CALIFORNIA BUILDING CODE – MATRIX ADOPTION TABLE
CHAPTER 17A – STRUCTURAL TESTS AND SPECIAL INSPECTIONS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user. See Chapter 1 for state agency authority and building applications.)

<table>
<thead>
<tr>
<th>Adopting agency</th>
<th>BSC</th>
<th>SFM</th>
<th>HCD 1</th>
<th>HCD 2</th>
<th>HCD 1/AC</th>
<th>DSA AC</th>
<th>DSA SS</th>
<th>DSA SS/CC</th>
<th>OSHPD 1</th>
<th>OSHPD 2</th>
<th>OSHPD 3</th>
<th>OSHPD 4</th>
<th>BSCC</th>
<th>DPH</th>
<th>AGR</th>
<th>DWR</th>
<th>CEC</th>
<th>CA</th>
<th>SL</th>
<th>SLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopt entire chapter</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tbody>
</table>
| Adopt entire chapter as amended |    |     |       |       |          |        |        |           |         |         |         |         |       |     |     |     |     |     |     |     | (amended sections listed below)
| Adopt only those sections that are listed below |    |     |       |       |          |        |        |           |         |         |         |         |       |     |     |     |     |     |     |     |
| Chapter / Section |    |     |       |       |          |        |        |           |         |         |         |         |       |     |     |     |     |     |     |     |
CHAPTER 17A
SPECIAL INSPECTIONS AND TESTS

SECTION 1701A
GENERAL

1701A.1 Scope. The provisions of this chapter shall govern the quality, workmanship and requirements for materials covered. Materials of construction and tests shall conform to the applicable standards listed in this code.

1701A.1.1 Application. The scope of application of Chapter 17A is as follows:

1. Structures regulated by the Division of the State Architect-Structural Safety, which include those applications listed in Sections 1.9.2.1 (DSA-SS), and 1.9.2.2 (DSA-SS/CC). These applications include public elementary and secondary schools, community colleges and state-owned or state-leased essential services buildings.

2. Structures regulated by the Office of Statewide Health Planning and Development (OSHPD), which include those applications listed in Sections 1.10.1, and 1.10.4. These applications include hospitals, skilled nursing facilities, intermediate care facilities and correctional treatment centers.

Exception: [OSHPD 2] Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with Chapter 17 and any applicable amendments therein.

1701A.1.2 Amendments in this chapter. DSA-SS adopts this chapter and all amendments.

Exceptions: Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:

1. Division of the State Architect - Structural Safety:
   [DSA-SS] For applications listed in Section 1.9.2.1.
   [DSA-SS/CC] For applications listed in Section 1.9.2.2.

2. Office of Statewide Health Planning and Development:
   [OSHPD 1] – For applications listed in Section 1.10.1.
   [OSHPD 4] – For applications listed in Section 1.10.4.

1701A.1.3 Reference to other chapters.

1701A.1.3.1 [DSA-SS/CC] Where reference within this chapter is made to sections in Chapters 16A, 19A, 21A, 22A, and 34A, the provisions in Chapters 16, 19, 21, 22, and 34 respectively shall apply instead.

1701A.2 New materials. New building materials, equipment, appliances, systems or methods of construction not provided for in this code, and any material of questioned suitability proposed for use in the construction of a building or structure, shall be subjected to the tests prescribed in this chapter and in the approved rules to determine character, quality and limitations of use.

1701A.3 Used materials. The use of second-hand materials that meet the minimum requirements of this code for new materials shall be permitted.

1701A.4 Special inspectors. [OSHPD 1 and 4] In addition to the inspector(s) of record required by the California Administrative Code (CCR, Title 24, Part 1), Section 7-144, the owner shall employ one or more special inspectors who shall provide inspections during construction on the types of work listed under Chapters 17A, 18A, 19A, 20, 21A, 22A, 23, 25, 34A, and noted in the Test, Inspection, and Observation (TIO) program required by Sections 7-141, 7-145 and 7-149, of the California Administrative Code. Test, Inspection and Observation (TIO) program shall satisfy requirements of Sections 1704A.2.3 and 1704A.5.

1701A.5 Special inspectors. [DSA-SS & DSA-SS/CC] In addition to the project inspector required by the California Administrative Code (CCR, Title 24, Part 1), Section 4-335, the owner shall employ one or more special inspectors who shall provide inspections during construction on the types of work listed under Chapters 17A, 18A, 19A, 20, 21A, 22A, 23, 25 and 34 of the California Building Code and noted in the special test, inspection and observation plan required by Section 4-335 of the California Administrative Code.

SECTION 1702A
DEFINITIONS

1702A.1 Definitions. The following terms are defined in Chapter 2, except those defined below which shall, for the purposes of this section, have the meanings shown herein.

APPROVED AGENCY.
APPROVED FABRICATOR.
CERTIFICATE OF COMPLIANCE.
DESIGNATED SEISMIC SYSTEM.
FABRICATED ITEM.
INTUMESCENT FIRE-RESISTANT COATINGS.
SPECIAL INSPECTIONS AND TESTS

MAIN WINDFORCE-RESISTING SYSTEM.

Mastic Fire-Resistant Coatings.

PROJECT INSPECTOR. [DSA-SS, DSA-SS/CC] The person approved to provide inspection in accordance with the California Administrative Code, Section 4-333(b). The term “project inspector” is synonymous with “inspector of record.”

SPECIAL INSPECTION.

Continuous special inspection. The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.

Periodic special inspection. The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.

SPECIAL INSPECTOR.

Sprayed Fire-Resistant Materials.

Structural Observation.

SECTION 1703A
APPROVALS

1703A.1 Approved agency. An approved agency shall provide all information as necessary for the building official to determine that the agency meets the applicable requirements.

1703A.1.1 Independence. An approved agency shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.

1703A.1.2 Equipment. An approved agency shall have adequate equipment to perform required tests. The equipment shall be periodically calibrated.

1703A.1.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and/or inspections.

1703A.2 Written approval. Any material, appliance, equipment, system or method of construction meeting the requirements of this code shall be approved in writing after satisfactory completion of the required tests and submission of required test reports.

