perform the duties imposed by this code, provided that if such structure or premises be occupied that credentials be presented to the occupant and entry requested. If such structure or premises is unoccupied, the *code official* shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the *code official* shall have recourse to the remedies provided by law to secure entry.

ISPSC 104.8 Modifications. Wherever there are practical difficulties involved in carrying out the provisions of this code, the *code official* shall have the authority to grant modifications for individual cases, upon application of the owner or owner's authorized agent ~~representative~~, provided the *code official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen sustainability, health, accessibility, life safety and structural requirements. The details of action granting modifications shall be recorded and entered in the files of the department of building safety.

ISPSC 105.1 When required. Any *owner*, or owner's authorized agent who desires to construct, enlarge, alter, *repair*, move, or demolish an *aquatic vessel* or to erect, install, enlarge, alter, repair, remove, convert or replace any system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the *code official* and obtain the required *permit* for the work.

ISPSC 105.2 Application for permit. Each application for a permit, with the required fee, shall be filed with the *code official* on a form furnished for that purpose and shall contain a general description of the proposed work and its location. The application shall be signed by the owner or ~~an~~ the owner's authorized agent. The permit application shall contain such other information required by the *code official*.

ISPSC 107.5 Stop work orders. Upon notice from the *code official*, work on any system that is being done contrary to the provisions of this code or in a dangerous or unsafe manner shall immediately cease. Such notice shall be in writing and shall be given to the owner of the property, or to the owner's authorized agent, or to the person doing the work. The notice shall state the conditions under which work is authorized to resume. Where an emergency exists, the *code official* shall not be required to give a written notice prior to stopping the work. Any person who shall continue any work in or about the structure after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be liable to a fine of not less than [AMOUNT] dollars or more than [AMOUNT] dollars.

ISPSC 107.7.2 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the *aquatic vessel* regulated by the technical codes in case of an emergency, where necessary, to eliminate an immediate danger to life or property. Where possible, the owner or the owner's authorized agent and occupant of the building where the aquatic vessel is located shall be notified of the decision to disconnect utility service prior to taking such action. If not notified prior to disconnecting, the owner or the owner's authorized agent or occupant of the building shall be notified in writing, as soon as practical thereafter.

Reason: The purpose for the proposal is to update the references to “applicant” and “owner” throughout the building code by changing them to the “owner or the owner’s authorized agent” where it is warranted. In Section 110.1, “the permit applicant” is changed to “the owner or the owner’s authorized agent” because the latter should be responsible to keep the work accessible and exposed for inspection. In Sections 1703.4.1 and 1707.1, “the applicant” is changed to “the owner or the owner’s authorized agent” because the latter should be responsible for the costs of required tests, reports and investigations. In Sections 1703.6 and 1704.2.4, “the applicant” is changed to “the owner or the owner’s authorized agent” because the latter should be responsible for submitting required reports to the building official. In Section 1703.6.1, the applicant” is changed to “the owner or the owner’s authorized agent” for consistency with Section 1704.2 that requires the latter to employ the approved agencies. In Section 1803.6, the “owner or authorized agent” is changed to the “permit applicant” because it should be permissible for the latter to submit the geotechnical report with the other submittal documents at the time of permit application.
The 2012 IBC contains additional references to “owner” but, based on the context in which they are used, it is not considered appropriate or useful to revise the language in conjunction with this proposal (e.g., from “the owner” to “the owner or the owner’s authorized agent”). See Sections 101.4.4, 104.6, 111.2, 112.3, 116.3, 116.4, 402.3, 913.4, 1107.4-Exc. 1, 1607.7.4, 3108.2, 3307.1, 3412.4, 3412.4.1, G101.2, G105.6-Item 3, K103.1 and L101.3.
The 2012 IBC contains additional references to “applicant” but, based on the context in which they are used, it is also not considered appropriate or useful to revise the language in conjunction with this proposal (e.g., from “the applicant” to “the owner or the owner’s authorized agent”). See Sections 104.10.1-Item 5, 105.1.1, 105.3, 107.3.1, 109.3, 109.5, 1612.3.1, 1612.3.2, 1704.2.3, 1704.3, G103.3, G103.4, G103.5.1, G103.6, G104.2, G105.7-Item 5 and J104.1.
All instances in the 2012 IBC of “applicant” and “owner,” other than listed above, are included in this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

Staff analysis: This proposal for IBC indicate a correlative change throughout the code for the changes in Chapter 1. If this proposal is approved, similar revisions will be completed in the other chapters of the codes where the terms similar to “owner and owner’s authorized agent”.

Public Hearing Results

PART I - IADMIN
Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides a consistent and proper designation of “owner and owner’s authorized agent” throughout the codes. The proposal will eliminate the confusion called by so many different terms being used in the codes to mean the same person.

Assembly Action: **None**

PART II – IECC – Commercial
HEARD BY IECC COMMERCIAL COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: Provides consistency in use of terminology within the code and with the use of the terms in the other International Codes.

Assembly Action: **None**

PART III – IECC – Residential
HEARD BY IECC RESIDENTIAL COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: This proposed language would clarify the intent of the code.

Assembly Action: **None**

PART IV - IRC
HEARD BY IRC COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it clarifies who is referenced and distinguishes authorized as a legal status.

Assembly Action: **None**

PART V - ISPSC
HEARD BY THE ISPSC COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement.

Assembly Action: **None**

Final Hearing Results

ADM22-13, Part I	**AS**
ADM22-13, Part II	**AS**
ADM22-13, Part III	**AS**
ADM22-13, Part IV	**AS**
ADM22-13, Part V	**AS**

Code Change No: ADM23-13

Original Proposal

Section: PART I - IBC: [A] 104.11; IEBC: [A] 104.11 IFC: [A] 104.9; IFGC: [A] 105.2; IMC: [A] 105.2; IPC: [A] 105.2; IPSDC: [A] 105.2; IPMC: [A] 105.2; IWUIC: [A] 105.3
PART II - IRC: R104.11;
PART III - ISPSC 104.9

THIS IS A 3 PART CODE CHANGE. PARTS I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE AS ONE CODE CHANGE. PART II WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. PART III WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Larry Wainright, Qualtim, representing Structural Building Components Association (lwainright@qualtim.com)

PART I – IBC; IEBC; IFC; IFCG; IMC; IPC; IPSDC; IPMC; IWUIC

Revise the International Building Code as follows:

IBC [A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. <u>Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons the alternative was not approved</u>.

Revise the International Existing Building Code as follows:

IEBC [A] 104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design, or method of construction shall be approved where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method, or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability, and safety. <u>Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved</u>.

Revise the International Fire Code as follows:

IFC [A] 104.9 Alternative materials and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. The *fire code official* is authorized to approve an alternative material or method of construction where the *fire code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety. <u>Where the alternative</u>

material, design or method of construction is not approved, the fire *code official* shall respond in writing, stating the reasons the alternative was not approved.

Revise the International Fuel Gas Code as follows:

IFGC [A] 105.2 Alternative materials, methods, appliances and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved.

Revise the International Mechanical Code as follows:

IMC [A] 105.2 Alternative materials, methods, equipment and appliances. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved.

Revise the International Plumbing Code as follows:

IPC [A] 105.2 Alternative materials, methods and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved.* An alternative material or method of construction shall be *approved* where the code official finds that the proposed alternative material, method or equipment complies with the intent of the provisions of this code and is at least the equivalent of that prescribed in this code. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved.

Revise the International Private Sewage Disposal Code as follows:

IPSDC [A] 105.2 Alternative materials, methods and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material or method of construction shall be approved where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved.

Revise the International Property Maintenance Code as follows:

IPMC [A] 105.2 Alternative materials, methods and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved.

Revise the International Wildland-Urban Interface Code as follows:

IWUIC [A] 105.3 Alternative materials or methods. The code official, in concurrence with approval from the *building official* and fire chief, is authorized to approve alternative materials or methods, provided that the code official finds that the proposed design, use or operation satisfactorily complies with the intent of this code and that the alternative is, for the purpose intended, at least equivalent to the level of quality, strength, effectiveness, fire resistance, durability and safety prescribed by this code. Approvals under the authority herein contained shall be subject to the approval of the *building official* whenever the alternate material or method involves matters regulated by the *International Building Code*.
The code official shall require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use. The details of any action granting approval of an alternate shall be recorded and entered in the files of the code enforcement agency. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved.

PART II – IRC

Revise the International Residential Code as follows:

IRC R104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code. Compliance with the specific performance-based provisions of the International Codes in lieu of specific requirements of this code shall also be permitted as an alternate. Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons the alternative was not approved.

PART III – ISPSC

Revise the International Swimming Pool and Spa Code as follows:

ISPSC 104.9 Alternative materials, methods and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be approved where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved.

Reason: the language added is similar to that included at 105.3.1 when a permit application is rejected. This proposed change assumes that the non-approval of an alternative method is not the same as the non-approval of a permit, i.e., the permit application may have been approved but an alternative method might not be approved until a later date. However, the reasons for responding to the applicant in writing are the same, as noted in the Commentary to section 105.3.1: ‘In order to ensure effective communication and due process of law, the reasons for denial of an application for a permit are required to be in writing. Further, the language is coordinated across all of the I-codes for consistency of enforcement.

Cost Impact: This proposal will not increase the cost of construction.

Public Hearing Results

PART I - IADMIN
Committee Action: Approved as Submitted

Committee Reason: The additional language protects the designer, clarifies the decisions and helps in the appeals process. It is good practice for the code official to respond in writing to keep accountability for alternative materials.

Assembly Action: None

PART II – IRC
HEARD BY IRC COMMITTEE

Committee Action: Approved as Submitted

Committee Reason: The committee approved this proposed code change because they felt that it is important to know the reason each time there is input given back. This is a learning experience on behalf of the design professional. The design professional understands what needs to be modified so the plans can be approved. It is important to have a paper trail for posterity.

Assembly Action: None

PART III – ISPSC
HEARD BY THE ISPSC COMMITTEE

Committee Action: Disapproved

Committee Reason: Requiring written reasons for disapproval for every alternative design, material or method will be a paperwork nightmare for smaller issues. The code official can make the determination as to when a response in writing is prudent.

Assembly Action: None

Final Hearing Results

ADM23-13, Part I	**AS**
ADM23-13, Part II	**AS**
ADM23-13, Part III	**D**

Code Change No: ADM27-13

Original Proposal

Section: PART I – IBC: 105.2
PART II – IRC: R105.2

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE. PART II WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Rick Davidson, City of Maple Grove, representing Association of Minnesota Building Officials (rdavidson@maplegrovemn.gov)

PART I – IBC

Revise the International Building Code as follows:

IBC [A] 105.2 Work exempt from permit. Exemptions from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. *Permits* shall not be required for the following:

Building:

1. One-story detached accessory structures ~~used as tool and storage sheds, playhouses and similar uses,~~ provided the floor area is not greater than 120 square feet (11 m^2).

2 through 13 *(No change to current text)*

(Remainder of section not shown remains unchanged.)

PART II – IRC

Revise the International Residential Code as follows:

R105.2 Work exempt from permit. *Permits* shall not be required for the following. Exemption from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this *jurisdiction*.

Building:

1. One-story detached *accessory structures* ~~used as tool and storage sheds, playhouses and similar uses,~~ provided the floor area does not exceed 200 square feet (18.58 m^2).

2 through 10 *(No change to current text)*

(Remainder of section not shown remains unchanged.)

Reason: The term “used as tool and storage sheds, playhouses and similar uses” is proposed to be deleted because there now exists in the IRC a definition for “accessory structure”. It is unnecessary to further define the term in the rule as it only serves to add confusion. For example, a small outdoor screen room meets the definition of accessory structure but is it exempt from permits? It poses no more of a hazard than a playhouse or tool shed. It is better to let the definition provide direction.
ACCESSORY STRUCTURE. *A structure not greater than 3,000 square feet (279 m^2) in floor area, and not over two stories in height, the use of which is customarily accessory to and incidental to that of the dwelling(s) and which is located on the same lot.*

Cost Impact: None

Public Hearing Results

PART I - IADMIN
Committee Action: **Disapproved**

Committee Reason: While typically laundry lists are not warranted, not all small structures should be considered accessory. These examples need to left in the code for clarity.

Assembly Action: **None**

PART II – IRC
HEARD BY IRC COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that the type of information addressed by this proposal is suitable for inclusion in the commentary to the code, but not in the code itself.

Assembly Action: **None**

Final Hearing Results

ADM27-13, Part I	**D**
ADM27-13, Part II	**AS**

Code Change No: ADM49-13

Original Proposal

Section: PART I - IBC: [A] 111.1, IEBC: [A] 110.1, IWUIC [A] 110.1;
PART II – IRC: R110.1

THIS IS A 2 PART CODE CHANGE. PARTS I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE AS ONE CODE CHANGE. PART II WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Jerry Anderson, City of Overland Park, Ks, representing self (jerry.anderson@opkansas.org)

PART I – IBC; IEBC; IWUIC

Revise the International Building Code as follows:

IBC [A] SECTION 111
CERTIFICATE OF OCCUPANCY

IBC [A] 111.1 Use and occupancy. No building or structure shall be used or occupied, and no change in the existing use or occupancy classification of a building or structure or portion thereof shall be made, until the *building official* has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction.

> **Exception:** Certificates of occupancy are not required for work exempt from *permits* under Section 105.2.

Revise the International Existing Building Code as follows:

IEBC [A] SECTION 110
CERTIFICATE OF OCCUPANCY

IEBC [A] 110.1 Altered area use and occupancy classification change. No altered area of a building and no relocated building shall be used or occupied, and no change in the existing use or occupancy classification of a building or portion thereof shall be made until the code official has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction.

Revise the International Wildland-Urban Interface Code as follows:

IWUIC SECTION 110
CERTIFICATE OF COMPLETION

IWUIC [A] 110.1 General. No building, structure or premises shall be used or occupied, and no change in the existing use or occupancy classification of a building, structure, premise or portion thereof shall be made until the code official has issued a certificate of completion therefor as provided herein. The certificate of occupancy shall not be issued until the certificate of completion indicating that the project is in compliance with this code has been issued by the code official.

PART II – IRC

Revise the International Residential Code as follows:

IRC SECTION R110
CERTIFICATE OF OCCUPANCY

IRC R110.1 Use and occupancy. No building or structure shall be used or occupied, and no change in the existing use or occupancy classification of a building or structure or portion thereof shall be made until the *building official* has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the *jurisdiction*. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the *jurisdiction* shall not be valid.

Exceptions:

1. Certificates of occupancy are not required for work exempt from permits under Section R105.2.
2. Accessory buildings or structures.

IRC R110.2 Change in use. Changes in the character or use of an existing structure shall not be made except as specified in Sections 3408 and 3409 of the *International Building Code*.

Reason: The purpose of this code change is to clarify the intent of this code section as it pertains to existing buildings and structures. The current language implies that a new (revised) certificate of occupancy is required only if there is a change in the occupancy classification. I have inserted the word "use" to indicate that there cannot be change in the use of the building or structure regardless if there is a change occupancy classification.

Cost Impact: no cost associated with this change

Public Hearing Results

PART I - IADMIN
Committee Action: **Approved as Submitted**

Committee Reason: The added language clarifies when there is the same occupancy, but with a different level of activity. This proposal will coordinate with the IEBC change to the definition of Change of Occupancy.

Assembly Action: **None**

PART II - IRC
HEARD BY IRC COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this code change proposal because they felt that it clarifies that a change in the existing occupancy does not grant a change in the existing use.

Assembly Action: **None**

Final Hearing Results

ADM49-13, Part I	**AS**
ADM49-13, Part II	**AS**

Code Change No: ADM51-13

Original Proposal

Section: **PART I - IBC: 202, IEBC: 202, IFC: 202, IFGC: 202, IMC: 202, IZC: 202**
PART II - IECC: C202;
PART III - IECC: R202 (IRC N1101.9);
PART IV - IRC: R202;
PART V – ISPSC: 202.

THIS IS A 5 PART CODE CHANGE. PARTS I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE AS ONE CODE CHANGE. PART II WILL BE HEARD BY THE ENERGY CONSERVATION CODE-COMMERCIAL COMMITTEE. PART III WILL BE HEARD BY THE ENERGY CONSERVATION CODE-RESIDENTIAL COMMITTEE. PART IV WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. PART V WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Jeremiah Williams, U.S. Department of Energy (jeremiah.williams@ee.doe.gov)

PART I – IBC; IEBC; IFC; IFCG; IMC; IZC

Revise the International Building Code as follows:

IBC SECTION 202
DEFINITIONS

[A] ALTERATION. Any construction, retrofit or renovation to an *existing structure* other than *repair* or *addition* that requires a permit. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

Revise the International Existing Building Code as follows:

IEBC SECTION 202
DEFINITIONS

[A] ALTERATION. Any construction, retrofit or renovation to an existing structure other than a *repair* or *addition* that requires a permit. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit. Alterations are classified as Level 1, Level 2 or Level 3.

Revise the International Fire Code as follows:

IFC SECTION 202
DEFINITIONS

[A] ALTERATION. Any construction, retrofit or renovation to an *existing structure* other than *repair* or *addition* that requires a permit. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

Revise the International Fuel Gas Code as follows:

IFGC SECTION 202
GENERAL DEFINITIONS

[A] ALTERATION. A change in a system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

Revise the International Mechanical Code as follows:

IMC SECTION 202
GENERAL DEFINITIONS

[A] ALTERATION. A change in a ~~mechanical~~ system that involves ~~an~~ a retrofit, extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

Revise the International Zoning Code as follows:

IZC SECTION 202
GENERAL DEFINITIONS

[A] ALTERATION. Any retrofit, change, addition or modification in construction, occupancy or use.

PART II – IECC-COMMERCIAL

Revise the International Energy Conservation Code-Commercial as follows:

IECC SECTION C202
GENERAL DEFINITIONS

ALTERATION. Any construction, retrofit or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

PART III – IECC-RESIDENTIAL

Revise the International Energy Conservation Code-Residential as follows:

IECC SECTION R202 (IRC N1101.9)
GENERAL DEFINITIONS

ALTERATION. Any construction, retrofit or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

PART IV – IRC

Revise the International Residential Code as follows:

IRC SECTION R202
DEFINITIONS

ALTERATION. Any construction, retrofit or renovation to an existing structure other than repair or addition that requires a *permit*. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a *permit*.

PART V – ISPSC

Revise the International Swimming Pool and Spa Code as follows:

ISPSC SECTION 202
DEFINITIONS

ALTERATION. Any construction, retrofit or renovation to an *existing aquatic vessel* other than repair or addition that requires a permit. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a *permit*.

Reason:
PART I - This proposal expands definition of "alteration" to include retrofits and changes to energy systems for consistency with the 2012 International Energy Conservation Code (IECC). While the terms "construction" and "renovation" are not defined in the International Existing Buildings Code (IEBC) or other International Code Council (ICC) codes, they logically include mechanical, water heating, and lighting systems. Since this is not clearly spelled out, given some interpretations of the code these energy using systems might be excluded from IECC compliance when they should not be excluded. The suggested new sentence is intended to clarify the scope of the IECC with respect to alterations of such systems or their component parts and is consistent with the definition of "alteration" in the 2012 IECC. Because the term "retrofit" is used regularly to generally describe work done in existing buildings, its inclusion in the definition along with construction and renovation is intended to provide more clarity when trying to determine what is and is not covered by the IEBC with respect to work being done in and to existing buildings.

PART II, PART III, PART IV, and PART V –
A change in a mechanical system as currently described in the code is an appropriate target for compliance and alterations to such systems should meet the applicable provisions of the energy code. Plumbing, electrical (lighting), and other building systems also use energy and, if altered as defined in the code, they should be equally addressed as mechanical systems are in the current code. As an example, the extension of a potable hot water system to serve additional lavatories could involve additional hot water piping that should be insulated. Another example involves updating a lighting system arrangement with new fixtures and wiring. Such situations do not involve repairs or additions and are currently not subject to the provisions of the code when they should be. This proposal clarifies "alterations" to include changes to HVAC, service heating water, or lighting systems involving extension, addition, or change to arrangement, type, or purpose. This ensures that alterations, no matter what systems are involved, comply with the code. Approval of this change also ensures consistency between the IEBC as applied to alterations and the IECC. All three chapters in the IEBC applicable to alterations (7, 8 and 9) refer to the IECC and contain provisions applicable to other than mechanical systems. This change ensures consistency in scope between the IEBC and the IECC with respect to alterations.

There is a cost impact associated with this proposed change to the degree that the subject systems are not clearly covered in the current code and as a result alterations that should be subject to the energy code are not required to meet the energy code.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

PART I - IADMIN
Committee Action: Disapproved

Committee Reason: The term 'retrofit' is undefined. The term 'needs a permit' is redundant.

Assembly Action: None

PART II – IECC – Commercial
HEARD BY IECC COMMERCIAL COMMITTEE

Committee Action: Approved as Submitted

Committee Reason: The changes improve the definition of alteration to clarify that it includes changes to the building systems as well as the building, and that it includes retrofitting existing building elements.

Assembly Action: None

PART III – IECC – Residential
HEARD BY IECC RESIDENTIAL COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: This is a needed change to clarify what constitutes an alteration.

Assembly Action: **None**

PART IV - IRC
HEARD BY IRC COMMITTEE

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because there is no definition in the code for "retrofit."

Assembly Action: **None**

PART V - ISPSC
HEARD BY THE ISPSC COMMITTEE

Committee Action: **Disapproved**

Committee Reason: The proposal appears to bring too much scope of coverage into this code that is only for coverage of pools and spas.

Assembly Action: **None**

Final Hearing Results

ADM51-13, Part I	**D**
ADM51-13, Part II	**AS**
ADM51-13, Part III	**AS**
ADM51-13, Part IV	**D**
ADM51-13, Part V	**D**

Code Change No: ADM52-13

Original Proposal

Section: **PART I - IBC: 202, IEBC: 202, IFC: 202, IMC: 202**
PART II - IECC: C202;
PART III - IECC: R202 (IRC N1101.9);
PART IV - IRC: R202;
PART V - ISPSC 202.

THIS IS A 5 PART CODE CHANGE. PARTS I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE AS ONE CODE CHANGE. PART II WILL BE HEARD BY THE ENERGY CONSERVATION CODE-COMMERCIAL COMMITTEE. PART III WILL BE HEARD BY THE ENERGY CONSERVATION CODE-RESIDENTIAL COMMITTEE. PART IV WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. PART V WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Deborah Taylor, Deborah F. Taylor Consulting, LLC, representing self (taylor@dftconsultingny.com)

PART I – IBC; IEBC; IFC; IMC

Revise the International Building Code as follows:

IBC SECTION 202
DEFINITIONS

[A] ALTERATION. Any construction or renovation to an *existing structure* other than *repair* or *addition*. <u>Also, a change in an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.</u>

Revise the International Existing Building Code as follows:

IEBC SECTION 202
DEFINITIONS

[A] ALTERATION. Any construction or renovation to an existing structure other than a *repair* or *addition.* <u>Also, a change in an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.</u> Alterations are classified as Level 1, Level 2 or Level 3.

Revise the International Fire Code as follows:

IFC SECTION 202
DEFINITIONS

[A] ALTERATION. Any construction or renovation to an *existing structure* other than *repair* or *addition*. <u>Also, a change in an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.</u>

Revise the International Mechanical Code as follows:

IMC SECTION 202
GENERAL DEFINITIONS

[A] ALTERATION. A change in a mechanical or electrical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation.

PART II – IECC-COMMERCIAL

Revise the International Energy Conservation Code-Commercial as follows:

IECC SECTION C202
GENERAL DEFINITIONS

ALTERATION. Any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in ~~a~~ an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

COMMISSIONING. A protocol included in the construction documents for mechanical and lighting systems, including controls, that establishes a process of testing, balancing, calibrating and adjusting the installed systems to ensure that they function according to *approved* construction documents.

LIGHTING POWER ALLOWANCE. The total input electrical power permitted by this code for lighting in a building, or part thereof as applicable.

LIGHTING POWER DENSITY. The ratio of lighting input power permitted by this code as a function of area served, measured in watts per square foot.

TOTAL CONNECTED LIGHTING POWER. A calculation of the lighting power capacity in a building, or part thereof, or design, performed in accordance with Section C405.5.1 of this code.

WORK. Proposed or actual construction that shall include demolition or installation of materials, equipment or systems related to creating, altering or removing a building, or part thereof.

PART III – IECC-RESIDENTIAL

Revise the International Energy Conservation Code-Residential as follows:

IECC SECTION R202 (IRC N1101.9)
GENERAL DEFINITIONS

ALTERATION. Any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in ~~a~~ an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

COMMISSIONING. A protocol included in the construction documents for mechanical and lighting systems, including controls, that establishes a process of testing, balancing, calibrating and adjusting the installed systems to ensure that they function according to *approved* construction documents.

LIGHTING POWER ALLOWANCE. The total input electrical power permitted by this code for lighting in a building, or part thereof as applicable.

LIGHTING POWER DENSITY. The ratio of lighting input power permitted by this code as a function of area served, measured in watts per square foot.

TOTAL CONNECTED LIGHTING POWER. A calculation of the lighting power capacity in a building, or part thereof, or design, performed in accordance with Section C405.5.1 of this code.

WORK. Proposed or actual construction that shall include demolition or installation of materials, equipment or systems related to creating, altering or removing a building, or part thereof.

PART IV – IRC

Revise the International Residential Code as follows:

IRC SECTION R202
DEFINITIONS

ALTERATION. Any construction, retrofit or renovation to an existing structure other than repair or addition that requires a *permit*. Also, a change in ~~a~~ an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a *permit*.

PART V – ISPSC

Revise the International Swimming Pool and Spa Code as follows:

ISPSC SECTION 202
DEFINITIONS

ALTERATION. Any construction, retrofit or renovation to an *existing aquatic vessel* other than repair or addition that requires a permit. Also, a change in an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a *permit*.

Reason: The definition for "alteration" needs to acknowledge electrical alterations as well. The added terms are already used in the code and required definition.

Cost Impact: This code change proposal will not increase the cost of construction.

Staff Analysis: The definition for Alteration also appears in the IFGC and IZC.

Public Hearing Results

PART I - IADMIN
Committee Action: **Disapproved**

Committee Reason: The definition for alteration should be left broad. The additional sentence is not needed.

Assembly Action: **None**

PART II – IECC – Commercial
HEARD BY IECC COMMERCIAL COMMITTEE

Committee Action: **Disapproved**

Committee Reason: The committee preferred the revision of this definition which was approved in ADM51-13.

Assembly Action: **None**

PART III – IECC – Residential
HEARD BY IECC RESIDENTIAL COMMITTEE

Committee Action: **Disapproved**

Committee Reason: The provisions proposed are not needed in the IECC-Residential provisions.

Assembly Action: **None**

PART IV - IRC
HEARD BY IRC COMMITTEE

Committee Action: **Approved as Submitted**

The following is errata that was not posted to the ICC website.

Modify the proposal as follows:

ALTERATION. Any construction~~, retrofit~~ or renovation to an existing structure other than repair or addition that requires a *permit*. Also, a change in an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a *permit*.

Committee Reason: The committee approved this proposed code change because they felt that it provides clarity.

Assembly Action: **None**

PART V - ISPSC
HEARD BY THE ISPSC COMMITTEE

Committee Action: **Disapproved**

The following is errata that was not posted to the ICC website.

Modify the proposal as follows:

ALTERATION. Any construction~~, retrofit~~ or renovation to an *existing aquatic vessel* other than repair or addition that requires a permit. Also, a change in an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a *permit*.

Committee Reason: The proposal appears to bring too much scope of coverage into this code that is only for coverage of pools and spas.

Assembly Action: **None**

Public Comment(s)

Part II - Public Comment:

Deborah F. Taylor, Principal, Deborah F. Taylor Consulting, LLC, representing self, requests Approval as Submitted for ADM52-13, Part II.

Commenter's Reason: Because of lighting and controls, electrical work needs to be added to the definition of "alteration." This definition was approved as submitted by the IRC Technical Committee, but disapproved by both the IECC Commercial and Residential Technical Committees. The other terms are used often in the code and should be defined in Chapter 2.

Part III - Public Comment:

Deborah F. Taylor, Principal, Deborah F. Taylor Consulting, LLC, representing self, requests Approval Modified by this Public Comment for ADM52-13, Part III.

Modify the proposal as follows:

ALTERATION. Any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in an electrical or mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

~~**COMMISSIONING.** A protocol included in the construction documents for mechanical and lighting systems, including controls, that establishes a process of testing, balancing, calibrating and adjusting the installed systems to ensure that they function according to *approved* construction documents.~~

~~**LIGHTING POWER ALLOWANCE.** The total input electrical power permitted by this code for lighting in a building, or part thereof as applicable.~~

~~**LIGHTING POWER DENSITY.** The ratio of lighting input power permitted by this code as a function of area served, measured in watts per square foot.~~

~~**TOTAL CONNECTED LIGHTING POWER.** A calculation of the lighting power capacity in a building, or part thereof, or design, performed in accordance with Section C405.5.1 of this code.~~

WORK. Proposed or actual construction that shall include demolition or installation of materials, equipment or systems related to creating, altering or removing a building, or part thereof.

Commenter's Reason: Because of lighting and controls, electrical work needs to be added to the definition of "alteration." The definition of 'alteration' as originally submitted was approved as submitted by the IRC Technical Committee, but disapproved by both the IECC Commercial and Residential Technical Committees. The term 'work' is used often in the IECC/Residential code and should be defined in Chapter 2. The definitions for "commissioning" and lighting-related work are not used in Chapter 4 of the IECC/Residential Code and have therefore have been removed from the proposal.

Final Hearing Results

ADM52-13, Part I	**D**
ADM52-13, Part II	**D**
ADM52-13, Part III	**D**
ADM52-13, Part IV	**AS**
ADM52-13, Part V	**D**

Code Change No: ADM60-13

Original Proposal

Section: **PART I - IBC: 202; IEBC: 202;**
PART II - IECC: C202;
PART III - IECC: R202 (IRC N1101.9);
PART IV - IRC: R202;
PART V - ISPSC: 202

THIS IS A 5 PART CODE CHANGE. PARTS I WILL BE HEARD BY THE ADMINISTRATIVE PROVISIONS COMMITTEE AS ONE CODE CHANGE. PART II WILL BE HEARD BY THE ENERGY CONSERVATION CODE-COMMERCIAL COMMITTEE. PART III WILL BE HEARD BY THE ENERGY CONSERVATION CODE-RESIDENTIAL COMMITTEE. PART IV WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. PART V WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Maureen Traxler, City of Seattle, representing Seattle Department of Planning and Development (maureen.traxler@seattle.gov)

PART I – IBC; IEBC

Revise the International Building Code as follows:

IBC SECTION 202
DEFINITIONS

[A] REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

Revise the International Existing Building Code as follows:

IEBC SECTION 202
DEFINITIONS

[A] REPAIR. The ~~restoration to good or sound condition~~ reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

PART II – IECC-COMMERCIAL

Revise the International Energy Conservation Code-Commercial as follows:

IECC SECTION C202
GENERAL DEFINITIONS

REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

PART III – IECC-RESIDENTIAL

Revise the International Energy Conservation Code-Residential as follows:

IECC SECTION R202 (IRC N1101.9)
GENERAL DEFINITIONS

REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

PART IV – IRC

Revise the International Residential Code as follows:

IRC SECTION R202
DEFINITIONS

REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage. For definitions applicable in Chapter 11, see Section N1101.9.

PART V – ISPSC

Revise the International Swimming Pool and Spa Code as follows:

ISPSC SECTION 202
DEFINITIONS

REPAIR. The ~~restoration to good or sound condition~~ reconstruction or renewal of any part of an existing *aquatic vessel* for the purpose of its maintenance or to correct damage.

Reason: We are proposing the definition be modified in each of the codes in which it appears. The identical definition appears in the IBC, IEBC, IRC and ISPSC--4 of the 6 ICC codes in which it appears. The IECC definition is "The reconstruction or renewal of any part of an existing building." Note that the term is not defined in the IFC, IMC, IFGC, IPC or IPSDC. The definition of 'repair' in the IGCC definition is identical except that it includes building sites as well as buildings, and can be addressed in Group C.

Limiting repairs to maintenance is not consistent with the use of the term in the codes. IBC Section 3405.1 and IEBC Section 404.1, Repairs, specifically state that repair includes correction of damage. "Work on nondamaged components that is necessary for the required *repair* of damaged components shall be considered part of the *repair* and shall not be subject to the requirements for *alterations* in this chapter." IEBC Section 606.2 deals with repairs to damaged buildings—explicitly including correction of damage, which in many cases would be more than "maintenance".

Another possible solution to this inconsistency would be to delete the phrase "for the purpose of its maintenance" as the term is defined in the IECC. However, adding damage to the existing definition more clearly distinguishes repairs from alterations.

Cost Impact: None.

Public Hearing Results

PART I - IADMIN
Committee Action: **Approved as Submitted**

Committee Reason: The revision to the term 'repair' cleans up the difference between the terms repair and alteration. This proposal will also provide consistency throughout the code.

Assembly Action: **None**

PART II – IECC – Commercial
HEARD BY IECC COMMERCIAL COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: The proposal results in the identical definition of repair in multiple International Codes.

Assembly Action: **None**

PART III – IECC – Residential
HEARD BY IECC RESIDENTIAL COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: This proposed change would provide consistency with other I-Codes.

Assembly Action: **None**

PART IV - IRC
HEARD BY IRC COMMITTEE

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposed code change because they felt that it clarifies what the code is commonly interpreted to intend. This action is consistent with prior committee action on ADM60 Part I.

Assembly Action: **None**

PART V - ISPSC
HEARD BY THE ISPSC COMMITTEE

Committee Action: **Disapproved**

Committee Reason: The phrase "to correct damage" is too specific and unnecessary.

Assembly Action: **None**

Public Comment(s)

Part V - Public Comment:

Maureen Traxler, City of Seattle Dept of Planning & Development, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Submitted.

Commenter's Reason: This is a five-part proposal; four parts were approved. The proposal makes the definition of "repair" consistent in all the codes where it is used. The proposal also makes the definition consistent with the common use of the term to refer to correction of damage as repair.

Final Hearing Results

ADM60-13, Part I	**AS**
ADM60-13, Part II	**AS**
ADM60-13, Part III	**AS**
ADM60-13, Part IV	**AS**
ADM60-13, Part V	**AS**

Code Change No: ADM61-13

Original Proposal

Section: IRC: R202

THIS CHANGE WILL BE HEARD BY THE RESIDENTIAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMMITTEES.

Proponent: Paul Armstrong, PE, CBO; Orange Empire Chapter – Code Committee, Orange Empire Chapter

Revise the International Residential Code as follows:

IRC SECTION R202
DEFINITIONS

IRC TOWNHOUSE. A single-family *dwelling unit* constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with <u>open space</u> ~~a *yard* or public way~~ on at least two or more sides.

Reason: The purpose of this change is to coordinate the definitions of Townhouse between the IRC and IBC. The proposal intends to use the definition in the 2012 IBC in both codes. The current inconsistency found is a problem in determining the application of the codes. The example is a townhouse design using a court on one of the sides. The IBC in the Scope, Section 101.2, would refer the designer to the IRC for the design of the project but the IRC, based on its definition, would not be allowed whether the project meets all the other criteria or not. So the user is back to the IBC and its definition does allow the design of the project. However, there are no provisions specific for townhouses in the IBC. So the definition the IBC is really only useful for determining the application of the IRC or IBC and needs to be consistent between the two codes.

Definitions are vital in understanding the application of all codes. While differences can exist between codes in the ICC family of codes, those definitions that are used in determining the application of one code or another should be consistent.

Cost Impact: The code change proposal will not increase the cost of construction.

Staff Analysis: Townhouse is defined in the IBC and IRC.

Public Hearing Results

HEARD BY IRC COMMITTEE

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because they felt that “open-space” is vague whereas “yard” and “public way” are defined. Open space does not necessarily mean open to the sky. While the definition for townhouse should be consistent between the IBC and the IRC, it is felt that the revision should be to the IBC version to use the defined terms of ‘yard’ and ‘public way.’

Assembly Action: **None**

Public Comment(s)

Public Comment:

Paul Armstrong, CSG Consultants, Inc., representing Orange Empire Chapter Code Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

IBC SECTION R202
DEFINITIONS

IBC TOWNHOUSE. A single-family *dwelling unit* constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with ~~open space~~ a *yard* or public way on at least two or more sides.

Commenter's Reason: The intent of the original proposal was to coordinate the definition of townhouse between the IBC and IRC.

The committee's reason for disapproval was the following:

> The committee disapproved this code change proposal because they felt that "open-space" is vague whereas "yard" and "public way" are defined. Open space does not necessarily mean open to the sky. While the definition for townhouse should be consistent between the IBC and the IRC, it is felt that the revision should be to the IBC version to use the defined terms of 'yard' and 'public way.'

Final Hearing Results

ADM61-13 **AMPC**

Code Change No: ADM62-13

Original Proposal

ADM62-13

IBC, IECC, IEBC, IFC, IFGC, IgCC, IMC, IPC, IPMC, IRC, and the ISPSC

The following table provides a comprehensive list of all standards that the respective standards promulgators have indicated have been, or will be, updated from the listing in the 2012 Editions of the International Codes. According to Section 4.5.1 of ICC Council Policy #CP 28, Code Development Policy, the updating of standards referenced by the Codes shall be accomplished administratively by the Administrative code development committee. Therefore, referenced standards that are to be updated for the 2015 edition of any of the I-Codes are listed in this single code change proposal. Note that the table below indicates the change to the standard, and the code or codes in which each standard appears. The list includes standards that the promulgators have already updated or will have updated by December 1, 2014.

> ***4.5.1 Standards referenced in the I-Codes:** The updating of standards referenced by the Codes shall be accomplished administratively by the Administrative code development committee in accordance with these full procedures except that the deadline for availability of the updated standard and receipt by the Secretariat shall be December 1 of the third year of each code cycle. The published version of the new edition of the Code which references the standard will refer to the updated edition of the standard. If the standard is not available by the deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued. Multiple standards to be updated may be included in a single proposal.*

AA — Aluminum Association

Standard Reference Number	Title	Referenced in Code(s):							
ADM 1-~~2010~~ 2015	Aluminum Design Manual: Part I Specification for Aluminum Structures	IBC							

AAMA — American Architectural Manufacturers Association

Standard Reference Number	Title	Referenced in Code(s):							
450-~~09~~ 10	Voluntary Performance Rating Method for Mulled Fenestration Assemblies	IRC							
506-~~08~~ 11	Voluntary Specifications for Hurricane Impact and Cycle Testing of Fenestration Products	IRC							
711-~~07~~ 13	Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products	IRC							
1402-~~86~~ 09	Standard Specification for Aluminum Siding, Soffit and Fascia	IBC							

ACCA — Air Conditioning Contractors of America

Standard Reference Number	Title	Referenced in Code(s):						
Manual D-~~09~~ 2011	Residential Duct Systems	IMC	IRC					
Manual J-2011	Residential Load Calculation - Eighth Edition	IRC	IECC-R					
Manual S-~~10~~ 13	Residential Equipment Selection	IRC	IECC-R					
180-~~2008~~ 2012	Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems	IMC	IRC					
183-2007 (reaffirmed 2011)	Peak Cooling and Heating Load Calculations in Buildings Except Low-Rise Residential Buildings	IMC	IECC					

ACI — American Concrete Institute

Standard Reference Number	Title	Referenced in Code(s):						
216.1-~~07~~ 14	~~Standard Method~~ Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies	IBC						
304.2R-~~04~~ 96	Placing Concrete by Pumping Methods (Reapproved 2008)	ISPSC						
305.1-~~06~~ 14	Specification for Hot Weather Concreting	ISPSC						
308.1-~~98~~ 11	~~Standard~~ Specification for Curing Concrete	ISPSC						
318-~~11~~ 14	Building Code Requirements for Structural Concrete	IBC	IRC	ISPSC				
332-~~10~~ 14	Residential Code Requirements for Structural Concrete Construction	IRC						
506.2-~~95~~ 13	Specification for Shotcrete	ISPSC						
530-~~11~~ 13	Building Code Requirements for Masonry Structures	IBC	IRC					
530.1-~~11~~ 13	Specifications for Masonry Structures	IBC	IRC					

~~AF&PA~~ AWC — ~~American Forest & Paper Association~~ American Wood Council

Standard Reference Number	Title	Referenced in Code(s):						
~~AF&PA~~ AWC STJR~~—2012~~ 2015	Span Tables for Joists and Rafters	IBC	IRC					
~~ANSI/AF&PA~~ AWC WFCM~~—2012~~ 2015	Wood Frame Construction Manual for One- and Two-Family Dwellings	IBC	IRC					
ANSI/AWC NDS-~~2012~~ 2015	National Design Specification (NDS) for Wood Construction - with 2012 Supplement	IBC	IRC					
~~ANSI/AF&PA~~ AWC SDPWS~~—2008~~ 2015	Special Design Provisions for Wind and Seismic	IBC						
~~AF&PA~~ AWC WCD No. 4-2003	Wood Construction Data-Plank and Beam Framing for Residential Buildings	IBC						

ANSI/~~AF&PA~~ AWC PWF~~—2007~~ 2015	Permanent Wood Foundation Design Specification	IBC	IRC					
AHRI	**Air Conditioning, Heating and Refrigeration Institute**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
210/240-2008 with Addenda 1 and 2	Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment	IECC-C						
310/380-2004 (CSA - C744-04)	Standard for Packaged Terminal Air-Conditioners and Heat Pumps	IECC-C						
340/360-2007 with Addendum 2	Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment	IECC-C						
365 (I-P)-2009	Commercial and Industrial Unitary Air-Conditioning Condensing Units	IECC-C						
366 (SI)-2009	Commercial and Industrial Unitary Air-Conditioning Condensing Units	IECC-C						
400-2001 with Addenda 1 and 2	Liquid to Liquid Heat Exchangers ~~with Addendum 2~~	IECC-C						
440-2008	Performance Rating of Room Fan-Coils	IECC-C						
460-2005	Performance Rating of Remote Mechanical-Draft Air-Cooled Refrigerant Condensers	IECC-C						
550/590-~~03~~ 2011 with Addendum 1	Performance Rating of Water-Chilling ~~Packages~~ and Heat Pump Water-Heating Packages Using the Vapor Compression Cycle ~~with Addenda~~	IECC-C						
700- ~~2006~~ 2011 with Addendum 1	~~Purity~~ Specifications for Fluorocarbon ~~and Other~~ Refrigerants	IECC-C						
870-20~~09~~ 05	Performance Rating of Direct Geoexchange Heat Pumps	IECC-C						
1160-~~08~~ (I-P) 09	Performance Rating of Heat Pump z21.56	IECC-C	ISPSC					
116~~0~~1 (SI)- ~~08~~ -2011	Performance Rating of Heat Pump Pool Heaters	IECC-C	ISPSC					
13256-1~~(2005)~~ (2011)	~~Water-Source Heat Pumps –~~ Water-to-Air and Brine-to-Air Heat Pumps – Testing and Rating for Performance: ~~Part 1 -~~	IECC-C						
13256-2~~(1998)~~ (2011)	~~Water-source Heat Pumps~~ Water-to-Water and Brine-to-water Heat Pumps - Testing and Rating For Performance: ~~Part 2:~~	IECC-C						