1703A.3 Approved record. For any material, appliance, equipment, system or method of construction that has been approved, a record of such approval, including the conditions and limitations of the approval, shall be kept on file in the building official’s office and shall be open to public inspection at appropriate times.

1703A.4 Performance. Specific information consisting of test reports conducted by an approved testing agency in accordance with the appropriate referenced standards, or other such information as necessary, shall be provided for the building official to determine that the material meets the applicable code requirements.

1703A.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.

1703A.4.2 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

1703A.5 Labeling. Where materials or assemblies are required by this code to be labeled, such materials and assemblies shall be labeled by an approved agency in accordance with Section 1703A. Products and materials required to be labeled shall be labeled in accordance with the procedures set forth in Sections 1703A.5.1 through 1703A.5.4.

1703A.5.1 Testing. An approved agency shall test a representative sample of the product or material being labeled to the relevant standard or standards. The approved agency shall maintain a record of the tests performed. The record shall provide sufficient detail to verify compliance with the test standard.

1703A.5.2 Inspection and identification. The approved agency shall periodically perform an inspection, which shall be in-plant if necessary, of the product or material that is to be labeled. The inspection shall verify that the labeled product or material is representative of the product or material tested.

1703A.5.3 Label information. The label shall contain the manufacturer’s or distributor’s identification, model number, serial number or definitive information describing the product or material’s performance characteristics and approved agency’s identification.

1703A.5.4 Method of labeling. Information required to be permanently identified on the product shall be acid etched, sand blasted, ceramic fired, laser etched, embossed or of a type that, once applied, cannot be removed without being destroyed.

1703A.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 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.

1703A.6.1 Follow-up inspection. The applicant shall provide for special inspections of fabricated items in accordance with Section 1704.2.5.
1704A.6.2 Test and inspection records. Copies of necessary test and inspection records shall be filed with the building official.

SECTION 1704A
SPECIAL INSPECTIONS, CONTRACTOR RESPONSIBILITY AND STRUCTURAL OBSERVATIONS

1704A.1 General. This section provides minimum requirements for special inspections, the statement of special inspections, contractor responsibility and structural observations.

1704A.2 Special inspections. Where application is made for construction as described in this section, the owner shall employ one or more approved agencies to perform inspections during construction on the types of work listed under Section 1705A. These inspections are in addition to the inspections identified in Section 110.

Exception: 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.

1704A.2.1 Special inspector qualifications. The special inspector shall provide written documentation to the building official demonstrating his or her competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of special inspection activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

The registered design professional in responsible charge and engineers of record involved in the design of the project are permitted to act as the approved agency and their personnel are permitted to act as the special inspector for the work designed by them, provided they qualify as special inspectors.

1704A.2.2 Access for special inspection. The construction or work for which special inspection is required shall remain accessible and exposed for special inspection purposes until completion of the required special inspections.

1704A.2.3 Statement of special inspections. The applicant shall submit a statement of special inspections prepared by the registered design professional in general responsible charge in accordance with Section 107.1 as a condition for construction documents review. This statement shall be in accordance with Section 1704A.3.

1704A.2.4 Report requirement. The inspector(s) of record and special inspectors shall keep records of inspections. The inspector of record and special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge as required by the California Administrative Code. Reports shall indicate that work inspected was or was not completed in conformance to approved construction documents as required by Title 24 Parts 1 and 2. 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 the building official.

1704A.2.5 Inspection of fabricators. Where fabrication of structural load-bearing members and assemblies is being performed on the premises of a fabricator’s shop, special inspection of the fabricated items shall be required by this section and as required elsewhere in this code.

1704A.2.5.1 Fabrication and implementation procedures. The special inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator’s ability to conform to approved construction documents and referenced standards. The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator’s scope of work.

1704A.3 Statement of special inspections. Where special inspection or testing is required by Section 1705, the registered design professional in responsible charge shall prepare a statement of special inspections in accordance with Section 1704A.3.1 for submittal by the applicant in accordance with Section 1704A.2.3.

Exception: The statement of special inspections is permitted to be prepared by a qualified person approved by the building official for construction not designed by a registered design professional.

1704A.3.1 Content of statement of special inspections. The statement of special inspections shall identify the following:

1. The materials, systems, components and work required to have special inspection or testing by the building official or by the registered design professional responsible for each portion of the work.
2. The type and extent of each special inspection.
3. The type and extent of each test.
4. Additional requirements for special inspection or testing for seismic or wind resistance as specified in Sections 1705A.10, 1705A.11 and 1705A.12.
5. For each type of special inspection, identification as to whether it will be continuous special inspection or periodic special inspection.

1704A.3.2 Seismic requirements in the statement of special inspections. Where Section 1705A.11 or 1705A.12 specifies special inspection, testing or certification for seismic resistance, the statement of special inspections shall identify the equipment/components that require special seismic certification and seismic force-resisting systems that are subject to special inspections.

1704A.3.3 Wind requirements in the statement of special inspections. Where Section 1705A.10 specifies spe-
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1704A.4 Contractor responsibility. Each contractor responsible for the construction of a main wind- or seismic force-resisting system, installation of equipment/components requiring special seismic certification or a wind- or seismic-resisting component listed in the statement of special inspections shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component. The contractor’s statement of responsibility shall contain acknowledgement of awareness of the special requirements contained in the statement of special inspection.

1704A.5 Structural observations. The owner shall employ a registered design professional to perform structural observations as defined in Section 1702A.

Prior to the commencement of observations, the structural observer shall submit to the building official a written statement identifying the frequency and extent of structural observations.

At the conclusion of the work included in the permit, the structural observer shall submit to the building official a written statement that the site visits have been made and identify any reported deficiencies which, to the best of the structural observer’s knowledge, have not been resolved.

SECTION 1705A
REQUIRED VERIFICATION AND INSPECTION

1705A.1 General. Verification and inspection of elements of buildings and structures shall be as required by this section.

1705A.1.1 Special cases. Special inspections shall be required for proposed work that is, in the opinion of the building official, unusual in its nature, such as, but not limited to, the following examples:

1. Construction materials and systems that are alternatives to materials and systems prescribed by this code.
2. Unusual design applications of materials described in this code.
3. Materials and systems required to be installed in accordance with additional manufacturer’s instructions that prescribe requirements not contained in this code or in standards referenced by this code.

1705A.2 Steel construction. The special inspections for steel elements of buildings and structures shall be as required in this section.

Exception: Special inspection of the steel fabrication process shall not be required where the fabricator does not perform any welding, thermal cutting or heating operation of any kind as part of the fabrication process. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator’s ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification, and grade for the main stress-carrying elements are capable of being determined. Mill test reports shall be identifiable to the main stress-carrying elements when required by the approved construction documents.

1705A.2.1 Structural steel. Special inspections and tests of structural steel shall be in accordance with the quality assurance requirements of this section and Chapter 22A.

AISC 360, Chapter N and AISC 341, Chapter J are adopted, except as noted below:

The following provisions of AISC 360, Chapter N are not adopted:

N4., Item 2. (Quality Assurance Inspector Qualifications)
N5., Item 2. (Quality Assurance)
N5., Item 3. (Coordinated Inspection)
N5., Item 4. (Inspection of Welding)
N7 (Approved Fabricators and Erectors)
N8 (Nonconforming Material and Workmanship)

In addition to the quality assurance requirements contained in AISC 360, Section N5, Item 6 (Inspection of High Strength Bolting), the requirements of Table 1705A.2.1 of the California Building Code shall apply.

In addition to the quality assurance requirements contained in AISC 360, Section N6 (Minimum Requirements for Inspection of Composite Construction), the requirements of Table 1705A.2.1 of the California Building Code shall apply.

1705A.2.2 Steel construction. Special inspection for steel construction shall be in accordance with Table 1705A.2.1 and this section.

1705A.2.2.1 Welding. Welding inspection and welding inspector qualification shall be in accordance with this section.

1705A.2.2.1.1 Cold-formed steel. Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks shall be in accordance with AWS D1.3.

1705A.2.2.1.2 Reinforcing steel. Welding inspection and welding inspector qualification for reinforcing steel shall be in accordance with AWS D1.4 and ACI 318.

1705A.2.2.2 Cold-formed steel trusses spanning 60 feet or greater. Where a cold-formed steel truss clear span is 60 feet (18 288 mm) or greater, the special
### TABLE 1705A.2.1
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

<table>
<thead>
<tr>
<th>Verification and Inspection</th>
<th>Continuous</th>
<th>Periodic</th>
<th>Reference Standard</th>
<th>CBC Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Material verification of high-strength bolts, nuts and washers:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Identification markings to conform to ASTM standards specified in the approved construction documents.</td>
<td>—</td>
<td>X</td>
<td>AISC 360, Section A3.3 and applicable ASTM material standards</td>
<td>—</td>
</tr>
<tr>
<td>b. Manufacturer’s certificate of compliance required.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
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<tr>
<td>2. Inspection of high-strength bolting:</td>
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<tr>
<td>a. Snug-tight joints.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>b. Pretensioned and slip-critical joints using turn-off bolt or direct tension indicator methods of installation</td>
<td>—</td>
<td>X</td>
<td>AISC 360, Section M2.5</td>
<td>—</td>
</tr>
<tr>
<td>c. Pretensioned and slip-critical joints using turn-off bolt without matchmarking or calibrated wrench methods of installation.</td>
<td>X</td>
<td>—</td>
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<td>—</td>
</tr>
<tr>
<td>3. Material verification of structural steel and cold-formed steel deck:</td>
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<tr>
<td>a. For structural steel, identification markings to conform to AISC 360.</td>
<td>—</td>
<td>X</td>
<td>AISC 360, Section A3.1 2203A.1</td>
<td>—</td>
</tr>
<tr>
<td>b. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents.</td>
<td>—</td>
<td>X</td>
<td>Applicable ASTM material standards</td>
<td>—</td>
</tr>
<tr>
<td>c. Manufacturer’s certified test reports.</td>
<td>—</td>
<td>X</td>
<td>—</td>
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<tr>
<td>4. Material verification of weld filler materials:</td>
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</tr>
<tr>
<td>a. Identification markings to conform to AWS specification in the approved construction documents.</td>
<td>—</td>
<td>X</td>
<td>AISC 360, Section A3.5 and applicable AWS A5 documents</td>
<td>—</td>
</tr>
<tr>
<td>b. Manufacturer’s certificate of compliance required.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
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<tr>
<td>5. Inspection of welding:</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>a. Structural steel and cold-formed steel deck:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Complete and partial joint penetration groove welds</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>1705A.2.2</td>
</tr>
<tr>
<td>2. Multipass fillet welds.</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>1705A.2.2</td>
</tr>
<tr>
<td>3. Single-pass fillet welds &gt; 5/16&quot;</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>1705A.2.2</td>
</tr>
<tr>
<td>4. Plug and slot welds.</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>1705A.2.2</td>
</tr>
<tr>
<td>5. Single-pass fillet welds ≤ 5/16&quot;</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>1705A.2.2</td>
</tr>
<tr>
<td>6. Floor and roof deck welds.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>1705A.2.2</td>
</tr>
<tr>
<td>b. Reinforcing steel:</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1. Verification of weldability of reinforcing steel other than ASTM A 706.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.</td>
<td>X</td>
<td>—</td>
<td>AWS D1.4, ACI 318: Section 3.5.2</td>
<td>—</td>
</tr>
<tr>
<td>3. Shear reinforcement.</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4. Other reinforcing steel.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6. Inspection of steel frame joint details for compliance:</td>
<td></td>
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<tr>
<td>a. Details such as bracing and stiffening.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>b. Member locations.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>1705A.2.2</td>
</tr>
<tr>
<td>c. Application of joint details at each connection.</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.
a. Where applicable, see also Section 1705A.11. Special inspections for seismic resistance.
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inspector shall verify that the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

1705A.2.2.3 Steel joist and joist girder inspection. Special inspection is required during the manufacture and welding of steel joists or joist girders. The special inspector shall verify that proper quality control procedures and tests have been employed for all materials and the manufacturing process, and shall perform visual inspection of the finished product. The special inspector shall place a distinguishing mark, and/or tag with this distinguishing mark, on each inspected joist or joist girder. This mark or tag shall remain on the joist or joist girder throughout the job site receiving and erection process.