AISI	**American Iron and Steel Institute**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
AISI S100-07/S2-~~10~~ 12	North American Specification for the Design of Cold Formed Steel Structural Members ~~with Supplement 2, dated~~ ~~2010~~ 2012	IBC	IRC					
AISI S110-07/S1-09 (2012)	Standard for Seismic Design of Cold-Formed Steel Structural Systems-Special Moment Frames, 2007 with Supplement 1, dated 2009, (2012)	IBC						
AISI S200-~~07~~ 2012	North American Standard for Cold-Formed Steel Framing - General Provisions	IBC						
AISI S210-~~07~~ 2012	North American Standard for Cold-formed Steel Framing-Floor and Roof System Design, 2007, (2012)	IBC						
AISI S211-07/S1-12 (2012)	North American Standard for Cold-Formed Steel Framing-Wall Stud Design, 2007, including Supplement 1, dated 2012, (2012)	IBC						
AISI S212-~~07~~ (2012)	North American Standard for Cold-Formed Steel Framing-Header Design, 2007, (2012)	IBC						
AISI S213-07/S1-~~09~~ (2012)	North American Standard for Cold-Formed Steel Framing-Lateral Design, with Supplement 1, dated 2009, (2012)	IBC						
AISI S214-~~07~~ 12	North American Standard for Cold-Formed Steel Framing - Truss Design with Supplement 2, dated ~~2008~~, 2012	IBC						
AISI S230-07-~~07/S2-08~~ /S3-12 (2012)	Standard for Cold-formed Steel Framing-Prescriptive Method for One- and Two-family Dwellings, 2007, with Supplement ~~2~~ 3, dated ~~2008~~ dated 2012, (2012)	IRC	IBC					
~~AITC~~	**~~American Institute of Timber Construction~~ (*Please note that the AITC is no longer promulgating ICC standards. Standards previously promulgated by AITC are now being handled by APA and WCLIB.)***							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
ALI	**Automotive Lift Institute**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						

ALI/ALCTV-~~2006~~ 2011	Standard for Automotive Lifts - Safety Requirements for Construction, Testing, and Validation ~~(ANSI)~~	IBC						
AMCA	**Air Movement and Control Association International**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
205-~~10~~ 12	Energy Efficiency Classification for Fans	IgCC						
220-~~05~~ 08	Laboratory Methods of Testing Air Curtain Units for Aerodynamic Performance Rating	IgCC						
500D-~~10~~ 12	Laboratory Methods for Testing Dampers for Rating	IECC-C						
ANSI	**American National Standards Institute**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
Z97.1- ~~09~~ 2014	Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test	IBC	IRC					
ANSI A137.1-~~88~~ 2012	American National Standard Specifications for Ceramic Tile	IBC	IRC					
Z21.50/CSA 2.22-~~2007~~ 2012	Vented Gas Fireplaces	IRC	IFGC	IgCC				
Z21.88/CSA 2.33-~~09~~ 2015	Vented Gas Fireplace Heaters	IRC	IFGC	IgCC				
LC 1/CSA 6.26-~~2005~~ 2013	Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)	IFGC						
LC 4/CSA 6.32-~~2007~~ 2012	Press-Connect Metallic Fittings for Use in Fuel Gas Distribution Systems	IFGC	IRC					
Z21.1-~~2005~~ 2010	Household Gas Cooking Appliances	IFGC	IRC					
Z21.5.1/CSA 7.1-~~2006~~ 2014	Gas Clothes Dryers - Volume I - Type 1 Clothes Dryer	IFGC	IRC					
Z21.5.2/CSA 7.2-~~2005~~ 2014	Gas Clothes Dryers - Volume II - Type 2 Clothes Dryer	IFGC						
Z21.10.1/CSA 4.1-~~2009~~ 2012	Gas Water Heaters - Volume I - Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less	IFGC	IRC					
Z21.10.3/CSA 4.3-~~2004~~ 2011	Gas Water Heaters - Volume III - Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating or Instantaneous	IFGC	IRC					
Z21.11.2-~~2007~~ 2011	Gas-Fired Room Heaters - Volume II - Unvented Room Heaters	IFGC	IRC					
Z21.13/CSA 4.9-~~2010~~ 2011	Gas-Fired Low Pressure Steam and Hot Water Boilers	IFGC	IRC					
A21.40.1/CSA 2.91-96 (R~~2002~~ 2011)	Gas-Fired Heat Activated Air Conditioning and Heat Pump Appliances	IFGC	IRC					
Z21.40.2/CSA 2.92-96 (R~~2002~~ 2011)	Air-Conditioning and Heat Pump Appliances (Thermal Combustion)	IFGC	IRC					
Z21.42-~~1993 (R2002)~~ 2014	Gas-Fired Illuminating Appliances	IFGC	IRC					

Z21.47/CSA 2.3-~~2007~~ 2012	Gas-Fired Central Furnaces	IFGC	IRC					
Z21.50/CSA 2.22-~~2006~~ 2012	Vented Gas Fireplaces	IFGC	IRC					
Z21.56/CSA 4.7-~~2007~~ 2013	Gas-Fired Pool Heaters	IFGC	ISPSC	IRC				
Z21.58/CSA 1.6-~~2003~~ 2013	Outdoor Cooking Gas Appliances	IFGC	IRC					
Z21.60/CSA 2.26-~~2003~~ 2012	Decorative Gas Appliances for Installation in Solid-fuel Burning Fireplaces	IFGC	IRC					
Z21.80/CSA 6.22-~~2003 (R2008)~~ 2011	Line Pressure Regulators	IFGC	IRC					
Z21.84-~~2002~~ 2012	Manually-lighted, Natural Gas Decorative Gas Appliances for Installation in Solid Fuel Burning Fireplaces	IFGC	IRC					
Z21.88/CSA 2.33-~~2009~~ 2015	Vented Gas Fireplace Heaters	IFGC	IRC					
Z21.97-~~2009~~ 2012	Outdoor Decorative Appliances	IFGC	IRC					
Z83.4/CSA 3.7-~~2003~~ 2012	Non-Recirculating Direct Gas-fired Industrial Air Heaters	IFGC						
~~Z83.6-90 (R1998)~~ withdrawn replaced with Z83.19 & Z83.20	Gas-fired Infrared Heaters	IFGC	IRC					
Z83.11/CSA 1.8-~~2006~~ 2013	Gas Food Service Equipment	IFGC						
Z83.18-~~2004~~ 2012	Recirculating Direct Gas-fired Industrial Air Heaters	IFGC						
Z83.19-2001 (R~~2005~~ 2009)	Gas-fired High Intensity Infrared Heaters	IFGC	IRC					
~~Z124.1-95~~ replaced with CSA B45.5-11/ IAPMO Z124-11	Plastic ~~Bathtub Units~~ Plumbing Fixtures	IPC	IRC					
~~Z124.1.2-2005~~ replaced with CSA B45.5-11/ IAPMO Z124-11	Plastic ~~Bathtub and Shower Units~~ Plumbing Fixtures	IPC	IRC					
~~Z124.2-95~~ replaced with CSA B45.5-11/ IAPMO Z124-11	Plastic ~~Shower Receptors and Shower Stalls~~ Plumbing Fixtures	IPC	IRC					
~~Z124.3-95~~ replaced with CSA B45.5-11/ IAPMO Z124-11	Plastic ~~Lavatories~~ Plumbing Fixtures	IPC	IRC					
~~Z124.4-96~~ replaced with CSA B45.5-11/ IAPMO Z124-11	Plastic ~~Water Closet Bowls and Tanks~~ Plumbing Fixtures	IPC	IRC					
~~Z124.6-97~~ replaced with CSA B45.5-11/ IAPMO Z124-11	Plastic ~~Sinks~~ Plumbing Fixtures	IPC	IRC					
~~Z124.7-97~~ replaced with IAPMO Z124.7-2012	Prefabricated Plastic Spa Shells	ISPSC						
~~Z124.9-94~~ replaced with CSA B45.5-11/ IAPMO Z124-11	Plastic ~~Urinal Fixtures~~ Plumbing Fixtures	IPC	IRC					
APA	**APA -The Engineered Wood Association**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
ANSI~~/AITC~~ A 190.1 – ~~07~~ 12	Structural Glued-Laminated Timber	IBC	IRC	IgCC				
APA E30-~~03~~ 11	Engineered Wood Construction Guide	IRC						
APA PDS ~~04~~ 12	Panel Design Specification	IBC						
APA PDS Supplement 5-~~08~~ 12	Design and Fabrication of All-Plywood Beams (revised ~~2008~~ 2013)	IBC						

APA PDS Supplement 1-~~90~~ 12	Design and Fabrication of Plywood Curved Panels (revised ~~1995~~ 2013)	IBC						
APA PDS Supplement 4-~~90~~ 12	Design and Fabrication of Plywood Sandwich Panels (revised ~~1993~~ 2013)	IBC						
APA PDS Supplement 3-~~90~~ 12	Design and Fabrication of Plywood Stressed-skin Panels (revised ~~1996~~ 2013)	IBC						
APA PDS Supplement 2-~~92~~ 12	Design and Fabrication of Glued Plywood-lumber Beams (revised ~~1998~~ 2013)	IBC						
EWS R540-~~02~~ 12	Builders Tips: Proper Storage and Handling of Glulam Beams	IBC						
EWS S475-~~01~~ 07	Glued Laminated Beam Design Tables	IBC						
EWS S560-~~03~~ 10	Field Notching and Drilling of Glued Laminated Timber Beams	IBC						
EWS T300-~~05~~ 07	Glulam Connection Details	IBC						
EWS X440-~~03~~ 08	Product Guide - Glulam	IBC						
API	**API –American Petroleum Institute**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
Publ 2009 7th Edition (2002, R2012)	Safe Welding and Cutting Practices in Refineries, Gas Plants and Petrochemical Plants	IFC						
Publ 2023 3rd Edition (R2001, R2006)	Guide for Safe Storage and Handling of Heated Petroleum-Derived Asphalt Products and Crude Oil Residue	IFC						
Publ 2028 3rd Edition (2002, R2012)	Flame Arrestors in Piping Systems	IFC						
Publ 2201 5th Edition (2003, 2010)	Procedures for Welding or Hot Tapping on Equipment in Service	IFC						
RP 651 ~~(1997)~~ 3rd Edition (2007)	Cathodic Protection of Aboveground Petroleum Storage Tanks	IFC						
RP 752 ~~(2003)~~ 3rd Edition (2009)	Management of Hazards Associated with Location of Process Plant Buildings, CMA Manager's Guide	IFC						
RP 1604 (1996) 3rd Edition, R2010)	Closure of Underground Petroleum Storage Tanks	IFC						
RP 1615 ~~(1996)~~ 6th Edition (2011)	Installation of Underground Petroleum Storage Systems	IFC						
RP 2001 ~~(2005)~~ 9th Edition (2012)	Fire Protection in Refineries	IFC						
RP 2350 ~~(2005)~~ 4th Edition (2012)	Overfill Protection for Storage Tanks in Petroleum Facilities, 3rd Edition	IFC						
RP 2003 ~~(1998)~~ 7th Edition (2008)	Protection Against Ignitions Arising out of Static, Lightening, and Stray Currents	IFC						
Spec 12P 3rd Edition ~~(1995)~~ (Reaffirmed ~~2000~~)	Specification for Fiberglass Reinforced Plastic Tanks	IFC						
Std 653 (~~2001~~) 4th Edition (~~2000~~) (2009)	Tank Inspection, Repair, Alteration and Reconstruction	IFC						
Std 2015 6th Edition (2001, R2006)	Safe Entry and Cleaning of Petroleum Storage Tanks	IFC						

Standard Reference Number	Title	Referenced in Code(s):						
Std 2000 6th Edition ~~(1998~~) 2009	Venting Atmosphere and Low-pressure Storage Tanks: Nonrefrigerated and Refrigerated	IFC						

APHA — American Public Health Association

Standard Reference Number	Title	Referenced in Code(s):						
~~2005~~ 2012	Standard Methods for Examination of Water and Waste water 2~~1~~ 2nd Edition	IgCC						

APSP — The Association of Pool & Spa Professionals

Standard Reference Number	Title	Referenced in Code(s):						
ANSI/~~NSPI~~ APSP/ICC 3-~~99~~ 2013	Standard for Permanently Installed Residential Spas	IRC						
ANSI/~~NSPI~~ APSP/ICC 4-~~2007~~ 2012	Standard for Above-ground/On-ground residential swimming pools	IRC						
ANSI/~~NSPI~~ APSP/ICC 5-~~2003~~ 2011	Standard for Residential In-Ground Swimming Pools	IRC						
ANSI/~~NSPI~~ APSP/ICC 6-~~2009~~ 2013	Standard for Residential Portable Spas	IRC						
ANSI/APSP/ICC 7-~~06~~ 2013	Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins	IBC	IRC	ISPSC				
ANSI/APSP/ICC 14-11	Portable Spa Energy Efficiency Standard	IPSPC						
ANSI/APSP/ICC 15-11	Standard for Energy Efficiency for Residential Inground Swimming Pools and Spas with Addenda A Approved 2013)	ISPSC						
ANSI/APSP/ICC16-11	Standard for Suction Fittings for Use in Swimming Pools, Wading Pools, Spas and Hot Tubs	ISPSC						

ASABE — American Society of Agricultural & Biological Engineers

Standard Reference Number	Title	Referenced in Code(s):						
EP 559.1 ~~1997~~ W/Corr. 1 ~~DEC 1996 (R2008~~) AUG2010	Design Requirements and Bending Properties for Mechanically Laminated Wood ~~Columns~~ Assemblies	IBC						
EP 486.~~1~~ 2 ~~DEC 1999 (R2005)~~ OCT2012	Shallow Post and Pier Foundation Design	IBC						
EP542~~-~~FEB1999 ~~99~~(R2009)	Procedures for Using and Reporting Data Obtained with the Soil Cone Penetrometer	IgCC						

S313.3-~~99~~ FEB1999 (R2009)	Soil Cone Penetrometer	IgCC						
ASCE/SEI	**American Society of Civil Engineers/Structural Engineers Institute**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
5—~~11~~ 13	Building Code Requirements for Masonry Structures	IBC	IRC					
6—11 13	Specification for Masonry Structures	IBC	IRC					
7—10	Minimum Design Loads for Buildings and Other Structures with Supplement No. 1	IBC	IEBC	IRC				
8—~~02~~ 14	Standard Specification for the Design of Cold-formed Stainless Steel Structural Members	IBC						
24-~~05~~ 13	Flood Resistant Design and Construction	IBC	ISPSC	IRC				
29-~~05~~ 14	Standard Calculation Methods for Structural Fire Protection	IBC						
~~31-03~~ 41-13 Note: will be incorporated into ASCE 41-13	Seismic Evaluation and Retrofit ~~Rehabilitation~~ of Existing Buildings	IEBC						
32-01	Design and Construction of Frost Protected Shallow Foundations	IBC	IRC					
41-~~06~~ 13	Seismic Evaluation and Retrofit ~~Rehabilitation~~ of Existing Buildings	IEBC						
ASHRAE	**American Society of Heating, Refrigerating and Air Conditioning Engineers**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
15-~~2010~~ 2013	Safety Standard for Refrigeration Systems	IMC						
34-~~2010~~ 2013	Designation and Safety Classification of Refrigerants	IRC	IMC					
52.2-~~2007~~ 2012	Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size	IgCC						
55-~~2004~~ 2010	Thermal Environmental Conditions on Human Occupancy	IgCC						
62.1-~~2010~~ 2013	Ventilation for Acceptable Indoor Air Quality	IMC	IECC	IEBC	IgCC			
90.1-~~2010~~ 2013	Energy Standard for Buildings Except Low-Rise Residential Buildings including Addendum G (ANSI/ASHRAE/IESNA 90.1-2007)	IECC	IgCC					

140-20~~10~~ 11	Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs	IECC						
146-~~2006~~ 2011	Testing for Rating Pool Heaters	IECC						
180-~~08~~ 2012	Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems	IMC						
ANSI/ASHRAE/ACCA 183-2007 (RA2011)	Peak Cooling and Heating Load Calculations in Buildings, Except Low-rise Residential Buildings	IECC						
ASHRAE-~~2004~~ 2012	HVAC Systems and Equipment Handbook - 2004	IMC	IECC					
ASHRAE-~~2009~~ 2013	ASHRAE Handbook of Fundamentals	IRC	IECC-R	IMC				
13256-1~~(2005)~~ 1998 (RA 2012)	Water-source Heat Pumps - Testing and Rating for Performance - Part 1: Water-to-Air and Brine-to-Air Heat Pumps (ANSI/ASHRAE/IESNA 90.1-2004)	IECC						
ASME	**American Society of Mechanical Engineers**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
ASME A17.1/CSA B44~~—2007~~2013	Safety Code for Elevators and Escalators	IBC	IFC	IEBC	IRC	IPMC		
A112.1.3-2000(R~~eaffirmed~~ 20~~05~~ 11)	Air Gap Fittings for Use with Plumbing Fixtures, Appliances, and Appurtenances	IPC	IRC					
A112.3.4-2000 (R~~eaffirmed~~ 2004) replaced with ASME A112.3.4-2013/CSA B45.9-13	Macerating Toilet Systems and Related Components	IPC	IRC					
A112.4.1-~~1993 (Reaffirmed 2002)~~ 2009	Water Heater Relief Valve Drain Tubes	IPC	IRC					
A112.4.2-~~2003 (R2008~~) 2009	Water Closet Personal Hygiene Devices	IPC						
A112.4.3-1999 (R~~eaffirmed~~ 20~~04~~ 10)	Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System	IPC	IRC					
A112.6.1M-1997 (R~~eaffirmed~~ 20~~02~~ 08)	Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use	IPC	IRC					
A112.6.2-2000 (R~~eaffirmed~~ 20~~04~~ 10)	Framing-Affixed Supports for Off-the-Floor Water Closets with Concealed Tanks	IPC	IRC					
A112.6.3-2001(R~~eaffirmed~~ 2007)	Floor and Trench Drains	IPC	IRC					
A112.6.7-~~2001(Reaffirmed 2007)~~ 2010	Enameled and Epoxy Coated Cast Iron and PVC Plastic Sanitary Floor Sinks	IPC						
A112.6.9-2005 (R2010)	Siphonic Roof Drains	IPC						
ASME A112.18.1-~~2005~~ 2012/ CSA B125.1-~~2005~~ 2012	Plumbing Supply Fittings	IPC	IRC					
ASME A112.18.2-~~2005~~ 2011/ CSA B125.2-~~2005~~ 2011	Plumbing Waste Fittings	IPC	IRC					
ASME A112.19.1-2013/ CSA B45.2-~~08~~ 13	Enameled Cast-Iron and Enameled Steel Plumbing Fixtures	IPC	IRC					

ASME A112.19.2-~~2008~~ 2013/ CSA B45.1-~~08~~ 13	Ceramic Plumbing Fixtures	IPC	IRC						
ASME A112.19.3-2008/ CSA B45.4-08(R2013)	Stainless-Steel Plumbing Fixtures	IPC	IRC						
ASME A112.19.5-2011/ CSA/B45.15-~~09~~ 11	Flush Valves and Spuds ~~Trim~~ for Water Closets, Urinals ~~Bowls~~ and Tanks	IPC	IRC						
ASME A112.19.7-2012/ CSA B45.10-~~09~~ 2012	Hydromassage Bathtubs ~~Appliances~~ Systems	IPC	IRC						
B16.1-~~2005~~ 2010	~~Cast~~ Gray Iron Pipe Flanges and Flanged Fittings~~, Classes 25, 125 and 250~~	IFGC							
B16.3-~~2006~~ 2011	Malleable Iron Threaded Fittings Classes 150 and 300	IPC	IRC	IMC					
B16.4~~—2006~~ 2011	Gray Iron Threaded Fittings ~~Class 125 and 250~~	IPC	IRC						
B16.5-~~2003~~ 2009	Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24	IMC							
B16.11-~~2005~~ 2011	Forged Fittings, Socket-Welding and Threaded	IPC	IRC	IMC					
B16.12-~~1998 (Reaffirmed 2006)~~ 2009	Cast Iron Threaded Drainage Fittings	IPC	IRC						
B16.15-~~2006~~ 2011	Cast Bronze Threaded Fittings	IRC	IMC	IPC	IPSPC				
B16.18-~~2001 (Reaffirmed 2005)~~ 2012	Cast Copper Alloy Solder Joint Pressure Fittings	IPC	IBC	IRC	IMC	IFC			
B16.20-~~1998(Reaffirmed~~ 2007~~)~~	Metallic Gaskets for Pipe Flanges: Ring-Joint, Spiral-Wound, and Jacketed	IFGC							
B16.22-2001~~(Reaffirmed 2005)~~ (R2010)	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings	IPC	IBC	IRC	IFC	IMC			
B16.23-~~2002 (Reaffirmed 2006)~~ 2011	Cast Copper Alloy Solder Joint Drainage Fittings: DWV	IPC	IRC	IMC					
B16.24-~~2006~~ 2011	Cast Copper Alloy Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500	IMC							
B16.26-~~2006~~ 2011	Cast Copper Alloy Fittings for Flared Copper Tubes	IPC	IRC	IMC					
B16.29-~~2007~~ 2012	Wrought Copper and Wrought-Copper-Alloy Solder Joint Drainage Fittings - (DWV)	IPC	IRC	IMC					
B16.33-~~2002(Reaffirmed 2007)~~ 2012	Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes 1/2 through 2)	IFGC	IRC						
B31.1-~~2007~~ 2012	Power Piping	IFC							
B31.3-~~2004~~ 2012	Process Piping	IBC	IFC						
B31.4-~~2006~~ 2012	Pipeline Transportation Systems for Liquid Hydrocarbons and other Liquids	IFC							
B31.9~~—08~~ 2011	Building Services Piping	IFC	IMC						
ASSE 1016/ASME A112.1016/CSA B125.16-2011 is a replacement for ASSE 1016-2010	Performance Requirements for Automatic Compensating, Valves for Individual Showers and Tub/Shower Combinations	IPC	IRC	IgCC					
BPVC-~~2007~~ 2010/2011 addenda	Boiler & Pressure Vessel Code	IFC	IMC	IFGC	IRC				
CSD-1-~~2009~~ 2011	Controls and Safety Devices for Automatically Fired Boilers	IMC							

ASPE — American Society of Plumbing Engineers

Standard Reference Number	Title	Referenced in Code(s):			
45-~~2007~~ 2013	Siphonic Roof Drainage Systems	IPC			