1705A.2.2.4 Light-framed steel truss inspection. The manufacture of cold-formed light framed steel trusses shall be continuously inspected by a qualified special inspector approved by the enforcement agency. The special inspector shall verify conformance of materials and manufacture with approved plans and specifications. The special inspector shall place a distinguishing mark, and/or tag with this distinguishing mark, on each inspected truss. This mark or tag shall remain on the truss throughout the job site receiving and erection process.

1705A.2.2.5 Inspection of structural welding. Inspection of all shop and field welding operations shall be made by a qualified welding inspector approved by the enforcement agency. The minimum requirements for a qualified welding inspector shall be as those for an AWS certified welding inspector (CWI), as defined in the provisions of the AWS QC1. All welding inspectors shall be as approved by the enforcement agency.

The welding inspector shall make a systematic daily record of all welds. In addition to other required records, this record shall include:

1. Identification marks of welders.
2. List of defective welds.
3. Manner of correction of defects.

The welding inspector shall check the material, details of construction and procedure, as well as workmanship of the welds. The inspector shall verify that the installation of end-welded stud shear connectors is in accordance with the requirements of AWS D1.1 and the approved plans and specifications. The inspector shall furnish the architect, structural engineer, and the enforcement agency with a verified report that the welding is proper and has been done in conformity with AWS D1.1, D1.8, and the approved construction documents.

1705A.3 Concrete construction. The special inspections and verifications for concrete construction shall be as required by this section and Table 1705A.3.

Exception: Special inspections shall not be required for concrete patios, driveways and sidewalks, on grade.

1705A.3.1 Materials. In the absence of sufficient data or documentation providing evidence of conformance to quality standards for materials in Chapter 3 of ACI 318, the building official shall require testing of materials in accordance with the appropriate standards and criteria for the material in Chapter 3 of ACI 318. Weldability of reinforcement, except that which conforms to ASTM A 706, shall be determined in accordance with the requirements of Section 3.5.2 of ACI 318.

1705A.3.2 Batch plant inspection. Except as provided under Section 1705A.3.3, the quality and quantity of materials used in transit-mixed concrete and in batched aggregates shall be continuously inspected by an approved special inspector at the location where materials are measured.

1705A.3.3 Waiver of continuous batch plant inspection. Continuous batch plant inspection may be waived by the registered design professional, subject to approval by the enforcement agency under either of the following conditions:

1. The concrete plant complies fully with the requirements of ASTM C 94, Sections 8 and 9, and has a current certificate from the National Ready Mixed Concrete Association or another agency acceptable to the enforcement agency. The certification shall indicate that the plant has automatic batching and recording capabilities.

2. For single-story light-framed buildings and isolated foundations supporting equipment only, where the specified compressive strength f'c of the concrete delivered to the jobsite is 3,500 psi (24.13 MPa) and where the f'c used in design is not greater than 3,000 psi (20.68 MPa).

When continuous batch plant inspection is waived, the following periodic inspection requirements shall apply and shall be described in the construction documents:

1. Qualified technician of the testing laboratory shall check the first batch at the start of the day.

2. Licensed weighmaster to positively identify materials as to quantity and certify to each load by a batch ticket.

3. Batch tickets, including material quantities and weights shall accompany the load, shall be transmitted to the inspector of record by a truck driver with load identified thereon. The load shall not be placed without a batch ticket identifying the mix. The inspector will keep a
TABLE 1705A.3
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

<table>
<thead>
<tr>
<th>VERIFICATION AND INSPECTION</th>
<th>CONTINUOUS</th>
<th>PERIODIC</th>
<th>REFERENCED STANDARD</th>
<th>IBC REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inspection of reinforcing steel, including prestressing tendons, and placement.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: 3.5, 7.1-7.7</td>
<td>1910.4</td>
</tr>
<tr>
<td>2. Inspection of reinforcing steel welding in accordance with Table 1705.2.2, Item 2b.</td>
<td>—</td>
<td>—</td>
<td>AWS D1.4, ACI 318: 3.5.2</td>
<td>—</td>
</tr>
<tr>
<td>3. Inspection of anchors cast in concrete where allowable loads have been increased or where strength design is used.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: 8.1.3, 21.2.8</td>
<td>1908.5, 1909.1</td>
</tr>
<tr>
<td>4. Inspection of anchors post-installed in hardened concrete members.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: 3.8.6, 8.1.3, 21.2.8</td>
<td>1909.1</td>
</tr>
<tr>
<td>5. Verifying use of required design mix.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: Ch. 4, 5.2-5.4</td>
<td>1904.2, 1910.2, 1910.3</td>
</tr>
<tr>
<td>6. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.</td>
<td>X</td>
<td>—</td>
<td>ASTM C 172, ASTM C 31, ACI 318: 5.6, 5.8</td>
<td>1910.10</td>
</tr>
<tr>
<td>7. Inspection of concrete and shotcrete placement for proper application techniques.</td>
<td>X</td>
<td>—</td>
<td>ACI 318: 5.9, 5.10</td>
<td>1910.6, 1910.7, 1910.8</td>
</tr>
<tr>
<td>8. Inspection for maintenance of specified curing temperature and techniques.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: 5.11-5.13</td>
<td>1910.9</td>
</tr>
<tr>
<td>10. Erection of precast concrete members.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: Ch. 16</td>
<td>—</td>
</tr>
<tr>
<td>11. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: 6.2</td>
<td>—</td>
</tr>
<tr>
<td>12. Inspect formwork for shape, location and dimensions of the concrete member being formed.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: 6.1.1</td>
<td>—</td>
</tr>
<tr>
<td>13. Inspection of adhesive anchors in horizontal and upwardly inclined positions.</td>
<td>—</td>
<td>X</td>
<td>ACI 318: D.9.2.2</td>
<td>—</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

a. Where applicable, see also Section 1705.11, Special inspections for seismic resistance.
b. Specific requirements for special inspection shall be included in the research report for the anchor issued by an approved source in accordance with ACI 355.2 or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to the commencement of the work.
c. Installation of all adhesive anchors in horizontal and upwardly inclined positions shall be performed by an ACI/CRSI certified adhesive anchor installer.

daily record of placements, identifying each truck, its load, and time of receipt, and approximate location of deposit in the structure and will transmit a copy of the daily record to the enforcement agency.