ASSE — American Society of Sanitary Engineering

Standard Reference Number	Title	Referenced in Code(s):			
~~1016-2010~~ ASSE 1016/ASME A112.1016/CSA B125.16-2011	Performance Requirements for Automatic Compensating, Valves for Individual Showers and Tub/Shower Combinations	IPC	IRC	IgCC	

ASTM — ASTM International

Standard Reference Number	Title	Referenced in Code(s):			
A53/A 53M-~~07~~ 12	Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless	IPC	IMC	IRC	IFGC
A74-~~09~~ 12	Specification for Cast Iron Soil Pipe and Fittings	IPC	IRC	IPSDC	
A82/A 2M-~~05a~~ 07	Specification for Steel Wire, Plain, for Concrete Reinforcement	IRC			
A106/A 106M-~~08~~ 11	Specification for Seamless Carbon Steel Pipe for High-Temperature Service	IMC	IRC	IFGC	
A123/A 123M-~~02~~ 12	Specification of Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products	IBC			
A126-~~04~~(2009)	Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings	IMC	IRC		
A153/A153M-~~05~~ 09	Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware	IBC	IRC		
A182-~~10a~~ 12A	Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings and Valves and Parts for High-Temperature Service	ISPSC			
A185/A 185M-~~06E01~~ 07	Specification for Steel Welded Wire Reinforcement, Plain for Concrete	IBC			
A240/A 240M-~~09~~ 12	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications	IBC	IRC	IPSPC	
A252-~~98(2007)~~ 10	Specification for Welded and Seamless Steel Pipe Piles	IBC			
A283/A 283M-~~03(2007)~~ 12	Specification for Low and Intermediate Tensile Strength Carbon Steel Plates	IBC			
A307-~~07b~~ 10	Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength	IBC	IRC		
A312/A 312M-~~08a~~ 12A	Specification for Seamless, and Welded, and Heavily Cold Worked Austenitic Stainless Steel	IPC	IRC	ISPSC	

	Pipes							
A377-~~03~~ 2003(2008)e1*	Index of Specification for Ductile-Iron Pressure Pipe	IRC						
A403-~~10a~~ 12	Standard Specification for Wrought Austenitic Stainless Steel Pipe Fittings	ISPSC						
A416/A 416M-~~06~~ 12A	Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete	IBC						
A420/A 420M-~~07~~ 10A	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service	IMC						
A421/A 421M- ~~05~~ 10	Specification for Uncoated Stress-Relieved Steel Wire for Prestressed Concrete	IBC						
A435/A 435M-90 ~~(2007)~~ 2012	Specification for Straight-Beam Ultrasonic Examination of Steel Plates	IBC						
A463M/A 463M-~~06~~ 10	Specification for Steel Sheet, Aluminum-Coated, by the Hot Dip Process	IBC	IRC					
A480/A480M-~~06b~~ 12	Specification for General Requirements for Flat-Rolled Stainless and Heat-/Resisting Steel Plate, Sheet and Strip	IBC						
A496-~~05~~ 07	Specification for Steel Wire, Deformed for Concrete Reinforcement	IBC						
A497 A497M-~~06e01~~ 07	Specification for Steel Welded Reinforcement Deformed for Concrete	IBC						
A510-~~08~~ 11	Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, Alloy Steel	IBC	IRC					
A572/A 572M-~~07~~ 12	Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel	IBC						
A588/A 588M-05 ~~10~~	Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 Mpa) Minimum Yield Point, with Atmospheric Corrosion Resistance	IBC						
A615/A 615M-~~09~~ 12	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement	IBC	IRC					
A653/A 653M-~~08~~ 11	Specification for Steel Sheet, Zinc-Coated Galvanized or Zinc-Iron Alloy-Coated Galvannealed by the Hot-Dip Process	IBC	IRC					
A690/690M-07(2012)	Standard Specification for High Strength Low-Alloy Nickel, Copper Phosphorus Steel H-Piles and Sheet Piling with Atmospheric Corrosion Resistance for Use in Marine Environments	IBC						
A706/A 706M-09B	Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement	IBC	IRC					
A722/A 722M-~~07~~ 12	Specification for Uncoated High-Strength Steel Bar for Prestressing Concrete	IBC						

A733-2003(2009)e1*	Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples	IPC						
A755/A 755M-~~03(2008)~~ 2011	Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IBC	IRC					
A767/A 767M-~~05~~ 09	Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement	IBC						
A775/A 775M-07b	Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IBC						
A778-01(2009)e1	Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products	IPC	IRC					
A792/A 792M-~~08~~ 10	Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process	IBC	IRC					
A875/A 875M-~~06~~ 10	Standard Specification for Steel Sheet Zinc-5%, Aluminum Alloy-Coated by the Hot-Dip Process	IBC	IRC					
A888-~~09~~ 11	Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Application	IPC	IPSDC	IRC				
A913/A 913M-~~07~~ 11	Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST)	IBC						
A924/A 924M-~~08a~~ 2010a	Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot Dip Process	IBC	IRC					
A951/A951M-~~06~~ 11	Specification for Steel Wire Masonry Joint Reinforcement	IRC						
A992/A 992M-~~06a~~ 11	Standard Specification for Structural Shapes	IBC						
A996/A 996M-20**09**b	Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement	IRC						
A1003/A 1003M-~~08~~ 12	Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-formed Framing Members	IRC						
A1008/A1008M-~~07~~ 12	Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened and Bake Hardenable	IBC						
B42-~~02e01~~ 10	Specification for Seamless Copper Pipe, Standard Sizes	IPC	IBC	IRC	IFC			
B43-~~98(2004)~~ 09	Specification for Seamless Red Brass Pipe, Standard Sizes	IPC	IBC	IRC	IFC	IMC		
B68-~~02~~ 11	Specification for Seamless Copper Tube, Bright Annealed	IBC	IFC	IMC				
B75-~~02~~ 11	Specification for Seamless Copper Tube	IPC	IPSDC	IRC	IMC			

B88-~~03~~ 09	Specification for Seamless Copper Water Tube	IPC	IBC	IPSDC	IRC	IMC	IF C	IPSPC
B101-~~07~~ 12	Specification for Lead-Coated Copper Sheet and Strip for Building Construction	IBC	IRC					
B135-~~08a~~ 10	Specification for Seamless Brass Tube	IRC	IMC					
B152/B 152M-~~06a~~ 09	Specification for Copper Sheet, Strip Plate and Rolled Bar	IPC						
B209-~~07~~ 10	Specification for Aluminum and Aluminum-Alloy Steel and Plate	IBC	IRC					
B210-~~04~~ 12	Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes	IFGC						
B227-~~04~~ 10	Specification for Hard-Drawn Copper-Clad Steel Wire	IRC						
B241/B 241M-~~02~~ 10	Specification for Aluminum and Aluminum-Alloy, Seamless Pipe and Seamless Extruded Tube	IFGC						
B251-~~02e01~~ 10	Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube	IPC	IPSDC	IBC	IFC	IRC	IM C	
B302-~~07~~ 12	Specification for Threadless Copper Pipe, Standard Sizes	IPC	IRC	IMC				
B370-~~09~~ 12	Specification for ~~Cold Rolled~~ Copper Sheet and Strip for Building Construction	IBC	IRC					
B447-~~07~~ 12a	Specification for Welded Copper Tube	IPC	IRC					
B633-~~07~~ 11	Specification for Electodeposited Coatings of Zinc on Iron and Steel	IRC						
B687-99~~(2005)e01~~ (2011)	Specification for Brass, Copper, and Chromium-Plated Pipe Nipples	IPC						
B695-04(2009)	Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel	IBC	IRC					
B813-~~00(2009)~~ 10	Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube	IPC	IPSDC	IRC	IMC			
B828-02(2010)	Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings	IPC	IPSDC	IRC				
C4-04~~e01~~ (2009)	Specification for Clay Drain Tile and Perforated Clay Drain Tile	IPC	IPSDC	IRC				
C5-~~03~~ 10	Specification for Quicklime for Structural Purposes	IBC	IRC					
C14-~~07~~ 11	Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe	IPC	IPSDC	IRC				
C22/C 22M-00~~(2005)e01~~ (2010)	Specification for Gypsum	IBC	IRC					
C27-98(2008)	Specification for ~~Standard~~ Classification of Fireclay and High-Alumina Refractory Brick	IBC	IRC					
C28/C 28M-~~00(2005)~~ 10	Specification for Gypsum Plasters	IBC	IRC					
C31/C 31M-~~08b~~ 12	Practice for Making and Curing Concrete Test Specimens in the Field	IBC						
C33/C33M-~~08~~ 11a	Specification for Concrete Aggregates	IBC	IRC					

C34~~-03~~ 10	Specification for Structural Clay Load-Bearing Wall Tile	IBC	IRC					
C35-~~01(2005)~~/C35M-1995(2009)	Specification for Inorganic Aggregates for Use in Gypsum Plaster	IBC	IRC					
~~C36/C 36M-03~~ Withdrawn Replaced	Specification for Gypsum Wallboard	IBC						
~~C37/C 37M-01~~ Withdrawn Replaced	Specification for Gypsum Lath	IBC						
C42/C 42M-~~04~~ 12	Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	IBC						
C55-~~06e01~~ 2011	Specification for Concrete Building Brick	IBC	IRC					
C56-~~05~~ 2010	Specification for Structural Clay Non-Load-Bearing Tile	IBC						
C59/C 59M-**00(2006)**	Specification for Gypsum Casting Plaster and Molding Plaster	IBC	IRC					
C61/C 61M-00(2006) (2011)	Specification for Gypsum Keene's Cement	~~IBC~~	IRC					
C62-~~08~~ 12	Specification for Building Brick (Solid Masonry Units Made From Clay or Shale)	IBC	IRC					
C67-~~08~~ 12	Test Methods of Sampling and Testing Brick and Structural Clay Tile	IBC						
C73-~~05~~ 10	Specification for Calcium Silicate ~~Face~~ Brick (Sand-Lime Brick)	IBC	IRC					
C76~~-08a~~ 12a	Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe	IPC	IPSDC	IRC				
C90-~~08~~ 12	Specification for Loadbearing Concrete Masonry Units	IBC	IRC	IECC				
C91-~~05~~ 12	Specification for Masonry Cement	IBC	IRC					
C94/C 94M-~~09~~ 12	Specification for Ready-Mixed Concrete	IBC	IRC					
C109/C 109M-~~05~~ 2001b	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)	IBC						
C126-~~99(2005)~~ 12	Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units	IBC						
C129-~~06~~ 11	Specification for Nonload-bearing Concrete Masonry Units	IBC	IRC					
C140-~~08a~~ 2012a	Test Method Sampling and Testing Concrete Masonry Units and Related Units	IBC	IRC					
C143/C 143M-~~08~~ 2010a	Test Method for Slump of Hydraulic Cement Concrete	IRC						
~~C145-85~~ *Withdrawn Combined*	Specification for Solid-Load Bearing Concrete Masonry Units	IRC						
C150-~~07~~ 12	Specification for Portland Cement	IBC	IRC					
C172/C172M-~~08~~ 10	Practice for Sampling Freshly Mixed Concrete	IBC						

C199-84 ~~(2005)~~ (2011)	Test Method for Pier Test for Refractory Mortars	IBC	IRC					
C203-~~5a~~ (2012)	Standard Test Methods for Breaking Load and Flexural Properties of Block-type Thermal Insulation	IRC						
C206-03(2009)	Specification for Finishing Hydrated Lime	IBC						
C207-~~06~~ 2011	Specification for Hydrated Lime for Masonry Purposes	IBC	IRC					
C208-~~2008a~~ 12	Specification for Cellulosic Fiber Insulating Board	IBC	IRC					
C212-~~00(2006)~~10	Specification for Structural Clay Facing Tile	IBC						
C216-~~07a~~ 12	Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale)	IBC	IRC					
C270-~~08a~~ 12a	Specification for Mortar for Unit Masonry	IBC	IRC					
C272-~~01(2007)~~/C272M-12	Standard Test Method for Water Absorption of Core Materials for ~~Structural~~ Sandwich Constructions	IRC						
C273/C273M-~~07a~~ 11	Standard Test Method for Shear Properties of Sandwich Core Materials	IRC						
C296-~~00(2004)~~ /C296M-00(2009)e1	Specification for Asbestos-Cement Pressure Pipe	IPC	IRC					
C315-07(2011)	Specification for Clay Flue Liners and Chimney Pots	IBC	IRC	IMC	IFGC			
C317/C 317M-00~~(2005)~~ 2010	Specification for Gypsum Concrete	IBC						
C330-**~~05~~/C330-2009**	Specification for Lightweight Aggregates for Structural Concrete	IBC						
C331-~~05~~ /C331M-2010	Specification for Lightweight Aggregates for Concrete Masonry Units	IBC						
C406-~~06e01~~ /C406M-2010	Specification for Roofing Slate	IBC	IRC					
C411-~~05~~ 11	Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation	IRC	IMC					
C425-04(2009)	Specification for Compression Joints for Vitrified Clay Pipe and Fittings	IPC	IPSDC	IRC				
C428/C428M-05(20~~06~~11)e1	Specification for Asbestos-Cement Nonpressure Sewer Pipe	IPC	IPSDC	IRC				
C443-~~05a~~ 12	Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	IPC	IPSDC	IRC				
C472-99~~(2004)~~ (2009)	Specification for Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete	IBC						
C473-~~07~~ 12	Test Methods for Physical Testing of Gypsum Panel Products	IBC						
C474-~~05~~ 12	Test Methods for Joint Treatment Materials for Gypsum Board Construction	IBC						
C475/C 475M-~~02(2007)~~ 12	Specification for Joint Compound and Joint Tape for Finishing	IBC	IRC					

	Gypsum ~~Wall~~ Board								
C476-~~08~~ 10	Specification for Grout for Masonry	IRC							
C496/C496M-~~96~~ 11	Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens	IEBC							
C503-~~08a~~ 10	Specification for Marble Dimension Stone (Exterior)	IBC							
C508/C508M-00~~(2004)~~ (2009)e1	Specification for Asbestos-Cement Underdrain Pipe	IPC	IRC						
C514-04(2009)e1	Specification for Nails for the Application of Gypsum Board	IBC	IRC						
C516-08~~a~~	Specification for Vermiculite Loose Fill Thermal Insulation	IBC							
C518-~~04~~ 10	Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus	IBC	IECC						
C547-~~07e1~~ 12	Specification for Mineral Fiber Pipe Insulation	IBC							
C549-06(2012)	Specification for Perlite Loose Fill Insulation	IBC							
C552-~~07~~ 12b	Standard Specification for Cellular Glass Thermal Insulation	IBC	IRC						
C557-03(2009)e~~0~~1	Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing	IBC	IRC						
C564-~~08~~ 12	Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings	IPC	IPSDC	IRC					
C568-~~08a~~ 10	Specification for Limestone Dimension Stone	IBC							
C578~~—08b~~12a	Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation	IBC	IRC						
C587-04~~(2009)~~	Specification for Gypsum Veneer Plaster	IBC	IRC						
C595/C95M-~~08a~~ 2012e1	Specification for Blended Hydraulic Cements	IBC	IRC						
C615/C615M-~~03~~ 2011	Specification for Granite Dimension Stone	IBC							
C616/C616M-~~08a~~ 2010	Specification for Quartz Dimension Stone	IBC							
C629-~~08~~ 2010	Specification for Slate Dimension Stone	IBC							
~~C630/C 630M-03~~ *Withdrawn replaced by C1396/C1396M-11*	Specification for Water-Resistant Gypsum Backing Board	IBC	IRC						
C635/C635M-~~07~~ 12	Specification for the Manufacturer, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings	IBC							
C645-~~08a~~ 11A	Specification for Nonstructural Steel Framing Members	IBC	IRC						
C652-~~09~~ 12	Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)	IBC	IRC						
C685/C 685M-~~07~~ 11	Specification for Concrete Made by Volumetric Batching and	IRC							

	Continuous Mixing							
C700-~~07a~~ 11	Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated	IPC	IPSDC	IRC				
C726-~~05e1~~ 12	Standard Specification for Mineral Wool Roof Insulation Board	IBC						
C728-05(2010)	Standard Specification for Perlite Thermal Insulation Board	IBC	IRC					
C744-~~08~~ 11	Specification for Prefaced Concrete and Calcium Silicate Masonry Units	IBC						
C754-~~08~~ 11	Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products	IBC						
C836/C836M-~~06~~ 12	Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course	IBC	IRC					
C840-~~08~~ 11	Specification for Application and Finishing of Gypsum Board	IBC						
C841-03(2008)E1	Specification for Installation of Interior Lathing and Furring	IBC						
C842-~~05~~(2010)E1	Specification for Application of Interior Gypsum Plaster	IBC						
C843-99~~(2006)~~ (2012)	Specification for Application of Gypsum Veneer Plaster	IBC	IRC					
C844-04(2010)	Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster	IBC	IRC					
C847-~~09~~ 12	Specification for Metal Lath	IBC	IRC					
C887-05(2010)	Specification for Packaged, Dry, Combined Materials for Surface Bonding Mortar	IBC	IRC					
C897-05(2009)	Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters	IBC	IRC					
C920-~~08~~ 11	Standard Specification for Elastomeric Joint Sealants	IBC	IRC	IgCC				
C926-~~06~~ 12A	Specification for Application of Portland Cement-Based Plaster	IBC	IRC					
C931/C 931M-04 *Withdrawn Replaced by C1396/C1396M-11*	Specification for Exterior Gypsum Soffit Board	IBC						
C932-06	Specification for Surface-Applied Bonding Compounds ~~Agents~~ for Exterior Plastering	IBC						
C933-~~07b~~ 11	Specification for Welded Wire Lath	IBC						

C946-~~91 (2001)~~ 10	Specification for ~~Practice for~~ Construction of Dry-stacked, Surface-Bonded Walls	IBC						
C954-~~07~~ 11	Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 inch (0.84 mm) to 0.112 inch (2.84 mm) in Thickness	IBC	IRC					
C955-~~09~~ 11C	Standard Specification for Load-bearing Transverse and Axial Steel Studs, Runners Tracks, and Bracing or Bridging, for Screw Application of Gypsum Panel Products and Metal Plaster Bases	IBC	IRC					
C956-04(2010)	Specification for Installation of Cast-in-Place Reinforced Gypsum Concrete	IBC						
C957-~~06~~ 10	Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Integral Wearing Surface	IBC	IRC					
C989/C989M-~~06~~ 12A	Specification for ~~Ground Granulated Blast-Furnace~~ Slag Cement for Use in Concrete and Mortars	IBC						
C1007-~~08a~~ 11a	Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories	IBC						
C1019-~~09~~ 11	Test Method for Sampling and Testing Grout	IBC						
C1029-~~08~~ 10	Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation	IBC	IRC					
C1032-06(2011)	Specification for Woven Wire Plaster Base	IBC	IRC					
C1047-~~09~~ 10A	Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base	IBC	IRC					
C1053-00~~(2005)~~ (2010)	Specification for Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications	IPC						
C1063-~~08~~ 12C	Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster	IBC	IRC					
C1088-09	Specification for Thin Veneer Brick Units Made From Clay or Shale	IBC						
C1072-~~06~~ 11	Standard Text Method for Measurement of Masonry Flexural Bond Strength	IBC						
C1107/C1107-~~08~~ 11	Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)	IRC						

C1116/C1116M-~~08a~~ 10	Standard Specification for Fiber - Reinforced Concrete and Shotcrete	IRC						
C1157-~~08a~~ 11	Standard Performance Specification for Hydraulic Cement	IBC						
C1167-~~03~~ 11	Specification for Clay Roof Tiles	IBC	IRC					
C1173-~~08~~ 10	Specification for Flexible Transition Couplings for Underground Piping Systems	IPC	IPSDC	IRC				
C1178/C 1178M-~~06~~ 11	Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel	IBC	IRC					
C1186-08	Specification for Flat ~~Nonasbestos~~ Fiber Cement Sheets	IBC	IRC					
C1218/C1218M-99(2008)	Test Method for Water-Soluble Chloride in Mortar and Concrete	IBC						
C1240-~~05~~ 12	Specification for Silica Fume Used in Cementitious Mixtures	IBC						
C1261-~~07~~ 10	Specification for Firebox Brick for Residential Fireplaces	IBC	IRC					
C1277-~~08~~ 11	Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	IPC	IPSDC	IRC				
C1278/C1278M-07a(2011)	Specification for Fiber-Reinforced Gypsum Panels	IBC	IRC					
C1280-~~09~~ 12A	Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing	IBC						
C1283-~~07a~~ 11	Practice for Installing Clay Flue Lining	IBC	IRC					
C1288-99~~(2004)e1~~ 2010	Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets	IBC	IRC					
C1289~~—08~~ 12a	Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board	IBC	IRC					
C1314-~~07~~ 11A	Test Method for Compressive Strength of Masonry Prisms	IBC						
C1325-08b	Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement ~~Interior Substrate Sheets~~ Backer Units	IBC	IRC					
C1328/C1328M-~~05~~ 12	Specification for Plastic (Stucco Cement)	IBC	IRC					

C1364-~~07~~ 10B	Standard Specification for Architectural Cast Stone	IBC						
C1371-04A(2010)E1	Standard Test Method For Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers	IECC	IgCC					
C1373/C1373--~~03~~ 11	Standard Practice for Determination of Thermal Resistance of Attic Insulation Systems Under Simulated Winter Conditions	IECC						
C1396/1396M-~~06a~~ 11	Specification for Gypsum Ceiling Board	IBC	IRC					
C1405-~~08~~ 12	Standard Specification for Glazed Brick (Single Fired, Solid Brick Units)	IBC						
C1492-03(2009)	Standard Specification for Concrete Roof Tile	IBC	IRC					
C1513-~~04~~ 12	Standard Specification for Concrete Roof Tile	IRC						
C1540-~~08~~ 11	Specification for Heavy Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	IPC						
C1611/C 1611M-~~05~~ 09BE1	Standard Test Method for Slump Flow of Self-Consolidating Concrete	IBC						
C1629/C1692M—06(2011)	Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels	IBC						
C1658/C1658-~~06~~ 12	Standard Specification for Glass Mat Gypsum Panels	IBC	IRC					
C1563-08	Standard Test Method for Gaskets for Use in Connection with Hub and Spigot Cast Iron Soil Pipe and Fittings for Sanitary Drain, Waste, Vent and Storm Piping Applications	IPC						
D25-~~99(2005)~~12	Specification for Round Timber Piles	IBC						
D56-05(2010)	Test Method for Flash Point by Tag Closed Tester	IBC						
D86-~~09~~ 2011b	Test Method for Distillation of Petroleum Products at Atmospheric Pressure	IBC	IFC					
D92-~~05a~~ 12	Test Method for Flash and Fire Points by Cleveland Open Cup Tester	IFC						
D93-~~08~~ 11	Test Method for Flash Point by Pensky-Martens Closed Cup Tester	IBC	IFC	IMC				