1705A.3.4 Inspection of prestressed concrete.

1. In addition to the general inspection required for concrete work, all plant fabrication of prestressed concrete members or tensioning of posttensioned members constructed at the site shall be continuously inspected by an inspector specially approved for this purpose by the enforcement agency.

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2. The prestressed concrete plant fabrication inspector shall check the materials, equipment, tensioning procedure and construction of the prestressed members and prepare daily written reports. The inspector shall make a verified report identifying the members by mark and shall include such pertinent data as lot numbers of tendons used, tendon jacking forces, age and strength of concrete at time of tendon release and such other information that may be required.

3. The inspector of prestressed members posttensioned at the site shall check the condition of the prestressing tendons, anchorage assemblies and concrete in the area of the anchorage, the tensioning equipment and the tensioning procedure and prepare daily written reports. The inspector shall make a verified report of the prestressing operation identifying the members or tendons by mark and including such pertinent data as the initial cable slack, net elongation of tendons, jacking force developed, and such other information as may be required.

4. The verified reports of construction shall show that of the inspector’s own personal knowledge, the work covered by the report has been performed and materials used and installed in every material respect in compliance with the duly approved plans and specifications for plant fabrication inspection. The verified report shall be accompanied by test reports required for materials used. For site posttensioning inspections the verified report shall be accompanied by copies of calibration charts, certified by an approved testing laboratory, showing the relationship between gage readings and force applied by the jacks used in the prestressing procedure.

1705A.3.5 Concrete preplacement inspection. Concrete shall not be placed until the forms and reinforcement have been inspected, all preparations for the placement have been completed, and the preparations have been checked by the inspector of record.

1705A.3.6 Placing record. A record shall be kept on the site of the time and date of placing the concrete in each portion of the structure. Such record shall be kept until the completion of the structure and shall be open to the inspection of the enforcement agency.

1705A.4 Masonry construction. Masonry construction shall be inspected and verified in accordance with TMS 402/ACI 530/ASCE 5 and TMS 602/ACI 530.1/ASCE 6 quality assurance program, as set forth in Table 1.19.3, Level C requirements. Inspection and testing of post-installed anchors in masonry shall be required in accordance with requirements for concrete in Chapters 17A and 19A.

1705A.4.1 Glass unit masonry and masonry veneer in Risk Categories II, III, or IV. The minimum special inspection program for glass unit masonry or masonry veneer designed by Section 2110A or Chapter 14, respectively, in structures classified as Risk Categories II, III, or IV, in accordance with Section 1604A.5, shall comply with TMS 402/ACI 530/ASCE 5 Level B Quality Assurance.

1705A.4.2 Vertical masonry foundation elements. Special inspection shall be performed in accordance with Section 1705.4 for vertical masonry foundation elements.

1705A.5 Wood construction. Special inspections of the fabrication process of prefabricated wood structural elements and assemblies shall be in accordance with Section 1704A.2.5 except as modified in this section. Special inspections of site-built assemblies shall be in accordance with this section.

1705A.5.1 High-load diaphragms. High-load diaphragms designed in accordance with Section 2306.2 shall be installed with special inspections as indicated in Section 1704A.2. The special inspector shall inspect the wood structural panel sheathing to ascertain whether it is of the grade and thickness shown on the approved building plans. Additionally, the special inspector must verify the nominal size of framing members at adjoining panel edges, the nail or staple diameter and length, the number of fastener lines and that the spacing between fasteners in each line and at edge margins agrees with the approved building plans.

1705A.5.2 Metal-plate-connected wood trusses spanning 60 feet or greater. Where a truss clear span is 60 feet (18 288 mm) or greater, the special inspector shall verify that the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

1705A.5.3 Wood structural elements and assemblies. Special inspection of wood structural elements and assemblies is required, as specified in this section, to ensure conformance with approved drawings and specifications, and applicable standards.

The special inspector shall furnish a verified report to the design professional in general responsible charge of construction observation, the structural engineer, and the enforcement agency, in accordance with the California Administrative Code and this chapter. The verified report shall list all inspected members or trusses, and shall indicate whether or not the inspected members or trusses conform with applicable standards and the approved drawings and specifications. Any nonconforming items shall be indicated on the verified report.

1705A.5.4 Structural glued laminated timber. Manufacture of all structural glued laminated timber shall be continuously inspected by a qualified special inspector approved by the enforcement agency.

The special inspector shall verify that proper quality control procedures and tests have been employed for all materials and the manufacturing process, and shall perform visual inspection of the finished product. Each inspected member shall be stamped by the special inspector with an identification mark.

Exception: Special Inspection is not required for noncustom members of 5 1/4 inch maximum width and 18 inch maximum depth, and with a maximum clear span.
of 32 feet, manufactured and marked in accordance with ANSI/AITC A 190.1 Section 6.1.1 for noncustom members.

1705A.5.5 Manufactured open web trusses. The manufacture of open web trusses shall be continuously inspected by a qualified special inspector approved by the enforcement agency.

The special inspector shall verify that proper quality control procedures and tests have been employed for all materials and the manufacturing process, and shall perform visual inspection of the finished product. Each inspected truss shall be stamped with an identification mark by the special inspector.

1705A.5.6 Timber connectors. The installation of all split ring and shear plate timber connectors, and timber rivets shall be continuously inspected by a qualified inspector approved by the enforcement agency. The inspector shall furnish the architect, structural engineer and the enforcement agency with a report duly verified by him that the materials, timber connectors and workmanship conform to the approved plans and specifications.