D226/D226M-~~06~~ 09	Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing	IBC	IRC					
D227/D227M-03(2011)E1	Specification for Coal-Tar-Saturated Organic Felt Used in Roofing and Waterproofing	IBC	IRC					
D635-~~06~~ 10	Test Method for Rate of Burning and/or Extent and Time of Burning of ~~Self-Supporting~~ Plastics in a Horizontal Position	IBC						
D1003-~~07~~ 11e1	Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics	IECC						
D1248-~~05~~ 12	Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable	IRC						
D1557-~~07~~ 12	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft3(2,700kN-m/m3))	IBC						
D1593-09	Non-rigid vinyl chloride plastic film and sheeting	ISPSC						
D1621-~~04a~~ 10	Standard Test Method for Compressive Properties Of Rigid Cellular Plastics	IRC						
D1623-~~03~~ 09	Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics	IRC						
D1693-~~08~~ 12	Test Method for Environmental Stress-Cracking of Ethylene Plastics	IRC	IMC					
D1784-~~08~~ 11	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Choloride) (CPVC) Compounds	IRC						
D1785-~~06~~ 12	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120	IPC	IMC	IRC	ISPSC			
D1863/D1863M-05(2011)E1	Specification for Mineral Aggregate Used on Built-Up Roofs	IBC	IRC					
D1869-95 ~~(2005)e1~~ (2010)	Specification for Rubber Rings for Asbestos-Cement Pipe	IPC	IPSDC	IRC				
D1929-~~96(2001)e01~~ 12	Test Method for Determining Ignition ~~Properties~~ Temperature of Plastics	IBC						
D1970/D1970M-~~09~~ 11	Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roof Underlayment for Ice Dam Protection	IBC	IRC					
D2126-~~04~~ 09	Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging	IRC						
D2216-~~05~~ 10	Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass	IBC						
D2235-04 (2011)	Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings	IPC	IPSDC	IMC	IRC			

D2239-~~03~~ 12	Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter	IPC	IRC					
D2241-~~05~~ 09	Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series)	IPC	IRC	IMC	ISPSC			
D2412-~~02(2008)~~ 11	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading	IRC	IMC					
D2487-~~06e1~~ 2011	Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)	IBC						
D2513-~~08b~~ 12	Specification for ~~Thermoplastic~~ Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings	IRC	IMC	IFGC				
D2559-~~04~~ 12A	Standard Specification for Adhesives for ~~Structural Laminated~~ Bonded Structural Wood Products for Use under Exterior (West Use) Exposure Conditions	IRC						
D2564-~~04e01~~ 12	Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems	IPC	IPSDC	IRC	IMC			
D2626/D2626M-04(2012)E1	Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing	IBC	IRC					
D2661-~~08~~ 11	Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings	IPC	IPSDC	IRC				
D2665-~~09~~ 12	Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	IPC	IPSDC	IRC				
D2672-96a~~(2003)~~ (2009)	Specification for Joints for IPS PVC Pipe Using Solvent Cement	IPC	IRC	ISPSC				
D2683-~~04~~ 10	Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing	IPC	IRC	IMC				
D2729-~~03~~ 11	Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings	IRC	IPC	IPSDC				
D2737-~~03~~ 12E1	Specification for Polyethylene (PE) Plastic Tubing	IPC	IRC					
D2822/D2822M-05(2011)E1	Specification for Asphalt Roof Cement, Asbestos Containing	IBC	IRC					
D2823/D2823M-05 (2011)E1	Specification for Asphalt Roof Coatings, Asbestos Containing	IBC	IRC					
D2824-06(2012)E1	Specification for Aluminum-Pigmented Asphalt Roof Coatings, Non-fibered, Asbestos Fibered, and Fibered without Asbestos	IRC	IBC					
D2837-~~08~~ 11	Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products	IRC	IMC					
D2843-~~99(2004)e01~~ 10	Test for Density of Smoke from the Burning or Decomposition of Plastics	IBC						
D2846/D 2846M-09BE1	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic	IPC	IRC	IMC	ISPSC			

	Hot- and Cold-Water Distribution Systems							
D2855-96~~(2002)~~ (2010)	Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings	IPC	IPSDC	IRC				
D2859-06 (2011)	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IBC	IFC					
D2898-~~(04)~~ 10	Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing	IBC	IRC	IWUIC				
D2949-~~01a(2008)~~ 10	Specification for 3.25-in. Outside Diameter Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	IPC	IPSDC	IRC				
D2974-07~~a~~ A	Standard Test Methods for Moisture, Ash and Organic Matter of Peat and other Organic Soils	IgCC						
D3035-~~08~~ 12	Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter	IPC	IRC	IMC				
D3139-98~~(2005)~~ 2011	Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	IPC						
D3161/D3161M-~~09~~ 12	Test Method for a Wind Resistance of Asphalt Shingles (Fan Induced Method)	IBC	IRC					
D3200-74~~(2005~~) 2012	Standard Specification and Test Method for Establishing Recommended Design Stresses for Round Timber Construction Poles	IBC						
D3201-08AE1	Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Based Products	IBC	IRC	IWUIC				
D3261-~~03~~ 12	Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings Plastic Pipe and Tubings	IMC	IPC					
D3278-1996~~(2004)e1~~ (2011)	Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus	IBC	IFC	IMC				
D3311-~~08~~ 11	Specification for Drain, Waste and Vent (DWV) Plastic Fittings Patterns	IPC	IRC					
D3350-~~08~~ 12	Specification for Polyethylene Plastics Pipe and Fittings Materials	IRC	IMC					
D3462/3462M-~~09~~ 10A	Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules	IBC	IRC					
D3679-~~09~~ 11	Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding	IBC	IRC					
D3689-07	Test Methods for Deep Foundations ~~Piles~~ Under Static Axial Tensile Load	IBC						
D3737-~~08~~ 09E1	Practice for Establishing Allowable Properties for Structural Glued Laminated Timber (Glulam)	IBC	IRC					
D3805/D3805M-97~~(2003)e1~~ (2009)	Standard Guide for Application of Aluminum-Pigmented Asphalt Roof Coatings	IBC						
D3909/D3909M-97b~~(2004)~~ 2012e1	Specification for Asphalt Roll Roofing (Glass Felt) Surfaced with Mineral Granules	IBC	IRC	IWUIC				
D3957-~~06~~ 09	Standard Practices for Establishing Stress Grades for Structural Members Used In Log	IBC	IRC					

	Buildings							
D4022/D4022M-2007(2012)E1	Specification for Coal Tar Roof Cement, Asbestos Containing	IBC	IRC					
D4068-~~01~~ 09	Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane	IPC	IRC					
D4272-~~08a~~ 09	Test Method for Total Energy Impact of Plastic Films by Dart Drop	IBC						
D4318-~~05~~ 10	Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils	IBC	IRC					
D4434/D4434M-~~09~~ 12	Specification for Poly (Vinyl Chloride) Sheet Roofing	IBC	IRC					
D4479/D4479M-07(2012)E1	Specification for Asphalt Roof Coatings - Asbestos-Free	IBC	IRC					
D4551-~~96 (2008)e1~~ 12	Specification for Poly (Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane	IPC	IRC					
D4586/D4586M-07(2012)E1	Specification for Asphalt Roof Cement, Asbestos-Free	IBC	IRC					
D4601/D4601M-~~08~~ 042012E1	Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing	IBC	IRC					
D4637/D4637M-~~08~~ 12	Specification for EPDM Sheet Used in Single-Ply Roof Membrane	IBC	IRC					
D4829-~~08a~~ 11	Test Method for Expansion Index of Soils	IBC	IRC					
D4869/D4869M-05(2011)e01	Specification for Asphalt-Saturated (Organic Felt) Underlayment Used in Steep Slope Roofing	IBC	IRC					
D4897/D4897M-01(2009)	Specification for Asphalt-Coated Glass-Fiber Venting Base Sheet Used in Roofing	IBC	IRC					
D4945-~~08~~ 12	Test Methods for High-Strain Dynamic Testing of Deep Foundations	IBC						
~~D5019-07a~~ Withdrawn/no replacement	Specification for Reinforced CSM Polymeric Sheet Used in Roofing Membrane	IBC	IRC					
D5055-~~10~~ 12	Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists	IBC	IRC	IgCC				
D5197-09E1	Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)	IgCC						
D5456-~~10~~ 12	Standard Specification for Evaluation of Structural Composite Lumber Products	IBC	IRC	IgCC				
D5516-~~03~~ 09	Test Method of Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to the Elevated Temperatures	IBC	IRC					
D5643/D5643M-06 (2012)E1	Specification for Coal Tar Roof Cement, Asbestos-Free	IBC	IRC					
D5664-~~08~~ 10	Test Methods for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength	IBC	IRC					

	Properties of Fire-Retardant Treated Lumber							
D6162-2000a(2008)	Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements	IBC	IRC					
D6164/D6164M-~~05e1~~ 11	Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements	IBC	IRC					
D6222/D6222M-~~08~~ 11	Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements	IBC	IRC					
D6223D6223M-02(2009)E1	Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements	IBC	IRC					
D6662-09	Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards	IWUIC						
D6694-08	Standard Specification for Liquid-applied Silicone Coating Used In Spray Polyurethane Foam Roofing Systems	IBC	IRC					
D6698-~~07~~ 12	Standard Test Method for On-Line Measurement of Turbidity Below 5 NTU in Water	IgCC						
D6754/D6745M-~~02~~ 10	Standard Specification for Ketone Ethylene Ester Based Sheet Roofing	IBC	IRC					
D6757-07	Standard Specification for ~~Inorganic~~ Underlayment Felt Containing Inorganic Fibers used in Steep-Slope Roofing ~~Products~~	IBC	IRC					
D6878-~~08e1~~/D6878-11A	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing	IBC	IRC					
D6886-~~11~~ 12	Standard Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis	IgCC						
D7032-~~08~~ 10a	Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)	IRC	IWUIC					
D7158-08~~d~~ /D7158M 2011	Standard Test Method for Wind Resistance of Sealed Asphalt Shingles (Uplift Force/Uplift Resistance Method)	IBC	IRC					
E84-~~09~~ 2012c	Test Method for Surface Burning Characteristics of Building Materials	IBC	IFC	IRC	IMC			
E96/E96M-~~05~~ 10	Test Method for Water Vapor Transmission of Materials	IBC	IRC					
E108-~~07a~~ 2011	Test Methods for Fire Tests of Roof Coverings	IBC	IRC					
E119-~~2008a~~ 2012a	Standard Test Methods for Fire Tests of Building Construction and Materials	IBC	IRC	IMC	IWUIC			

E136-~~09~~ 2012	Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C	IBC	IRC	IMC	IWUIC			
E519-~~00e1~~ /E519M 2010	Standard Test Method for Diagonal Tension (Shear) in Masonry Assemblages	IEBC						
E605-93(~~2006~~) (2011)	Test Method for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members	IBC						
E681-~~04~~ 2009	Test Method for Concentration Limits of Flammability of Chemicals (Vapors and Gases)	IBC	IFC					
E736-00~~(2006)~~ (2011)	Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members	IBC						
E779~~—03~~ 10	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	IECC	IgCC					
E814-~~08b~~ 2011a	Test Method of Fire Tests of Through-Penetration Firestops	IBC	IRC	IMC				
E970-~~08a~~ 2010	Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source	IBC	IRC					
E1300-~~07e01~~ 12AE1	Practice for Determining Load Resistance of Glass in Buildings	IBC						
E1332-90(2003)	Standard Classification for the Determination of Outdoor-Indoor Transmission Class	IgCC						
E1354-~~09~~ 2011b	Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter	IBC	IFC					
E1465-08A	Standard Practice for Radon Control Options for the Design and Construction of New Low-Rise Residential Buildings	IRC						
E1509-~~04~~ 12	Standard Specification for Room Heaters, Pellet Fuel-Burning Type	IRC	IMC	IgCC				
E1529-~~06~~ 10	Test Method for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies	IFC						
E1537-~~07~~ 12	Test Method for Fire Testing of Upholstered Furniture	IFC						
E1590-~~07~~ 12	Test Method for Fire Testing of Mattresses	IFC						
E1592-05(2012)	Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference	IBC						
E1602-~~03~~ 02(2010)E1	Guide for Construction of Solid Fuel-Burning Masonry Heaters	IBC	IRC					
E1643-~~10~~ 11	Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders used in Contact with Earth or Granular Fill Under Concrete Slabs	IgCC						

E1677-~~05~~ 11	Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls	IECC						
E1966-07A(2011)	Test Method for Fire resistant Joint Systems	IBC	IFC					
E1980-~~01~~ 11	Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-sloped Opaque Surfaces	IECC	IgCC					
E1996-~~09~~ 12	Specification for Performance of Exterior Windows, ~~Glazed~~ Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes	IBC	IRC	IFC				
E2072-~~04~~ 10	Standard Specification for Photolumiscent (Phosphorescent) Safety Markings	IBC	IFC					
E2174-~~09~~ 10AE1	Standard Practice for On-Site Inspection of Installed Fire Stops	IBC	IEBC					
E2178~~–03~~ 11	Standard Test Method for Air Permeance of Building Materials	IRC	IECC					
E2231-~~04~~ 09	Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess to Surface Burning Characteristics	IRC	IMC					
E2273-03(2011)	Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies	IBC	IRC					
E2307 -~~04~~ 12	Standard Test Method for Determining Fire Resistance of a Perimeter ~~Fire Barriers~~ Joint System Between an Exterior Wall Assembly and a Floor Assembly Using the Intermediate-Scale, Multi-story Test Apparatus[1].	IBC						
E2336-04(2009)	Standard Test Methods Fire Resistive Grease Duct Enclosure Systems	IMC						
E2357-~~05~~ 11	Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies	IECC						
E2393-~~09~~ 10A	Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barrier	IBC	IEBC					
E2404~~—08~~ 12	Standard Practice for Specimen Preparation and Mounting of Textile, Paper or Vinyl Wall or Ceiling Coverings to Assess Surface Burning Characteristics	IBC	IFC					
E2568—09e1	Standard Specification of PB Exterior Insulation and Finish Systems ~~(EIFS)~~	IBC	IRC					
E2573~~—07a~~ 12	Standard Practice for Specimen Preparation and Mounting of Site-fabricated Stretch Systems to Assess Surface Burning Characteristics	IBC	IFC					
E2599-~~09~~ 11	Standard Practice for Specimen Preparation and Mounting of Reflective Insulation Materials and Vinyl Stretch Ceiling Materials ~~Radiant Barrier~~ for Building Applications to Assess	IBC						

	Surface Burning Characteristics							
E2634-~~08~~ 11	Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems	IBC	IRC					
F409-~~02(2008)~~ 12	Specification for Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings	IPC	IRC					
F437-~~06~~ 09	Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	IPC	IRC	IMC	ISPSC			
F438-~~04~~ 09	Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40	IPC	IRC	IMC	ISPSC			
F439-~~06~~ 12	Specification for ~~Socket-Type~~ Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	IPC	IRC	IMC	ISPSC			
F441/F 441M-~~02(2008)~~ 12	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80	IPC	IRC	IMC				
F442/F 442M-~~99(2005)e1~~ 12	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)	IPC	IRC	IMC				
F477-~~08~~ 10	Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe	IPC	IPSDC	IRC				
F493-~~04~~ 10	Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings	IPC	IRC	IMC				
F547-~~06~~ (2012)	Terminology of Nails for Use with Wood and Wood-based Materials	IBC						
F656-~~08~~ 10	Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings	IPC	IPSDC	IRC				
F714-~~08~~ 12E1	Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter	IPC	IRC	IMC				
F876-~~08b~~ 10E1	Specification for Crosslinked Polyethylene (PEX) Tubing	IPC	IRC	IMC				
F877-~~07~~ 11	Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems	IPC	IRC	IMC				
F891-~~07~~ 10	Specification for Coextruded Poly (Vinyl Chloride) (PVC) Plastic Pipe with a Cellular Core	IPC	IPSDC	IRC				
F1055-~~98(2006)~~ 11	Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene Pipe and Tubing	IPC	IRC	IMC				
F1281-~~07~~ 11	Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX)	IPC	IRC	IMC				

	Pressure Pipe							
F1282-~~06~~ <u>10</u>	Specification for Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe	IPC	IMC	IRC				
F1346-91 ~~(2003)~~ <u>(2010</u>	Performance Specification for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs	IBC	IRC	IPMC	IgCC	ISPSC		
F1484-~~05~~ <u>12</u>	Standard Test Methods for Performance of Steam Cookers	IgCC						
F1488-~~03~~ <u>09E1</u>	Specification for Coextruded Composite Pipe	IPC	IPSDC	IRC	IgCC			
F1496-~~99(2005)e1~~ <u>12</u>	Standard Test Method for Performance of Convection Ovens	IgCC						
F1499-~~01(2008)~~ <u>12</u>	Specification for Coextruded Composite Drain, Waste, and Vent Pipe (DWV)	IPSDC						
F1667-05 <u>11A E1</u>	Specification for Driven Fasteners: Nails, Spikes, and Staples	IBC	IRC					
F1673-~~04(2005)~~ <u>10</u>	Standard Specification for Polyvinylidene Fluoride (PVDF) Corrosive Waste Drainage Systems	IPC						
F1807-~~08~~ <u>12</u>	Specifications for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing <u>and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing</u>	IPC	IRC	IMC				
F1924-~~05~~ <u>12</u>	Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing	IMC						
F1960-~~09~~ <u>12</u>	Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) Tubing	IPC	IRC	IMC				
F1974-~~08~~ 09	Specification for Metal Insert Fittings for Polyethylene/Aluminum/Polyethylene and Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure Pipe	IPC	IRC	IMC				
F1986-01~~(2006)~~ <u>(2011)</u>	Specification for Multilayer Pipe, Type 2, Compression Fittings and Compression Joints for Hot and Cold Drinking Water Systems	IPC	IRC					
F2080-~~08~~ <u>09</u>	Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Cross-linked Polyethylene (PEX) Pipe	IPC	IRC					

F2098-08	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-Linked Polyethylene (PEX) Tubing to Metal Insert and Plastic Insert Fittings	IPC	IRC						
F2159-~~05~~ 11	Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IPC							
F2200—~~05~~ 11B	Standard Specification for Automated Vehicular Gate Construction	IRC	IFC						
F2262-~~05~~ 09	Standard Specification for Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene Tubing OD Controlled SDR9	IPC	IRC						
F2306/F 2306M-~~08~~ 11	Specification for 12" to 60" 300 to 1500 mm annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications	IPC							
F2387-04(2012)	Standard Specification for Manufactured Safety Vacuum Release Systems, Swimming (SVRS) for Pools, Spas and Hot Tubs	IBC							
F2389-~~07e1~~ 10	Specification for Pressure-Rated Polypropylene (PP) Piping Systems	IPC	IRC	IMC					
F2434-~~08~~ 09	Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp ring for SDR9 Cross-Linked Polyethylene (PEX) Tubing and SDR9 Cross-Linked Polyethylene/Aluminum/Cross-Linked Polyethylene (PEX-AL-PEX) Tubing	IPC	IRC	IMC					
F2735-09	Standard Specification for Plastic Insert Fittings for SDR9 Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	IMC	IPC	IRC					
F2769-~~09~~ 10	Polyethylene of Raised Temperature (PE-RT) Plastic Hot and Cold-Water Tubing and Distribution Systems	IMC	IPC	IRC					

AWCI	**The Association of the Wall & Ceiling Industries International**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
12-B-~~98~~ 04	~~Technical Manual 12-B~~ Standard Practice for the Testing and Inspection of Field Applied Thin Film Intumescent Fire-Resistive Materials; an Annotated Guide, ~~First~~ Second Edition	IBC							

AWPA	**American Wood Protection Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**

M4~~—08~~ 11	Standard for the Care of Preservative-Treated Wood Products	IBC	IRC					
U1~~—11~~ 14	USE CATEGORY SYSTEM: User Specification for Treated Wood except Section 6, Commodity Specification H	IBC	IRC					

AWS	**American Welding Society**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
A5.8-~~04~~M/A5.8:2011	Specifications for Filler Metals for Brazing and Braze Welding	IRC	IMC	IPC				
D1.3-~~98~~/D1.3M:2008	Structural Welding Code-Sheet Steel	IBC						
D1.4-~~1998~~ /D1.4M:2011	Structural Welding Code - Reinforcing Steel Including Metal Inserts and Connections in Reinforced Concrete Construction	IBC						

AWWA	**American Water Works Association**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
C104-~~98~~/A21.4-08	~~Standard for~~ Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water	IRC	IPC					
C110/A21.10-~~03~~ 12	~~Standard for~~ Ductile-Iron and Gray-Iron Fittings~~, 3 in through 48 Inches for Water~~	IRC	IPC	IMC				
C111-~~00~~/A21.11-12	~~Standard for~~ Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings	IPC	IFGC					
C115-A21.15-~~99~~ 11	~~Standard for~~ Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges	IRC	IPC	IMC				
C151/A21.51-~~02~~ 09	~~Standard for~~ Ductile-Iron Pipe, Centrifugally Cast for Water	IRC	IPC	IMC				
C153/A21.53-~~00~~ 11	~~Standard for~~ Ductile-Iron Compact Fittings for Water Service	IRC	IPC	IMC				
C510-~~00~~ 07	Double Check Valve Backflow Prevention Assembly	IRC	IPC					
C511-~~00~~ 07	Reduced-Pressure Principle Backflow Prevention Assembly	IRC	IPC					
C651-~~99~~ 05	Disinfecting Water Mains	IPC						
C652-~~02~~ 11	Disinfection of Water-Storage Facilities	IPC						

BHMA	**Builders Hardware Manufacturers' Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**

A 156.19-~~2007~~ 2013	Power Assist and Low Energy Power Operated Doors	IBC	IFC					

CDPH	**California Department of Public Health**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
CDPH Section 01350	~~EHLB~~ Standard Method for the Testing and Evaluation of ~~VOC~~ Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1(2010)	IgCC						

CGA	**Compressed Gas Association**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
C-7 (~~2004~~) (2011)	Guide to Preparation of Precautionary Labeling and Marking of Compressed Gas Containers	IFC						
ANSI/CGA P-18-2006	Standard for Bulk Inert Gas Systems ~~at Consumer Sites (an American National Standard)~~	IFC						
P-20 (~~2003~~) (2009)	Standard for Classification of Toxic Mixtures	IFC						
P-23 (~~2003~~) (2008)	Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components	IFC						
S-1.1 (~~2005~~) (2011)	Pressure Relief Device Standards - Part 1 - Cylinders for Compressed Gases	IFC	IFGC					
S-1.3 (~~2005~~) (2008)	Pressure Relief Device Standards - Part 3 - Stationary Storage Containers for Compressed Gases	IFC	IFGC					

CPA	**Composite Panel Association**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
A135.4-~~2004~~ 2012	Basic Hardboard	IBC	IRC					
A135.5-~~2004~~ 2012	Prefinished Hardboard Paneling	IBC	IRC					
A135.6-~~2006~~ 2012	~~Hardboard~~ Engineered Wood Siding	IBC	IRC					
A208.1-~~99~~ 2009	Particleboard	IBC	IRC					

CRRC	**Cool Roof Rating Council**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
CRRC-1-20~~10~~ 12	Cool Roof Rating Council Standard	IgCC						

CSA	**~~Canadian Standards Association~~ CSA Group**	
Standard Reference Number	**Title**	**Referenced in Code(s):**

ASME A17.1/CSA B44—2013	Safety Code for Elevators and Escalators	IBC	IFC	IEBC	IRC	IPMC			
ASME A112.18.1-~~2005~~ 2012/ CSA B125.1-~~2005~~ 2012	Plumbing Supply Fittings	IPC	IRC						
ASME A112.18.2-~~2005~~ 2011/ CSA B125.2-~~2005~~ 2011	Plumbing Waste Fittings	IRC	IPC						
ASME A112.19.1 2013/ CSA B45.2-~~08~~ 13	Enameled Cast-Iron and Enameled Steel Plumbing Fixtures	IRC	IPC						
A112.19.2-~~2008~~ 2013/ CSA B45.1-~~08~~ 13	Ceramic Plumbing Fixtures	IPC	IRC						
ASME A112.19.3-2008/ CSA B45.4-08(R2013)	Stainless-Steel Plumbing Fixtures	IRC	IPC						
ASME A112.19.5-2011/ CSA/B45.15-~~09~~ 11	Flush Valves and Spuds ~~Trim~~ for Water Closets, Urinals ~~Bowls~~ and Tanks	IPC	IRC						
ASME A112.19.7-2012/ CSA B45.10-~~09~~ 2012	Hydromassage Bathtubs ~~Appliances~~ Systems	IPC	IRC						
ASME A112.3.4-2013/CSA B45.9-99~~(R2008)~~ 13	Macerating Systems and Related Components	IRC	IPC						
ASSE 1016/ASME A112.1016/CSA B125.16-2011 is a replacement for ASSE 1016-2010	Performance Requirements for Automatic Compensating, Valves for Individual Showers and Tub/Shower Combinations	IPC	IRC	IgCC					
CSA B45.5-~~02 (R2008)~~ 11/ IAPMO Z124-2011	Plastic Plumbing Fixtures	IRC	IPC						
B64.1.1-~~01~~ 11	Vacuum Breakers, Atmospheric Type (AVB)	IRC	IPC						
B64.1.2-~~07~~ 11	Pressure Vacuum Breakers (PVB)	IRC	IPC						
B64.1.3-~~07~~ 11	Spill Resistant Pressure Vacuum Breakers (SRPVB)	IPC	IRC						
B64.2-~~01~~ 11	Vacuum Breakers, Hose Connection Type (HCVP)	IRC	IPC						
B64.2.1-~~07~~ 11	Vacuum Breakers, Hose Connection (HCVB) with Manual Draining Feature	IRC	IPC						
B64.2.1.1-~~07~~ 11	Hose Connection Dual Check Vacuum Breakers (HCDVB)	IRC	IPC						
B64.2.2-~~01~~ 11	Vacuum Breakers, Hose Connection Type (HCVP) with Automatic Draining Feature	IRC	IPC						
B64.3-~~07~~ 11	Dual Check Valve Backflow Preventers Atmospheric Port (DCAP)	IRC	IPC						
B64.4-~~07~~ 11	Reduced Pressure Principle Backflow Preventers (RP)	IRC	IPC						
B64.4.1-~~07~~ 11	Reduced Pressure Principle for Fire Systems (RPF)	IRC	IPC						
B64.5-~~07~~ 11	Double Check Backflow Preventers (DCVA)	IRC	IPC						
B64.5.1-~~07~~ 11	Double Check Valve Backflow Preventers for Fire Systems (DCVAF)	IRC	IPC						
B64.6-~~07~~ 11	Dual Backflow Preventers Check Valve (DuC)	IPC	IRC						
B64.7-~~07~~ 11	Laboratory Faucet Vacuum Breakers (LFVB)	IRC	IPC						
B64.10.1-~~07~~ 11	~~Manual for the Selection, Installation,~~ Maintenance and Field Testing of Backflow Preventers ~~ion~~	IPC							

	~~Devices~~								
B79-08 (R2013)	Commercial and Residential Drains, and Cleanouts	IPC							
CSA B125.3-~~2005~~ 12	Plumbing Fittings	IRC	IPC						
B137.1-~~05~~ 13	Polyethylene (PE) Pipe , Tubing and Fittings for Cold Water Pressure Services	IRC	IPC						
B137.2-~~05~~ 13	Polyvinylchloride PVC Injection-Moulded Gasketed Fittings for Pressure Applications	IRC	IPC	ISPSC					
B137.3-~~05~~ 13	Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications	IRC	IPC	IPSDC					
B137.5-~~05~~ 13	Cross-Linked Polyethylene (PEX) Tubing Systems for Pressure Applications	IRC	IPC						
B137.6-~~05~~ 13	Chlorinated Polyvinylchloride CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems	IRC	IPC	ISPSC					
B137.9-~~02~~ 13	Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-Pipe Systems	IRC	IPC	IMC					
B137.10M-~~05~~ 13	Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems	IRC	IPC	IMC					
B137.11-~~05~~ 13	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications	IRC	IPC						
B181.1-~~06~~ 11	Acrylonitrile-butadiene-stryrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings	IRC	IPC	IPSDC					
B181.2-~~06~~ 11	Polyvinylchloride PVC Drain, and chlorinated polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings	IRC	IPC	IPSDC					
B181.3-~~06~~ 11	Polyolefin and polyvinylidene fluoride (PVDF) Laboratory Drainage Systems	IRC	IPC						
B182.1- ~~06~~ 11	Plastic drain and sewer pipe and pipe fittings	IPC	IPSDC						
B182.2-~~06~~ 11	PSM type polyvinylchloride (PVC) sewer pipe and fittings	IRC	IPC	IPSDC					
B182.4-~~06~~ 11	Profile polyvinylchloride PVC Sewer Pipe and Fittings	IRC	IPC	IPSDC					
B182.6-~~06~~ 11	Profile Polyethylene (PE) Sewer Pipe and Fittings for leak proof sewer applications	IRC	IPC						
B182.8-~~06~~ 11	Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings	IRC	IPC						
B356-~~00(2005)~~ 10	Water Pressure Reducing Valves for Domestic Water Supply Systems	IPC	IRC						
B481.1-~~07~~ 12	Testing and Rating of Grease Interceptors Using Lard	IPC							
B602-~~05~~ 10	Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe	IRC	IPC	IPSDC					
CAN/CSA A257.1M-~~92~~ 2009	Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings	IRC	IPC	IPSDC					

CAN/CSA A257.2M-~~92~~ 2009	Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings	IRC	IPC	IPSDC
CAN/CSA A257.3M-~~92~~ 2009	Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections, and Fittings Using Rubber Gaskets	IRC	IPC	IPSDC
B137.11-~~05~~ 13	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications	IRC	IPC	
B45.3-02 (R2008)	Porcelain Enameled Steel Plumbing Fixtures	IRC	IPC	
0437-Series-93 (R2006)	Standards on OSB and Waferboard (Reaffirmed 2001)	IRC		
ANSI ~~CSA America~~ FC 1-~~2003~~ 2012 to be relocated under ANSI	Stationary Fuel Cell Power Systems	IFGC	IMC	IRC
CAN/CSA B366.1-~~2009~~ 2011	Solid-Fuel-Fired Central Heating Appliances	IgCC		
B483.1-~~07~~ 14	Drinking Water Treatment Systems	IRC	IPC	
CSA C22.2 No. 218.1-M89(R~~2006~~ 2011)	Spas, Hot Tubs and Associated Equipment	ISPSC		
C22.2 No. 236 ~~05~~ -11 ~~(R2009) M89(R2006)~~	~~Heating and~~ Cooling Equipment (binational standard with UL 1995)	ISPSC		
C22.2 No. 108-01 (R2010)	Liquid Pump	ISPSC		

CTI — Cooling Technology Institute

Standard Reference Number	Title	Referenced in Code(s):
STD-201 (~~2009~~ 11)	Standard for Certification of Water Cooling Tower Thermal Performance	IECC

DASMA — Door and Access Systems Manufacturers

Standard Reference Number	Title	Referenced in Code(s):	
105-92~~(R2004)~~ -13	Test Method for Thermal Transmitance and Air Infiltration of Garage Doors	IECC	
107-97 (R~~2004~~ 2012)	Room Fire Test Standard for Garage Doors Using Foam Plastic Insulation	IBC	
108-~~05~~ 12	Standard Method for Testing Sectional Garage Doors and Rolling Doors: Determination of Structural Performance Under Uniform Static Air Pressure Difference	IBC	IRC
115-~~05~~ 12	Standard Method for Testing Sectional Garage Doors and Rolling Doors: Determination of Structural Performance Under Missile Impact and Cyclic Wind	IBC	IRC

	Pressure								

FEMA Federal Emergency Management Agency

Standard Reference Number	Title	Referenced in Code(s):							
FEMA P646-~~08~~ 12	Guidelines for Design of Structures for Vertical Evacuation from Tsunamis	IBC							
FEMA~~-~~ ~~FA/~~ TB-2-08	Flood-D ~~d~~amage Resistant Materials Requirements	IRC							
~~FIA-TB-11 – 01~~ FEMA-TB 11—01	Crawlspace Construction for Buildings Located in Special Flood Hazard Area	IBC	IRC						

FM FM Global

Standard Reference Number	Title	Referenced in Code(s):							
FM 4470 ~~2009~~ 2013	Approval Standard for Single-Ply Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction ~~Covers~~.	IBC							
4474-~~04~~ 11	American National Standard for Evaluating ~~the Simulated Wind Uplift Resistance of~~ Roof/Ceiling Assemblies, -Plastic Interior Finish Materials, Plastic Exterior Building Panels, Wall/Ceiling Coating Systems, Interior or Exterior Finish Systems ~~Using Static Positive and/or Negative Differential Pressures~~	IBC							
4880 ~~(2005)~~ 2010	Approval Standard for Class 1 Rating of ~~Evaluating~~ Insulated Wall or Wall and Roof/Ceiling Panels, ~~Assemblies, Plastic~~ Interior Finish Materials, ~~Plastic Exterior Building, Wall/Ceiling~~ or Coatings ~~Systems, Interior or~~ and Exterior Finish Systems	IBC	IRC						

GA Gypsum Association

Standard Reference Number	Title	Referenced in Code(s):							
GA 216-~~07~~ 13	Application and Finishing of Gypsum Panel Products	IBC							

GA-253-~~07~~ 12	~~Recommended Standard Specification for the~~ Application of Gypsum Sheathing	IRC							
GA-600-~~09~~ 12	Fire- Resistance Design Manual, ~~18th~~ 20th Edition	IBC							

HPVA — Hardwood Plywood and Veneer Association

Standard Reference Number	Title	Referenced in Code(s):							
HP-1-~~2009~~ 2013	Standard for Hardwood and Decorative Plywood	IBC	IRC	IgCC					

IAPMO — International Association of Plumbing and Mechanical Officials

Standard Reference Number	Title	Referenced in Code(s):							
CSA B45.5-11/ IAPMO Z124-2011 replaces ANSI Z124.1, 1.2, 2, 3, 4, 6, 9	Plastic Plumbing Fixtures	IRC	IPC						
IAPMO Z124.7-2012 replaces ANSI Z124.7-97	Prefabricated Plastic Spa Shells	ISPSC							

ICC — International Code Council

Standard Reference Number	Title	Referenced in Code(s):							
ICC A117.1-09 14	Accessible and Usable Buildings and Facilities	IBC	IFC	IZC	IEBC	IRC			
IBC-~~12~~ 15	International Building Code	IRC	IFC	IMC	IPC	IPSDC	IFGC	IECC	IEBC IWUIC
IECC-~~12~~ 15	International Energy Conservation Code	IBC	IRC	IMC	IPC	IFGC	IgCC	ISPSC	
IEBC-~~12~~ 15	International Existing Building Code	IBC	IMC	IPMC	IgCC				
IFC-~~12~~ 15	International Fire Code	IBC	IRC	IMC	IPC	IFGC	IECC	IEBC	IPMC
IFGC-~~12~~ 15	International Fuel Gas Code	IBC	IRC	IFC	IMC	IPC	IECC	IEBC	IPMC
IMC-~~12~~ 15	International Mechanical Code	IBC	IRC	IFC	IPC	IFGC	IECC	IEBC	IPMC
ICCPC-~~12~~ 15	International Performance Code	IgCC							
IPC-~~12~~ 15	International Plumbing Code	IBC	IRC	IFC	IMC	IPSDC	IFGC	IEBC	IPMC
IPSDC-~~12~~ 15	International Private Sewage Disposal Code	IBC	IPC	IRC					
IPMC-~~12~~ 15	International Property Maintenance Code	IBC	IRC	IFC	IEBC				
IRC-~~12~~ 15	International Residential Code	IBC	IFC	IMC	IFGC	IEBC	IPC	IPMC	IgCC
IWUIC-~~12~~ 15	International Wildland-Urban Interface Code	IBC	IFC						
IZC-~~12~~ 15	International Zoning Code	IBC	IMC						
ICC 500-~~08~~ 14	ICC/NSSA Standard on the Design and Construction of Storm Shelters	IBC	IRC						

ICC 600-~~08~~ 14	Standard for Residential Construction In High Wind Regions	IBC	IRC						
ICC 700-~~2008~~ 12	National Green Building Standard	IgCC							
IgCC-~~12~~ 15	International Green Construction Code	IBC	ICCPC	IEBC	IECC	IFC	IFGC	IMC	IPC
IES	**Illuminating Engineering Society**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
TM-15-~~07~~ 11	Luminaire Classification System for Outdoor Luminaires	IgCC							
IIAR	**International Institute of Ammonia Refrigeration**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
2-~~99~~ 2014 ~~(Addendum A-2005)~~	~~Addendum A to~~ Equipment, Design, and Installation of Ammonia Mechanical Refrigerating Systems	IMC							
ISEA	**International Safety Equipment Association**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
ANSI/ISEA Z358.1-~~98~~ 2009	Emergency Eyewash and Shower Equipment	IPC							
MSS	**Manufacturers Standardization Society of the Valve and Fittings Industry**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
MSS SP-6-~~01~~ 2012	Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings	IFGC							
ANSI MSS SP-58 ~~1993~~ 2009	Pipe Hangers and Supports –Materials, Design, Manufacture, Selection, Application, and Installation	IRC	IFGC						
~~SP-69-2002~~ ANSI/MSS SP-58-2009	Pipe Hangers and Supports – Materials, Design, Manufacture, Selection ~~and~~ , Application , and Installation *(SP69 will be withdrawn in 2014 and ANSI MSS SP-58-2009 replaces it*)	IMC							
NFPA	**National Fire Protection Association**								
Standard Reference Number	Title	Referenced in Code(s):							

10-~~10~~ 13	Standard for Portable Fire Extinguishers	IFC	IBC						
13-~~10~~ 13	Standard for the Installation of Sprinkler Systems	IFC	IBC						
13D-~~10~~ 13	Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes	IFC	IRC	IBC					
13R- ~~10~~ 13	Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies ~~Up to and Including Four Stories in Height~~	IFC	IBC	IEBC					
14-~~10~~ 13	Standard for the Installation of Standpipe, ~~Private Hydrants~~ and Hose Systems	IFC	IBC						
15-12	Standard for the Water Spray Fixed Systems for Fire Protection	IFC							
16-11	Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems	IFC	IBC						
17-~~09~~ 13	Standard for Dry Chemical Extinguishing Systems	IFC	IBC						
17A-~~09~~ 13	Standard for Wet Chemical Extinguishing Systems	IFC	IBC						
20- ~~10~~ 13	Standard for the Installation of Stationary Pumps for Fire Protection	IFC	IBC						
22-~~08~~ 13	Standard for the Water Tanks for Private Fire Protection	IFC							
24- ~~10~~ 13	Standard for the Installation of Private Fire Service Mains and Their Appurtenances	IFC							
25-~~11~~ 13	Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems	IFC	IPMC						
30A-~~12~~ 15	Code for Motor Fuel Dispensing Facilities and Repair Garages	IFC	IMC	IFGC					
30B-~~12~~ 15	Code for the Manufacture and Storage of Aerosol Products	IFC							
31-~~11~~ 15	Standard for the Installation of Oil-Burning Equipment	IFC	IRC	IMC	IBC				

32-~~11~~ 15	Drycleaning Plants	IFC	IBC						
33-~~11~~ 15	Standard for Spray Application Using Flammable or Combustible Materials	IFC							
34-~~11~~ 15	Standard for Dipping and Coating Processes Using Flammable or Combustible Liquids	IFC							
35-~~11~~ 15	Standard for Manufacture of Organic Coatings	IFC							
37-~~10~~ 14	Installation and Use of Stationary Combustion Engines and Gas Turbines	IMC	IFGC						
40-~~11~~ 15	Standard for the Storage and Handling of Cellulose Nitrate Film	IFC	IBC						
45-~~11~~ 15	Standard on Fire Protection for Laboratories Using Chemicals	IMC							
~~50-01~~ replaced with 55-13 that incorporates NFPA 50	~~Bulk Oxygen Systems at Consumer Sites~~ Compressed Gases and Cryogenic Fluids Code	IPC							
51- ~~07~~13	Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes	IFC	IPC	IFGC					
51A-12	Standard for Acetylene Cylinder Charging Plants	IFC							
52-~~10~~ 13	Vehicular Fuel Gaseous System Code	IFC							
55-~~10~~ 13	~~Standard for the Storage, Use and Handling of~~ Compressed Gases and Cryogenic Fluids Code ~~in Portable and Stationery Containers Cylinders and Tanks~~	IFC							
58-~~11~~ 13	Liquefied Petroleum Gas Code	IFC	IBC	IRC	IMC	IFGC			
59A ~~10~~ 13	Standard for the Production, Storage and Handling of Liquefied Natural Gas (LNG)	IFC							
61- ~~08~~ 13	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities	IFC	IBC						

69-~~08~~ 14	Standard on Explosion Prevention Systems	IFC	IMC						
72- ~~10~~ 13	National Fire Alarm and Signaling Code	IFC	IBC	IRC	IMC	IEBC	IgCC	IWUIC	
80- ~~10~~ 13	Standard for Fire Doors and Other Opening Protectives	IFC	IBC						
82-~~09~~ 14	Standard on Incinerators, Waste and Linen Handling Systems and Equipment~~, 2009 Edition~~	IMC	IFGC	IBC	IRC				
85-11	Boiler and ~~Construction~~ Combustion Systems Hazards Code	IFC	IBC	IRC	IFGC				
86-~~11~~ 15	Standard for Ovens and Furnaces	IFC							
88A-~~11~~ 15	Standard for Parking Structures	IFGC							
91-~~10~~ 15	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids	IMC							
92~~B – 09~~ 12	Smoke Control ~~Management~~ Systems ~~in Malls, Atria, and Large Spaces~~	IFC	IBC	IMC					
96-~~11~~ 13	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operation	IMC							
99-~~12~~ 15	Health Care Facilities Code	IBC	IFC	IEBC	IBC				
101-~~12~~ 15	Life Safety Code	IBC	IFC	IEBC					
105-~~10~~ 15	~~Installation~~ Standard ~~of~~ for Smoke Door Assemblies and Other Opening Protectives	IBC	IFC						
110-~~10~~ 15	Standard for Emergency and Standby Power Systems	IFC	IBC	IECC					
111-~~10~~ 15	Standard on Stored Electrical Energy Emergency and Standby Power Systems	IFC	IECC	IBC					
120-~~10~~ 15	Standard for Fire Prevention and Control in Coal Mines	IFC	IBC						
160-~~11~~ 15	Standard for the Use of Flame Effects Before an Audience	IFC							
170-~~09~~ 15	Standard for Fire Safety and Emergency Symbols	IFC	IBC						

204-~~07~~ 15	Standard for Smoke and Heat Venting	IFC							
211-~~10~~ 13	Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances	IFC	IBC	IRC	IMC	IFGC			
221-~~09~~ 15	Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls~~, 2009 Edition~~	IBC							
241-~~09~~ 13	Standard for Safeguarding Construction, Alteration, and Demolition Operations	IFC							
253-~~11~~ 15	Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	IBC	IFC						
259-~~08~~ 13	Standard Test Method for Potential Heat of Building Materials	IBC	IRC						
260-~~09~~ 13	Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture	IFC							
261-~~09~~ 13	Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes	IFC							
262-~~11~~ 15	Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces	IMC							
274-~~09~~ 13	Standard Test Method to Evaluate Fire Performance Characteristics of Pipe Insulation	IMC							
275-~~10~~ 13	Standard Method of Fire Tests for the Evaluation of Thermal Barriers ~~Used Over Foam Plastic Insulation~~	IBC	IRC						
285-11	Standard Fire Test Method ~~of~~ for the Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible	IBC							