1705A.6 Soils. Special inspections for existing site soil conditions, fill placement and load-bearing requirements shall be as required by this section and Table 1705A.6. The approved geotechnical report, and the construction documents prepared by the registered design professionals shall be used to determine compliance. During fill placement, the special inspector shall determine that proper materials and procedures are used in accordance with the provisions of the approved geotechnical report.

Exception: Where Section 1803A does not require reporting of materials and procedures for fill placement, the special inspector shall verify that the in-place dry density of the compacted fill is not less than 90 percent of the maximum dry density at optimum moisture content determined in accordance with ASTM D 1557.

1705A.6.1 Soil fill. All fills used to support the foundations of any building or structure shall be continuously inspected by the geotechnical engineer or his or her qualified representative. It shall be the responsibility of the geotechnical engineer to verify that fills meet the requirements of the approved construction documents and to coordinate all fill inspection and testing during the construction involving such fills.

The duties of the geotechnical engineer or his or her qualified representative shall include, but need not be limited to, the inspection of cleared areas and benches prepared to receive fill; inspection of the removal of all unsuitable soils and other materials; the approval of soils to be used as fill material; the inspection of placement and compaction of fill materials; the testing of the completed fills; the inspection or review of geotechnical drainage devices, buttress fills or other similar protective measures in accordance with the approved construction documents.

A verified report shall be submitted by the geotechnical engineer as required by the California Administrative Code. The report shall indicate that all tests and inspection required by the approved construction documents were completed and that the tested materials and/or inspected work meet the requirements of the approved construction documents.

1705A.7 Driven deep foundations. Special inspections shall be performed during installation and testing of driven deep foundation elements as required by Table 1705A.7. The approved instruction documents prepared by the registered design professionals, shall be used to determine compliance.

1705A.7.1 Driven deep foundations observation. The installation of driven deep foundations shall be continuously observed by a qualified representative of the geotechnical engineer responsible for that portion of the project.

The representative of the geotechnical engineer shall make a report of the deep foundation pile-driving operation giving such pertinent data as the physical characteristics of the deep foundation pile-driving equipment, identifying marks for each deep foundation pile, the total depth of embedment for each deep foundation; and when the allowable deep foundation pile loads are determined by a dynamic load formula, the design formula used, and the permanent penetration under the last 10 blows. One copy of the report shall be sent to the enforcement agency.

1705A.8 Cast-in-place deep foundations. Special inspections shall be performed during installation and testing of cast-in-place deep foundation elements as required by Table 1705.8. The approved geotechnical report, and the construction documents prepared by the registered design professionals, shall be used to determine compliance.

<table>
<thead>
<tr>
<th>TABLE 1705A.6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REQUIRED VERIFICATION AND INSPECTION OF SOILS</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VERIFICATION AND INSPECTION TASK</th>
<th>CONTINUOUS DURING TASK LISTED</th>
<th>PERIODICALLY DURING TASK LISTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.</td>
<td>—</td>
<td>X</td>
</tr>
<tr>
<td>2. Verify excavations are extended to proper depth and have reached proper material.</td>
<td>—</td>
<td>X</td>
</tr>
<tr>
<td>3. Perform classification and testing of compacted fill materials.</td>
<td>—</td>
<td>X</td>
</tr>
<tr>
<td>4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td>5. Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly.</td>
<td>—</td>
<td>X</td>
</tr>
</tbody>
</table>

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**TABLE 1705A.7**
REQUIRED VERIFICATION AND INSPECTION OF DRIVEN DEEP FOUNDATION ELEMENTS

<table>
<thead>
<tr>
<th>VERIFICATION AND INSPECTION TASK</th>
<th>CONTINUOUS DURING TASK LISTED</th>
<th>PERIODICALLY DURING TASK LISTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Verify element materials, sizes and lengths comply with the requirements.</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td>2. Determine capacities of test elements and conduct additional load tests, as required.</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td>3. Observe driving operations and maintain complete and accurate records for each element.</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td>4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element.</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td>5. For steel elements, perform additional inspections in accordance with Section 1705A.2.</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6. For concrete elements and concrete-filled elements, perform additional inspections in accordance with Section 1705A.3.</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**TABLE 1705.8**
REQUIRED VERIFICATION AND INSPECTION OF CAST-IN-PLACE DEEP FOUNDATION ELEMENTS

<table>
<thead>
<tr>
<th>VERIFICATION AND INSPECTION TASK</th>
<th>CONTINUOUS DURING TASK LISTED</th>
<th>PERIODICALLY DURING TASK LISTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Observe drilling operations and maintain complete and accurate records for each element.</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td>2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes.</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td>3. For concrete elements, perform additional inspections in accordance with Section 1705.3.</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

1705A.9 Helical pile foundations. Special inspections shall be performed continuously during installation of helical pile foundations. The information recorded shall include installation equipment used, pile dimensions, tip elevations, final depth, final installation torque and other pertinent installation data as required by the registered design professional in responsible charge. The approved geotechnical report and the construction documents prepared by the registered design professional shall be used to determine compliance.

**TABLE 1705A.10** Special inspections for wind resistance. Special inspections itemized in Sections 1705A.10.1 through 1705A.10.3, unless exempted by the exceptions to Section 1704A.2, are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where $V_{wor}$ as determined in accordance with Section 1609.3.1 is 120 miles per hour (52.8 m/sec) or greater.
2. In wind Exposure Category C or D, where $V_{wor}$ as determined in accordance with Section 1609.3.1 is 110 mph (49 m/sec) or greater.

1705A.10.1 Structural wood. Continuous special inspection is required during field gluing operations of elements of the main windforce-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.

1705A.10.2 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the main windforce-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

1705A.10.3 Wind-resisting components. Periodic special inspection is required for the following systems and components:

1. Roof cladding.
2. Wall cladding.
1705A.11 Special inspections for seismic resistance. Special inspections itemized in Sections 1705A.11.1 through 1705A.11.8, unless exempted by the exceptions of Section 1704A.2, are required for the following:

1. The seismic force-resisting systems in structures assigned to Seismic Design Category D, E or F in accordance with Sections 1705A.11.1 through 1705A.11.3, as applicable.