	Components								
286-~~11~~ 15	Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth	IFC	IBC	IRC					
288-12	Standard Methods of Fire Tests of ~~Floor~~ Horizontal Fire Door Assemblies Installed in Horizontal~~ly~~ Fire-Resistance-Rated Floor Systems	IBC							
289-~~09~~ 13	Standard Method of Fire Test for Individual Fuel Packages	IFC	IBC						
318-~~09~~ 15	Standard for the Protection of Semiconductor Fabrication Facilities	IFC							
385- ~~07~~ 12	Standard for Tank Vehicles for Flammable and Combustible Liquids	IFC							
407-12	Standard for Aircraft Fuel Servicing	IFC							
409-~~11~~ 15	Aircraft Hangers	IFC	IBC	IFGC					
~~430-04~~ 400-13	~~Storage of Liquid and Solid Oxidizers~~ Hazardous Material Code	IFC							
484-~~12~~ 15	Standard for Combustible Metals	IFC	IBC						
~~490-10~~ 400-13	Storage of Ammonium Nitrate Hazardous Material Code	IFC							
495-~~10~~ 13	Explosive Materials Code	IFC							
498-~~10~~ 13	Standard for Safe Havens and Interchange Lots for Vehicles Transporting Explosives	IFC							
501-~~10~~ 13	Standard on Manufactured Housing	IRC							
505-~~11~~ 13	Fire Safety Standard Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations	IFC							
654-~~06~~ 13	Standard for Prevention of Fire & Dust Explosions from the Manufacturing, Processing, and	IBC	IFC						

	Handling of Combustible Particulate Solids								
655-12	Standard for the Prevention of Sulfur Fires and Explosions	IBC	IFC						
664-12	Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities	IBC	IFC						
701-10	Standard Method~~s~~ of Fire Tests for Flame-Propagation of Textiles and Films	IFC	IBC						
703-~~12~~ 15	Standard for Fire Retardant Treated Wood and Fire Retardant Coatings for Building Materials	IFC							
704-12	Standard System for the Identification of the Hazards of Materials for Emergency Response	IFC	IMC	IBC					
720-~~09~~ 15	Standard for the Installation of Carbon Monoxide (CO) Warning Equipment Dwelling Units	IFC	IBC	IRC					
750-~~10~~ 13	Standard on Water Mist Fire Protection Systems	IFC	IMC	IFGC					
853-~~10~~ 15	Installation of Stationary Fuel Cell Power Systems	IRC							
1122- ~~08~~ 13	Code for Model Rocketry	IFC							
1123-~~10~~ 13	Code for Fireworks Display	IFC							
1124- ~~08~~ 13	Code for the Manufactur~~e~~ing, Transportation, Storage and Retail Sales of Fireworks and Pyrotechnic Articles	IFC	IBC						
1125-12	Code for the Manufacture of Model Rocket and High Power Rocket Motors	IFC							
1126-~~11~~ 15	Standard for the Use of Pyrotechnics Before a Proximate Audience	IFC							
1127- ~~08~~ 13	Code for High Power Rocketry	IFC							
1142-12	Standard on Water Supply for Suburban and Rural Fire Fighting	IFC							
2001-12	Standard on Clean Agent Fire Extinguishing	IFC	IBC						

	Systems								
NSF	**NSF International**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
3-~~2008~~ 2010	Commercial Warewashing Equipment	IPC	IgCC						
14-~~2008e~~ 2011	Plastics Piping System Components and Related Materials	IRC	IPC	ISPSC					
18-~~2007~~ 2012	Manual Food and Beverage Dispensing Equipment	IPC							
40-~~2000~~ 2012	Residential Wastewater Treatment Systems	IPSDC							
41-~~1999~~ 2011	Nonliquid Saturated Treatment Systems ~~(Composing Toilets)~~	IPSDC							
42-~~2007ae~~ 2011	Drinking Water Treatment Units - Aesthetic Effects	IRC	IPC						
44-~~2007~~ 2012	Residential Cation Exchange Water Softeners	IRC	IPC	IgCC					
50-~~2009~~ 2012	Equipment for Swimming Pools, Spas, Hot Tubs, and other Recreational Water Facilities	IgCC	ISPSC						
53-~~2007a~~ 2011a	Drinking Water Treatment Units - Health Effects	IRC	IPC						
58-~~2007~~ 2012	Reverse Osmosis Drinking Water Treatment Systems	IRC	IPC	IgCC					
61-~~2008~~ 2012	Drinking Water System Components - Health Effects	IRC	IPC	IgCC					
62-~~2007~~ 2012	Drinking Water Distillation Systems	IPC							
350-2011	Onsite Residential and Commercial Water Reuse Treatment Systems	IgCC							
PCA	**Portland Cement Association**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
100-~~07~~ 12	Prescriptive Design of Exterior Concrete Walls for One and Two-Family Dwellings (Pub. No. EB241)	IRC							
PCI	**Prestressed Concrete Institute**								

Standard Reference Number	Title	Referenced in Code(s):							
MNL 124-~~89~~ 11	Design for Fire Resistance of Precast Prestressed Concrete	IBC							
PDI	**Plumbing and Draining Institute**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
PDI G101 ~~(2003)~~ 2012	Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data	IPC							
PTI	**Post-Tensioning Institute**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
PTI DC ~~-2007~~ 10.5-12	Standard Requirements for Design and Analysis of Shallow Post-tensioned Concrete Foundation on Expansive Soils~~,~~ ~~Second Edition~~	IBC							
~~PTI DC 2007 10.5-12~~	~~Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive Soils, Third Edition~~	~~IBC~~							
RMI	**Rack Manufacturers Institute**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
ANSI/MH16.1~~—08~~ 12	Specification for Design, Testing and Utilization of Industrial Steel Storage Racks	IBC							
SBCA	**Structural Building Components Association**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
BCSI-~~2008~~ 2013	Building Component Safety Information Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected	IRC							

	Wood Trusses								
CFS-BCSI-2008	Cold Formed Steel Building Component Safety Information (CFSBCSI) Guide to Good Practice for Handling, Installing & Bracing of Cold-formed Steel Trusses	IRC							
SMACNA	**Sheet Metal & Air Conditioning Contractors National Assoc. Inc.**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
SMACNA ~~-85~~ 2012	HVAC Air Duct Leakage Test Manual 2nd Edition	IECC-C	IgCC						
SMACNA ~~/ANSI 2005~~ 2015	HVAC Duct Construction Standards - Metal and Flexible 4th Edition (ANSI)	IMC							
SPRI	**Single-Ply Roofing Institute**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
ANSI/SPRI RP-4- ~~08~~ 13	Wind Design Guide for Ballasted Single-ply Roofing Systems	IBC							
ANSI/SPRI/FM4435-ES-1- ~~03~~ 11	Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems	IBC							
TIA	**Telecommunications Industry Association**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
222-G-2005	Structural Standards for Antenna Supporting Structures and Antennas, including - Addendum 1, 222-G-1 dated 2007, ~~and~~ Addendum 2, 222-G-2 Dated 2009, Addendum 3, 222-3 dated 2013, and Addendum 4, 222-G-4 dated 2014	IBC							
TMS	**The Masonry Society**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
216- ~~97~~ 2013	Standard Method for Determining Fire Resistance of	IBC							

	Concrete and Masonry Construction Assemblies								
302-~~07~~ 2012	Standard Method for Determining the Sound Transmission ~~Class~~ Rating for Masonry Walls	IBC	IRC	IgCC					
402-~~11~~ 2013	Building Code for Masonry Structures	IBC	IRC						
403-~~10~~ 2013	Direct Design Handbook for Masonry Structures	IBC	IRC						
602-~~11~~ 2013	Specification for Masonry Structures	IBC	IRC						
TPI	**Truss Plate Institute**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
TPI 1-2007 2012	National Design Standards for Metal Plate Connected Wood Truss Construction	IBC	IRC						
UL	**Underwriters Laboratories**								
Standard Reference Number	**Title**	**Referenced in Code(s):**							
9−2009	Fire Tests of Window Assemblies~~, with Revisions through April 2005~~	IBC							
14B-2008	Sliding Hardware for Standard Horizontally Mounted Tin Clad Fire Doors ~~– with Revisions through July 2000~~	IBC							
14C-2006	Swinging Hardware for Standard Tin Clad Fire Doors Mounted Singly and in Pairs, with revisions through December 2008	IBC							
17-2008	Vent or Chimney Connector Dampers for Oil-Fired Appliances, with Revisions through January 2010	IRC	IMC						
80-2007	Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids with Revisions through August 2009	IRC	IFC						

103-~~2001~~ 2010	Factory-Built Chimneys, for Residential Type and Building Heating Appliances with Revisions through July 2012	IBC	IMC	IFGC	IRC			
127-~~08~~ 2011	Factory-Built Fireplaces ~~- with Revisions through January 2010~~	IBC	IRC	IMC				
142-06	Steel Aboveground Tanks for Flammable and Combustible Liquids with Revisions through February 2010	IFC						
174-04	Household Electric Storage Tank Water Heaters - with Revisions through ~~May 2006~~ September 2012	IRC	IMC					
180-~~03~~ 2012	Liquid-level Indicating Guarges for Oil Burner Fuels~~- with revision through March 2007~~ and Other Combustible Liquids	IRC	IMC					
197-~~2003~~ 2010	Commercial Electric Cooking Appliances - with revisions through ~~March 2006~~ June 2011	IMC						
217–2006	Single and Multiple Stations Smoke Alarms - with revisions through April ~~2010~~ 2012	IBC	IRC	IFC				
263-~~03~~ 2011	Standard for Fire Test of Building Construction and Materials ~~with revisions through October 2007~~	IBC	IRC	IWUIC	IMC			
294-1999	Access Control Systems Units with Revisions through September 2010	IBC	IFC					
300-2005 (R2010)	Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Equipment with Revisions through July 16, 2010	IBC	IFC					
305-~~97~~ 2012	Panic Hardware	IBC	IFC					
325-2002	Door, Drapery, Gate, Louver and Window Operators and Systems - with Revisions through	IBC	IFC	IRC				

	~~February 2010~~ January 2012							
372-2007	Automatic Electrical Controls for Household and Similar Use - Part 2: Particular Requirements for Burner Ignition Systems and Components with revisions through July ~~25, 2011~~ 2012	ISPSC						
378-06	Draft Equipment, with Revisions through January 2010	IRC	IMC					
391-~~2006~~ 2010	Solid-Fuel and Combination-Fuel Central and Supplementary Furnaces	IMC						
412-~~2004~~ 2011	Refrigeration Unit Coolers - with Revisions through ~~January 2009~~ August 2012	IMC						
499-05	Electric Heating Appliances-with revisions through ~~January 2009~~ April 2012	IMC						
555–2006	Fire Dampers-with revisions through May ~~2010~~ 2012	IBC	IMC					
555S–1999	Smoke Dampers - with Revisions through May ~~2010~~ 2012	IBC	IMC					
641–~~1995~~ 2010	Type L Low-Temperature Venting Systems ~~- with Revisions through July 2009~~	IBC	IRC	IMC	IFGC			
651–~~05~~ 2011	Schedule 40 and Schedule 80 Rigid PVC Conduit and Fittings with revisions through March ~~2010~~ 2012	IFGC	IRC					
705-2004 Revision 5	Standard for Power Ventilators ~~with revisions through March 2012~~	IMC						
710B-~~2004~~ 2011	Recirculating Systems ~~with Revisions through December 2009~~	IBC	IFC	IMC				
723—08	Standard for Test for Surface Burning Characteristics of Building Materials with Revisions through September 2010	IBC	IFC	IWUIC	IRC			

726-1995	Oil-Fired Boiler Assemblies - with Revisions through April ~~2010~~ 2011	IRC	IMC	IECC					
729-03	Oil-Fired Floor Furnaces with revisions through ~~April 2010~~ August 2012	IRC	IMC						
730-03	Oil-Fired Wall Furnaces ~~with revisions through April 2010~~ August 2012	IRC	IMC						
731-1995	Oil-Fired Unit Heaters with Revisions through ~~April 2010~~ August 2012	IMC	IECC-C						
737-~~07~~ 2011	Fireplaces Stoves~~- with Revisions through January 2010~~	IRC	IMC						
793-08	Automatically Operated Roof Vents For Smoke and Heat with Revisions through September 2011	IBC	IFC						
795-~~2006~~ 2011	Commercial-Industrial Gas Heating Equipment with revisions through ~~April 2010~~ September 2012	IRC	IFGC						
842-07	Valves for Flammable Fluids, with Revisions through April 2011	IRC	IMC						
858-05	Household Electric Ranges - with Revisions through ~~May 2010~~ April 2012	IMC	IRC						
864-03	Standard for Control Units and Accessories for Fire Alarm Systems-with Revisions through ~~February 2010~~ August 2012	IBC	IFC						
867-~~00~~ 2011	Electrostatic Air Cleaners~~-with Revisions through February 2010~~	IMC							
873-2007	Temperature-Indicating and -Regulating Equipment, with revisions through July ~~25, 2011~~ 2012	ISPSC							
875-09	Electric Day Bath Heaters with revisions through ~~October 2009~~ November 2011	IMC	IRC						
896-1993	Oil-Burning Stoves - with Revisions	IRC	IMC						

	through May 2010 August 2012							
900-04	Air Filter Units- with revisions through ~~November 2009~~ February 2012	IFC	IMC					
907-~~94~~ 2010	Fireplace Accessories - with revisions through ~~July 2006~~ April 2010	IMC						
924-06	Emergency Lighting and Power Equipment with revisions through ~~January 2009~~ February 2011	IBC	IFC					
959-~~2001~~ 2010	Medium Heat Appliance Factory-Built Chimneys - ~~with Revisions through June 2010~~	IRC	IMC	IFGC				
1004-1-~~08~~ 2012	Standard for Rotating Electrical Machines General Requirements with revisions through June 23, 2011	ISPSC						
1026-~~07~~ 2012	Electric Household Cooking and Food Services Appliances	IRC						
1037-99	Antitheft Alarms and Devices with Revisions through December 2009	IFC						
1040-1996	Fire Test of Insulated Wall Construction - with Revisions through September 2007 October 2012	IBC	IRC					
1042-~~94~~ 2009	Electric Baseboard Heating Equipment- with revisions through ~~February 2008~~ June 2010	IRC						
1046-~~00~~ 2010	Grease Filters for Exhaust Ducts with revisions through January 2012	IMC						
1081-2008	Standard for Swimming Pool Pumps, Filters and Chlorinators, with revisions through ~~March 31, 2010~~ November 2011	ISPSC						
1240-2005	Electric Commercial Clothes-Drying Equipment - with Revisions through ~~October 2009~~ February 2011	IMC						
1261-2001	Electric Water Heaters for Pools and Tubs - with Revisions through	IRC	IMC	ISPSC				

	~~June 16, 2010~~ July 2012							
1275-2005	Flammable Liquid Storage Cabinets with Revisions through ~~May 2006~~ February 2010	IFC						
1315-95	Standard for Safety for Metal Waste Paper containers- with Revisions through ~~August 2007~~ September 2012	IFC						
1363-2007	Relocatable Power Taps - with revisions through ~~October 2009~~ September 2012	IFC						
1453-04	Electric Booster and Commercial Storage Tank Water Heaters - with Revisions through December 2009 July 2011	IRC	IMC					
1482-~~10~~ 2011	Solid-Fuel Type Room Heaters	IBC	IRC	IMC	IgCC			
1563-2009	Standard for Electric Hot Tubs, Spas and Association Equipment with revisions through ~~March 31, 2010~~ July 2012	ISPSC						
1673-~~96~~ 2010	Electric Space Heating Cables-with revision through ~~July 2003~~ October 2011	IRC						
1693-~~02~~ 2010	Electric Radiant Heating Panels and Heating Panel Sets, with Revisions through October 2011	IRC						
1703-02	Flat-plate Photovoltaic Modules and Panels - with revisions through ~~April 2008~~ May 2012	IBC						
1738-~~06~~ 2010	Venting Systems for Gas-Burning Appliances, Categories II, III and IV, with Revisions though May 2011	IRC	IFGC					
1741-~~99~~ 2010	Inverters, Converters, Controllers and Interconnection System Equipment with Distributed	IRC						

	Energy Resources~~-with revisions through November 2005~~								
1815-~~09~~ 2012	Standard for Nonducted Heat Recovery Ventilators	IMC							
1897-~~2004~~ 2012	Uplift Tests for Roof Covering Systems ~~with revisions through May 2008~~	IBC							
1978-~~05~~ 2010	Grease Ducts	IMC							
1994-04	Luminous Egress Path Marking Systems with Revisions through ~~April 2010~~ November 2010	IBC	IFC						
1995-~~2005~~ 2011	Heating and Cooling Equipment~~, with revisions through July 2009~~	IRC	IMC	ISPSC					
1996-~~04~~ 2009	Electric Duct Heaters-with revisions through ~~July 2009~~ November 2011	IRC	IMC						
2017-2008	Standards for General-Purpose Signaling Devices and Systems-with Revisions through ~~October 2009~~ May 2011	IBC	IRC						
2024-~~2008~~ 2011	Standard for Safety Optical-Fiber and Communications Cable Raceway ,with Revisions through April 2011	IMC							
2158-1997	For Electric Clothes Dryers - with Revisions through March 2009	IMC							
2158A-~~2006~~ 2010	Outline of Investigation for Clothes Dryer Transition Duct	IRC	IMC						
2200-~~98~~ 2012	Stationary Engine Generator Assemblies ~~with Revisions through December 2009~~	IBC	IFC	IMC	IFGC				

2208-~~2005~~ 2010	Solvent Distillation Units - with Revisions through ~~December 2009~~ March 2011	IFC						
2221-~~2001~~ 2010	Tests of Fire Resistive Grease Duct Enclosure Assemblies	IMC						
2335-~~01~~ 2010	Fire Tests of Storage Pallets-with Revisions through ~~March 2010~~ September 2012	IFC						
2518-~~02~~ 2005	Air Dispersion System Materials	IMC						
2523-09	Standard for Solid Fuel-Fired Hydronic Heating Appliances, Water Heaters, and Boilers, with Revisions through October 2011	IRC	IgCC	IMC				

ULC/CAN	**Underwriters Laboratories Canada**							
Standard Reference Number	**Title**	**Referenced in Code(s):**						
CAN/ULC S102.2-~~1988~~ 2010	Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies ~~- with 2000 Revisions~~	IBC	IRC					

Reason: *The CP 28 Code Development Policy, Section 4.5.1 requires the updating of referenced standards to be accomplished administratively, and be proces as a Code Change Proposal for consideration by the Administrative Code Change Committee. In September 2012, a letter was sent to each developer of standa that is referenced in the International Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Above is the list of referenced standards that are to be updated based upon responses from standards developer.*

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

Public Hearing Results

Committee Action: **Approved as Modified**

Errata to this proposal is contained in the Updates to the 2013 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Documents/2012-2014Cycle/Proposed-B/00-CompleteGroupB-MonographUpdates.pdf for more information

The following is errata that was not posted to the ICC website.

ASTM D5019, while withdrawn by ASTM, is still referenced in the IBC and IRC, so it will remain in the list of referenced standards. This standard will be removed from this update proposal.

ASTM	**ASTM International**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
D5019-07a	Specification for Reinforced CSM Polymeric Sheet Used in Roofing Membrane	IBC, IRC

FM 4470 was indicated in the posted errata as being updated to 2013, however, the correct reference is 2012.

FM	**FM Global**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
FM 4470 ~~2009~~ 2012	Approval Standard for Single-Ply Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction.	IBC

The following revisions are modifications to the proposal.

The following standards were in the automatic update code change proposals. Revise the referenced edition as follows.

AISI	**American Iron and Steel Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
AISI S110-07/S1-09 (2012)	Standard for Seismic Design of Cold-Formed Steel Structural Systems-Special Moment Frames, 2007 with Supplement 1, dated 2009, (Reaffirmed 2012)	IBC
AISI S210-07 (2012)	North American Standard for Cold-formed Steel Framing-Floor and Roof System Design, 2007, (Reaffirmed 2012)	IBC
AISI S211-07/S1-12 (2012)	North American Standard for Cold-Formed Steel Framing-Wall Stud Design, 2007, including Supplement 1, dated 2012, (Reaffirmed 2012)	IBC
AISI S212-07 (2012)	North American Standard for Cold-Formed Steel Framing-Header Design, 2007, (Reaffirmed 2012)	IBC
AISI S213-07/S1-09 (2012)	North American Standard for Cold-Formed Steel Framing-Lateral Design, with Supplement 1, dated 2009, (Reaffirmed 2012)	IBC
AISI S230-07-07/S2-08 /S3-12 (2012)	Standard for Cold-formed Steel Framing-Prescriptive Method for One- and Two-family Dwellings, 2007, with Supplement 2 3, dated 2008 dated 2012, (Reaffirmed 2012)	IBC, IRC

The following standards will be removed from the automatic update code change proposal. The current edition will remain the referenced edition.

ACI	**American Concrete Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
318-11	Building Code Requirements for Structural Concrete	IBC, IRC, ISPSC

ICC	**International Code Council**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ICC A117.1-2009	Accessible and Useable Buildings and Facilities	IBC, IEBC, IFC, IRC, IZC

The following standard is not referenced and should be removed from the IMC Chapter 15.

NFPA	**National Fire Protection Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~NFPA 274-09~~	~~Standard Test Method to Evaluate Fire~~	~~IMC~~

	~~Performance Characteristics of Pipe Insulation~~	

Committee Reason: The proponent indicated that AISI standard references were not revised and updated, but were instead reviewed and reaffirmed in 2012. The committee agreed that it is important to clarify this in the reference.

The committee agreed that the edition of ACI 318 should remain at 2011 instead of being updated to 2014. The specific references to sections in the ACI 318 in the International Codes are coordinated with the 2011 edition. The 2014 edition will be substantially reformatted and renumbered. The 2014 edition must be finalized before it is possible to verify that the references will still be complete and accurate. Some of the revisions to references may be considered technical revisions. This correlation may need to be done as part of the Group A codes changes next cycle. If possible to address this in the public comments for Group B, it should be done.

The committee agreed that the edition of ICC A117.1 should remain 2009 instead of being updated to 2014. The ICC A117.1 is undergoing significant changes in relation to the sizes required for accessibility. At the time of the hearings, the standard has not yet reached the stage of a public draft. Once the revisions are finalized, the scoping requirements in the IBC must be reviewed to understand the full impact on spaces and buildings. Since some of the coordination may include revisions to the codes, the reference of the new edition should be delayed to allow for this coordination effort in the Group A and Group B code change cycles.

The proponent pointed out that NFPA 274 is no longer referenced anywhere in the IMC, however, it is still included in the IMC Chapter 15. Rather than being included in the automatic update proposal, it should be removed from the IMC Chapter 15.

The committee approved the automatic updates for the remainder of the standards listed in the proposal. The proposed updates to the standard are consistent with the ICC policies for updates.

A question was raised during the testimony regarding the updating of NFPA 70, National Electrical Code. NFPA 70 will be automatically updated from the 2011 edition to the 2014 edition. The ICC Board of Directors have identified NFPA 70 as a member of the ICC family of codes, therefore, it will not be indicated in the automatic update proposal.

Assembly Action **None**

Public Comment(s)

Public Comment 1:

Matthew Senecal, P.E., representing the American Concrete Institute (ACI), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

<u>ACI</u>

318 - ~~11~~ <u>14</u> Building Code Requirements for Structural Concrete

Commenter's Reason: At the Dallas Committee Action Hearings, a decision was made to retain the reference to ACI 318-11 instead of updating to the latest edition, ACI 318-14. This was based upon a concern expressed on the floor that, because ACI 318 is going through reorganization, specific ACI 318 section numbers cited within the 2015 IBC may become inconsistent with ACI 318-14, thereby causing confusion to the user..

On July 1, 2013, ACI assembled a task group consisting of the concerned parties to review this issue in detail. The group concluded that If the specific ACI 318 section numbers cited in the 2015 IBC can be editorially changed to the correct ACI 318-14 section numbers, then any potential problem to the user will be avoided.

Editorial changes of this kind are allowed according to Section 4.4 of CP#28. The 318-14 section references compatible with the 2015 IBC have been determined and will be forwarded to ICC Staff for inclusion in the 2015 IBC, and other ICC Codes as appropriate.

It is important to note that there are no technical changes in ACI 318-14 that affect the eight modifications in 2015 IBC Section 1905 or any other provision of the 2015 IBC. This means only the editorial changes discussed above are required to make ACI 318-14 compatible with the 2015 IBC.

<u>ASTM</u>

Public Comment 2:

Marcelo M. Hirschler, representing GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

E814-~~08b~~ <u>2013</u> Test Method of Fire Tests of Through-Penetration Firestops

E1537-~~12~~ 2013	Test Method for Fire Testing of Upholstered Furniture

Commenter's Reason: Standards date updates

Public Comment 3:

Marcelo M. Hirschler, representing GBH International, and Steve Mawn, representing ASTM International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

D6662-~~09~~ 2013	Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards
E84-20~~12c~~ 2013A	Test Method for Surface Burning Characteristics of Building Materials
E1354-~~2011b~~ 2013	Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter
E1590-~~12~~ 2013	Test Method for Fire Testing of Mattresses
E2404~~—12~~ 2013E1	Standard Practice for Specimen Preparation and Mounting of Textile, Paper or Vinyl Wall or Ceiling Coverings to Assess Surface Burning Characteristics

Commenter's Reason: Standards date updates

Public Comment 4:

Steve Mawn, representing ASTM International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

A74-~~12~~ 13A	Specification for Cast Iron Soil Pipe and Fittings
A182-~~12A~~ 13	Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings and Valves and Parts for High-Temperature Service
A240/A 240M-~~12~~ 13A	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications
A283/A 283M-12A	Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
A307-~~10~~ 12	Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
A312/A 312M-~~12A~~ 13A	Specification for Seamless, and Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
A403-~~12~~ 13	Standard Specification for Wrought Austenitic Stainless Steel Pipe Fittings
A480/A480M-~~12~~ 13	Specification for General Requirements for Flat-Rolled Stainless and Heat-/Resisting Steel Plate, Sheet and Strip
A510-~~11~~ 13	Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, Alloy Steel
A572/A 572M-12A	Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
A588/A 588M-~~05~~ 10	Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 Mpa) Minimum Yield Point, with Atmospheric Corrosion Resistance
A875/A 875M-~~10~~ 13	Standard Specification for Steel Sheet Zinc-5%, Aluminum Alloy-Coated by the Hot-Dip Process

A888-~~11~~ 13A	Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Application
A924/A 924M-~~2010a~~ 13	Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot Dip Process
A1003/A 1003M-~~12~~ 13A	Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-formed Framing Members
A1008/A1008M-12A	Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened and Bake Hardenable
B152/B 152M-~~09~~ 13	Specification for Copper Sheet, Strip Plate and Rolled Bar
B241/B 241M-~~10~~ 12E1	Specification for Aluminum and Aluminum-Alloy, Seamless Pipe and Seamless Extruded Tube
B633-~~11~~ 13	Specification for Electodeposited Coatings of Zinc on Iron and Steel
C33/C33M-~~11a~~ 13	Specification for Concrete Aggregates
C34-~~10~~ 12	Specification for Structural Clay Load-Bearing Wall Tile
C42/C 42M-~~12~~ 13	Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
C56-~~2010~~ 12	Specification for Limestone Dimension Stone
C59/C 59M-00~~(2006)~~ (2011)	Specification for Gypsum Casting Plaster and Molding Plaster
C62-~~08~~ 13	Specification for Slate Dimension Stone
C67-~~12~~ 13	Test Methods of Sampling and Testing Brick and Structural Clay Tile
C76-~~12a~~ 13A	Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
C90-~~12~~ 13	Specification for Loadbearing Concrete Masonry Units
C94/C 94M-~~12~~ 13	Specification for Construction of Dry-stacked, Surface-Bonded Walls
C109/C 109M-~~2001b~~ 12	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
C126-~~12~~ 13	Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units
C140-~~2012a~~ 13	Test Method Sampling and Testing Concrete Masonry Units and Related Units
C143/C 143M-~~2010a~~ 12	Test Method for Slump of Hydraulic Cement Concrete
C207- ~~2011~~ 06(2011)	Specification for Hydrated Lime for Masonry Purposes
C216-~~12~~ 13	Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale)
C317/C 317M-00(2010)	Specification for Gypsum Concrete
C330-/C330M-2009	Specification for Lightweight Aggregates for Structural Concrete
C474-~~12~~ 13	Test Methods for Joint Treatment Materials for Gypsum Board Construction
C578—12~~a~~b	Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
C587-04(2009)	Specification for Gypsum Veneer Plaster
C595/C95M-~~2012e1~~ 13	Specification for Blended Hydraulic Cements
C615/C615M-~~2011~~ 11	Specification for Granite Dimension Stone
C616/C616M-~~2010~~ 10	Specification for Quartz Dimension Stone

C629- ~~2010~~ 10	Specification for Slate Dimension Stone
C635/C635M-~~12~~ 13	Specification for the Manufacturer, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
C645-~~11A~~ 13	Specification for Nonstructural Steel Framing Members
C652-~~12~~ 13	Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)
C700-~~11~~ 13	Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated
C728-05 ~~(2010)~~ (2013)	Standard Specification for Perlite Thermal Insulation Board
C926-~~12A~~ 13	Specification for Application of Portland Cement-Based Plaster
C932-06(2013)	Specification for Surface-Applied Bonding Compounds ~~Agents~~ for Exterior Plastering
C933-~~11~~ 13	Specification for Welded Wire Lath
C1019-~~11~~13	Test Method for Sampling and Testing Grout
C1029-~~10~~13	Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation
C1063-12~~C~~ D	Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster
C1072-~~11~~ 13	Standard Text Method for Measurement of Masonry Flexural Bond Strength
C1088-~~09~~ 13	Specification for Thin Veneer Brick Units Made From Clay or Shale
C1107/C1107M -~~11~~ 13	Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
C1116/C1116M-10A	Standard Specification for Fiber - Reinforced Concrete and Shotcrete
C1157/C1157M-11	Standard Performance Specification for Hydraulic Cement
C1173-10E1	Specification for Flexible Transition Couplings for Underground Piping Systems
C1186-08(2012)	Specification for Flat Fiber Cement Sheets
C1277-~~11~~ 12	Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings
C1280-~~12A~~ 13	Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing
C1289~~—12a~~ 13E1	Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
C1314-~~11A~~ 12	Test Method for Compressive Strength of Masonry Prisms
C1396/1396M-~~11~~ 2013	Specification for Gypsum Ceiling Board
C1513-~~12~~ 2013	Standard Specification for Concrete Roof Tile
C1563-~~08~~ 2013	Standard Test Method for Gaskets for Use in Connection with Hub and Spigot Cast Iron Soil Pipe and Fittings for Sanitary Drain, Waste, Vent and Storm Piping Applications
D86-~~2011b~~ 2012	Test Method for Distillation of Petroleum Products at Atmospheric Pressure
D92-2012b	Test Method for Flash and Fire Points by Cleveland Open Cup Tester
D93-~~11~~ 2012	Test Method for Flash Point by Pensky-Martens Closed Cup Tester
D1693-~~12~~ 2013	Test Method for Environmental Stress-Cracking of Ethylene Plastics
D1970/D1970M-~~11~~ 2013	Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roof Underlayment for Ice Dam Protection
D2239-2012A	Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
D2513-~~12~~ 2013E1	Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings

D2683-2010E1	Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
D2737-2012~~E1~~A	Specification for Polyethylene (PE) Plastic Tubing
D2974-~~07A~~ 2013	Standard Test Methods for Moisture, Ash and Organic Matter of Peat and other Organic Soils
D3035-2012E1	Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
D3161/D3161M-~~12~~ 2013	Test Method for a Wind Resistance of Asphalt Shingles (Fan Induced Method)
D3201-~~08AE1~~ 2013	Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Based Products
D3350-~~08~~ 2012E1	Specification for Polyethylene Plastics Pipe and Fittings Materials
D3689-~~07~~2013E1	Test Methods for Deep Foundations Under Static Axial Tensile Load
D3737-~~09E1~~ 2012	Practice for Establishing Allowable Properties for Structural Glued Laminated Timber (Glulam)
D4637/D4637M-~~12~~ 2013	Specification for EPDM Sheet Used in Single-Ply Roof Membrane
D5055-~~12~~2013	Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists
D5456-~~12~~ 2013	Standard Specification for Evaluation of Structural Composite Lumber Products
D6223/D6223M-02(~~2009)~~(2011)E1	Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements
D6757-~~07~~ 2013	Standard Specification for Underlayment Felt Containing Inorganic Fibers used in Steep-Slope Roofing
E96/E96M-~~10~~ 2013	Test Method for Water Vapor Transmission of Materials
E1332-90(20~~03~~10A)	Standard Classification for the Determination of Outdoor-Indoor Transmission Class
E1529-~~10~~ 2013	Test Method for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies
E1537-~~12~~ 2013	Test Method for Fire Testing of Upholstered Furniture
E1996-2012A	Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
E2178~~-11~~ 2013	Standard Test Method for Air Permeance of Building Materials
E2307-~~12~~ 2010	Standard Test Method for Determining Fire Resistance of a Perimeter Joint System Between an Exterior Wall Assembly and a Floor Assembly Using the Intermediate-Scale, Multi-story Test Apparatus[1]
E2336-04(2013)	Standard Test Methods Fire Resistive Grease Duct Enclosure Systems
F441/F 441M-~~12~~ 2013	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80
F442/F 442M-~~12~~ 2013	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)
F714-~~12E1~~ 2013	Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
F876-~~10E1~~ 2013	Specification for Crosslinked Polyethylene (PEX) Tubing
F877-2011A	Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems
F1055-~~11~~ 2013	Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene Pipe and Tubing
F1496-~~12~~ 2013	Standard Test Method for Performance of Convection Ovens

F1807-~~12~~ 2013	Specifications for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing
F2080-~~09~~ 2012	Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Cross-linked Polyethylene (PEX) Pipe
F2200~~—11B~~ 2013	Standard Specification for Automated Vehicular Gate Construction
F2306/F 2306M-~~11~~ 2013	Specification for 12" to 60" 300 to 1500 mm annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications

Commenter's Reason: Further revisions to ASTM Standards.

ICC

Public Comment 5:

Jonathan Humble, representing ICC Reference Standards Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

ICC A117.1 – ~~2009~~ 2014 Accessible and Usable Buildings and Facilities

Commenter's Reason (Humble): The ICC Reference Standards Committee (ICC-REF), a committee organized to review standards and provide an opinion of standards compliance based on Council Policy 28, requests that ADM 62-13 be further modified with the incorporation of ICC A117.1-2014 edition.

The ICC-REF disagrees with the ADM code development committee reasons for reverting back to the 2009 edition of ICC A117.1. Contrary to the code development committee's reason concerning significant changes, Section 4.5.1 of the Council Policy does not stipulate any restrictions to modifications to a standards updating. Rather, the intent is that an updated standard should coordinate with the various I-codes in which the standard is referenced. Since this standard is referenced generically in each of the referenced I-codes, and not specifically by individual section number, it is believed that the update will not yield the coordination issues cited in the code development committee's recommendation.

We therefore recommend that ADM62-13 be further modified by the updating of ICC A117.1 to the 2014 edition.

Public Comment 6:

Kenneth Schoonover, KMS Associates, Inc. representing self, requests Approval as Modified by this Public Comment.

Approve the proposed update to ICC/ANSI A117.1-14 for the IBC and the IRC. Retain the reference to ICC/ANSI A117.1-2009 for the IZC, IFC and IEBC.

Commenter's Reason: ICC/ANSI A117.1 Standard is going through its normal revision cycle, which is expected to be complete before the end of this code development cycle. The new edition of A117.1 will be published and available for reference in the 2015 International Codes.

While it is true that there are significant changes, that is not a good reason to freeze the I-Codes reference at the 2009 Edition of the standard. ICC Council Policy #CP28-05 specifically allows an administrative update of a standard to be approved, based upon completion before Dec. 1 of 2014. We anticipate that this standard will be published and available well before December 1, 2014. In writing this rule for completion of a referenced standard a full year after the update is approved, ICC is specifically allowing for completion of technical work on a standard to be completed, with no qualifications regarding the progress of that work. The revisions underway for A117.1 will not impact the content of the 2015 I-Codes. Further, there are a number of reasons why the update to this standard should be approved:

1. If the revisions in question are included in the new standard, there is no good reason not to move forward with them. The changes will have been well vetted, the benefits of the changes have already been established, and the basis for the changes will have been well substantiated.
2. The potential impact on design and construction is no reason delay implementation. It will be several years before the new edition of the I-Codes are widely adopted and enforced. The changes are significant, but not so dramatic as to cause a major upheaval in the design and construction industry. This would not be the first time, or the last, that changes in codes and standards will have had such effect. Designers and builders can and will adapt, and there will be sufficient time to adapt for those who choose to be proactive and plan ahead.
3. There are many other changes and improvements in the standard that will be delayed if the standard is not updated. Among them are revisions that will correlate to a great extent the I-Codes with the new 2010 ADA Standards, which are now adopted and in force. The I-Codes have long sought to be as technically consistent as possible with the ADA Accessibility Guidelines. Designers,

builders and building owners benefit from having model codes that match the federal accessibility requirements. Failure to update the standard will be a lost opportunity to continue that benefit.

4. The A117 Committee has, to date, agreed to minimize the impact of the changes on housing. The proposals under consideration by the committee include exceptions to Chapter 10 of the Standard that will limit the spatial impact Accessible, Type A and Type B units.

Analysis: Availability of older editions of a standard are determined by the policies of the standard promulgator. The IFC references the A117.1 in Sections 907.5.2.3.4 (Visible alarms) Group R-2, 1007.9 (Accessible means of egress) Signage and 1010.1 Ramps. Chapters 9 and 10 are repeated in the IBC and IFC. The IZC references the A117.1 in Sections 801.2.4 and 801.3.1. The references are specific to requirements for passenger loading zones and accessible parking spaces. Accessible parking requirements and passenger loading zones are also addressed in the IBC, Section 1106.

Public Comment 7:

Steve Orlowski, representing National Association of Home Builders (NAHB), and Tim Ryan, representing the International Association of Building Officials (IABO), requests Approved as Modified by the Code Committee.

Commenter's Reason: During the code development hearing, the committee agreed that there was a need to modify the list of referenced standard, specifically the updating of the A117.1 standard. CP policy 28 allows for standards that are already referenced in the I-Codes to be updated, even if they are still under development, provide they are completed before December 1, 2014. There are several standards that have been changed or are currently being changed without any opportunity to determine whether the standard should still be referenced in the code or the ability to change the code to reflect changes that have occurred in the standard.

For example the A117 standard is currently discussing changes that may possibly change the required dimensions of clear floor space and dimensions along the accessible route significantly. Without the opportunity to fully understand how existing buildings that were built in accordance with the previous edition of the standard and how the proposed changes will interact with ADA and FHA requirements, NAHB encourages the final assembly to support the modification approved by the committee to not update the reference to the 2014 A117.1 standard.

Public Comment 8:

Robert Eugene, representing UL LLC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

705-2004 ~~Revision 5~~ Standard for Power Ventilators with revisions through March 2012

Commenter's Reason: This modification provides no technical change. The re-formatting provides consistency with the formatting of the other UL referenced standards.

Public Comment 9:

Robert Eugene, representing UL LLC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1703-02 Flat-plate Photovoltaic Modules and Panels - with revisions through ~~May 2012~~ November 2014

Commenter's Reason: This modification will incorporate additional fire testing provisions. It will also include various clarifications and editorial revisions to the standard.

Public Comment 10:

Robert Eugene, representing UL LLC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

14B-2008 Sliding Hardware for Standard Horizontally Mounted Tin Clad Fire Doors with revisions through May 3, 2013

14C-2006 Swinging Hardware for Standard Tin Clad Fire Doors Mounted Singly and in Pairs, with revisions through ~~December 2008~~ May 2013

181A-~~05~~ 2013	Closure Systems for Use with Rigid Air Ducts and Air Connectors~~— with Revisions through February 2008~~
181B-~~05~~ 2013	Closure Systems for Use with Flexible Air Ducts and Air Connectors~~—with Revisions through February 2008~~
268~~—06~~2009	Smoke Detectors for Fire ~~Prevention Signaling~~ Alarm Systems ~~-with revisions through October 2003~~
325-2002	Door, Drapery, Gate, Louver and Window Operators and Systems - with Revisions through ~~January 2012~~ June 2013
343-2008	Pumps for Oil-Burning Appliances – with revisions through June 2013
441-2010	Gas Vents~~—with Revisions through August 2006~~
471-~~06~~ 2010	Commercial Refrigerators and Freezers—with Revisions through ~~October 2008~~ December 2012
499-05	Electric Heating Appliances-with revisions through ~~April 2012~~ February 2013
508-99	Industrial Control Equipment—with Revisions through ~~September 2008~~ March 2013
641~~-1995~~ 2010	Type L Low-Temperature Venting Systems with revisions through May 2013
710-~~95~~ 2012	Exhaust Hoods for Commercial Cooking Equipment~~—with Revisions through December 2009~~
834-04	Heating, Water Supply and Power Boilers Electric—with Revisions through ~~December 2009~~ January 2013
842-07	Valves for Flammable Fluids, with Revisions through ~~April 2011~~ October 2012
867-~~00~~ 2011	Electrostatic Air Cleaners-with Revisions through February 2013
923~~—2008~~ 2013	Microwave Cooking Appliances~~—with Revisions through June 2010~~
1042-~~94~~ 2009	Electric Baseboard Heating Equipment-with revisions through June ~~2010~~ 2013
1081-2008	Standard for Swimming Pool Pumps, Filters and Chlorinators, with revisions through ~~November 2011~~ May 2013
1240-2012	Electric Commercial Clothes-Drying Equipment - with Revisions through ~~February 2011~~ October 2012
1313-93	Standard for Nonmetallic Safety Cans for Petroleum Products—with Revisions through ~~August 2007~~ November 2012
1479-03	Fire Tests of Through-penetration Firestops—with Revisions through ~~*March 2010*~~ October 2012
1618-09	Wall Protectors, Floor Protectors and Hearth Extensions – with revisions through May 2013
1715-97	Fire Test of Interior Finish Material—with Revisions through ~~April 2008~~ January 2013
1812-~~2009~~ 2013	Standard for Ducted Heat Recovery Ventilators~~—with Revisions through June 2010~~
1820-04	Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics—with Revisions through ~~February 2009~~ May 2013
1887-04	Fire Tests of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics—with Revisions through ~~February 2009~~ May 2013
2075-~~04~~ 2013	Standard for Gas and Vapor Detectors and Sensors~~—with revisions through September 2007~~
2079-04	Tests for Fire Resistance of Building Joint Systems—with Revisions through ~~June 2008~~ December 2012
2085-97	Protected Above-ground Tanks for Flammable and Combustible Liquids—with Revisions through ~~December 1999~~ September 2010
2200-2012	Stationary Engine Generator Assemblies-- with Revisions through June 2013
2360-00	Test Methods for Determining the Combustibility Characteristics of Plastics Used in Semi-Conductor Tool Construction—with Revisions through ~~June, 2008~~ May 2013

2523-09	Standard for Solid Fuel-Fired Hydronic Heating Appliances, Water Heaters, and Boilers, with Revisions through ~~October 2011~~ February 2013

Commenter's Reason: This modification provides additional updates to referenced standards revision dates and titles as applicable.

Final Hearing Results

ADM62-13	**AMPC1,2,3,4,8,9,10**