2. Equipment/components requiring special seismic certification assigned to Seismic Design Category D, E or F in accordance with Section 1705A.11.4.

3. Architectural, mechanical and electrical components in accordance with Sections 1705A.11.5 and 1705A.11.6.

4. Storage racks in structures assigned to Seismic Design Category D, E or F in accordance with Section 1705A.11.7.

5. Seismic isolation and damping systems in accordance with Section 1705A.11.8.

1705A.11.1 Structural steel. Special inspection for structural steel shall be in accordance with the quality assurance requirements of AISC 341 as modified by Section 1705A.2.1 of this code.

1705A.11.2 Structural wood. Continuous special inspection is required during field gluing operations of elements of the seismic force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the seismic force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.

1705A.11.3 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the seismic force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the seismic force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

1705A.11.4 Special inspection for special seismic certification. The special inspector shall examine equipment and components requiring special seismic certification in accordance with Section 1705A.12.4 and verify that the label, anchorage or mounting conforms to the certificate of compliance.

1705A.11.5 Architectural components. Periodic special inspection is required during the erection and fastening of exterior cladding, interior and exterior nonbearing walls, ceilings, and interior and exterior veneer in structures assigned to Seismic Design Category D, E or F.

1705A.11.5.1 Access floors. Periodic special inspection is required for the anchorage of access floors in structures assigned to Seismic Design Category D, E or F.

1705A.11.6 Mechanical and electrical components. Special inspection for mechanical and electrical components shall be as follows:

1. Periodic special inspection is required during the anchorage of electrical equipment for emergency or standby power systems in structures assigned to Seismic Design Category D, E or F;

2. Periodic special inspection is required during the anchorage of other electrical equipment in structures assigned to Seismic Design Category D, E or F;

3. Periodic special inspection is required during the installation and anchorage of piping systems designed to carry hazardous materials and their associated mechanical units in structures assigned to Seismic Design Category D, E or F;

4. Periodic special inspection is required during the installation and anchorage of ductwork designed to carry hazardous materials in structures assigned to Seismic Design Category D, E or F; and

5. Periodic special inspection is required during the installation and anchorage of vibration isolation systems in structures assigned to Seismic Design Category D, E or F where the construction documents meet the requirements of Sections 1705A.11.7, as applicable.

1705A.11.7 Storage racks. Periodic special inspection is required during the anchorage of storage racks 8 feet (2438 mm) or greater in height in structures assigned to Seismic Design Category D, E or F.

1705A.11.8 Seismic isolation and damping systems. Periodic special inspection shall be provided for seismic isolation systems during the fabrication and installation of isolator units and energy dissipation devices. Continuous special inspection is required for prototype and production testing of isolator units and damping devices.

1705A.12 Testing and certification for seismic resistance. The testing and certification specified in Sections 1705A.12.1 through 1705A.12.4, unless exempted from special inspections by the exceptions of Section 1704A.2 are required as follows:

1. The seismic force-resisting systems in structures assigned to Seismic Design Category D, E or F shall meet the requirements of Sections 1705A.12.1 and 1705A.12.2, as applicable.

2. Equipment and components in structures assigned to Seismic Design Category D, E or F shall comply with the special seismic certification requirements of Section 1705A.12.4.

3. Architectural, mechanical and electrical components in structures assigned to Seismic Design Category D, E or F where the requirements of ASCE 7 Section 13.2.1, Item 2, are met by submittal of manufacturer’s certification, shall comply with Section 1705A.12.3.

4. The seismic isolation system in seismically isolated structures and damping devices, shall meet the testing requirements of Section 1705A.12.5.

1705A.12.1 Concrete reinforcement. Where reinforcement complying with ASTM A 615 is used to resist earth-
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quake-induced flexural and axial forces in special moment frames, special structural walls and coupling beams connecting special structural walls, in structures assigned to Seismic Design Category B, C, D, E or F, the reinforcement shall comply with Section 21.1.5.2 of ACI 318. Certified mill test reports shall be provided for each shipment of such reinforcement. Where reinforcement complying with ASTM A615 is to be welded, chemical tests shall be performed to determine weldability in accordance with Section 3.5.2 of ACI 318.

1705A.12.2 Structural steel. Testing for structural steel shall be in accordance with the quality assurance requirements of AISC 341.

Exception: Testing for structural steel in structures assigned to Seismic Design Category C that are not specifically detailed for seismic resistance, with a response modification coefficient, R, of 3 or less, excluding cantilever column systems.

1705A.12.3 Manufacturer’s certification of nonstructural components. The registered design professional shall specify on the construction documents the requirements for manufacturer’s certification by analysis, testing or experience data for nonstructural components, in accordance with Section 13.2.1, Item 2 of ASCE 7, where such certification is required by Section 1705A.12.

Seismic sway braces satisfying requirements of FM 1950 shall be deemed to satisfy the requirements of this Section.

1705A.12.4 Special seismic certification. [OSHPD 1 & 4]

The registered design professional shall specify on the construction documents the requirements for special seismic certification by analysis, testing or experience data for equipment and components listed in Section 1705A.12.4.1.

Active or energized equipment and components shall be certified exclusively on the basis of approved shake table testing in accordance with ICC-ES AC 156.

Minimum of two equipment/components shall be tested for a product line with similar structural configuration. Where a range of products are tested, the two equipment/components shall be either the largest and smallest, or approved alternative representative equipment/components.

Exception: When a single product (and not a product line with more than one product with variations) is certified and manufacturing process is ISO 9001 certified, one test shall be permitted.

All tests shall be performed by an independent laboratory having accreditation to the International Standards Organization (ISO) accreditation standard 17025 or shall be under the responsible charge of an independent California licensed engineer. Test reports shall be reviewed and accepted by an independent California licensed structural engineer.

For a multicomponent system, where active or energized components are certified by tests, connecting elements, attachments, and supports can be justified by supporting analysis.

1705A.12.4.1 Special seismic certification shall be required for the following systems, equipment, and components:

1. Emergency and standby power systems.
2. Elevator equipment (excluding elevator cabs).
3. Components with hazardous contents.
4. Exhaust and smoke control fans.
5. Switchgear and switchboards.
7. Radiography and fluoroscopy systems in fluoroscopy rooms.
8. CT (Computerized Tomography) systems.
9. Air conditioning units.
10. Air handling units.
11. Chillers, evaporators, and condensers.
12. Cooling towers.
13. Transformers.
15. UPS and batteries.
17. Control panels.
18. Power isolation and correction systems.
19. Motorized surgical lighting systems.
20. Motorized operating table systems.

Exceptions:

1. Equipment and components weighing not more than 20 lbs. supported directly on structures (and not mounted on other equipment or components) with supports and attachments in accordance with this code.
2. Movable (mobile) and temporary equipment/components that are not anchored to structure or permanently attached to the building utility services such as electricity, gas or water. For the purposes of this requirement, “permanently attached” shall include all electrical connections except plugs for duplex receptacles.
3. Pipes, ducts, conduits and cable trays, excluding in-line equipment and components.
5. Electric motors and pumps not more than 10 hp rigidly supported directly on structures (and not mounted on other equipment or components) with supports and attachments in accordance with this code.
1705A.12.5 Seismic isolation and damping systems. Seismic isolation and damping systems shall be tested in accordance with Sections 17.8 and 18.9 of ASCE 7.

Prototype and production testing and associated acceptance criteria for isolator units and damping devices shall be subject to preapproval by the building official. Testing exemption for similar units shall require approval by the building official.

1705A.13 Sprayed fire-resistant materials. Special inspections for sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be in accordance with Sections 1705.13.1 through 1705.13.6. Special inspections shall be based on the fire-resistance design as designated in the approved construction documents. The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. Special inspections shall be performed after the rough installation of electrical, automatic sprinkler, mechanical and plumbing systems and suspension systems for ceilings, where applicable.

1705A.13.1 Physical and visual tests. The special inspections shall include the following tests and observations to demonstrate compliance with the listing and the fire-resistance rating:

1. Condition of substrates.
2. Thickness of application.
3. Density in pounds per cubic foot (kg/m³).
5. Condition of finished application.

1705A.13.2 Structural member surface conditions. The surfaces shall be prepared in accordance with the approved fire-resistance design and the written instructions of approved manufacturers. The prepared surface of structural members to be sprayed shall be inspected before the application of the sprayed fire-resistant material.

1705A.13.3 Application. The substrate shall have a minimum ambient temperature before and after application as specified in the written instructions of approved manufacturers. The area for application shall be ventilated during and after application as required by the written instructions of approved manufacturers.

1705A.13.4 Thickness. No more than 10 percent of the thickness measurements of the sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be less than the thickness required by the approved fire-resistance design, but in no case less than the minimum allowable thickness required by Section 1705A.13.4.1.

1705A.13.4.1 Minimum allowable thickness. For design thicknesses 1 inch (25 mm) or greater, the minimum allowable individual thickness shall be the design thickness minus \(|\frac{1}{4}\) inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent. Thickness shall be determined in accordance with ASTM E 605. Samples of the sprayed fire-resistant materials shall be selected in accordance with Sections 1705A.13.4.2 and 1705A.13.4.3.

1705A.13.4.2 Floor, roof and wall assemblies. The thickness of the sprayed fire-resistant material applied to floor, roof and wall assemblies shall be determined in accordance with ASTM E 605, making not less than four measurements for each 1,000 square feet (93 m²) of the sprayed area, or portion thereof, in each story.

1705A.13.4.3 Cellular decks. Thickness measurements shall be selected from a square area, 12 inches by 12 inches (305 mm by 305 mm) in size. A minimum of four measurements shall be made, located symmetrically within the square area.

1705A.13.4.4 Fluted decks. Thickness measurements shall be selected from a square area, 12 inches by 12 inches (305 mm by 305 mm) in size. A minimum of four measurements shall be made, located symmetrically within the square area, including one each of the following: valley, crest and sides. The average of the measurements shall be reported.

1705A.13.4.5 Structural members. The thickness of the sprayed fire-resistant material applied to structural members shall be determined in accordance with ASTM E 605. Thickness testing shall be performed on not less than 25 percent of the structural members on each floor.

1705A.13.4.6 Beams and girders. At beams and girders thickness measurements shall be made at nine locations around the beam or girder at each end of a 12-inch (305 mm) length.

1705A.13.4.7 Joists and trusses. At joists and trusses, thickness measurements shall be made at seven locations around the joist or truss at each end of a 12-inch (305 mm) length.

1705A.13.4.8 Wide-flanged columns. At wide-flanged columns, thickness measurements shall be made at 12 locations around the column at each end of a 12-inch (305 mm) length.

1705A.13.4.9 Hollow structural section and pipe columns. At hollow structural section and pipe columns, thickness measurements shall be made at a minimum of four locations around the column at each end of a 12-inch (305 mm) length.

1705A.13.5 Density. The density of the sprayed fire-resistant material shall not be less than the density specified in the approved fire-resistance design. Density of the sprayed fire-resistant material shall be determined in accordance with ASTM E 605. The test samples for determining the density of the sprayed fire-resistant materials shall be selected as follows:

1. From each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m²) or portion thereof of the sprayed area in each story.

2. From beams, girders, trusses and columns at the rate of not less than one sample for each type of struc-
tural member for each 2,500 square feet (232 m²) of floor area or portion thereof in each story.

1705A.13.6 Bond strength. The cohesive/adhesive bond strength of the cured sprayed fire-resistant material applied to floor, roof and wall assemblies and structural members shall not be less than 150 pounds per square foot (psf) (7.18 kN/m²). The cohesive/adhesive bond strength shall be determined in accordance with the field test specified in ASTM E 736 by testing in-place samples of the sprayed fire-resistant material selected in accordance with Sections 1705A.13.6.1 through 1705A.13.6.3.

1705A.13.6.1 Floor, roof and wall assemblies. The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from each floor, roof and wall assembly at the rate of not more than one sample for every 2,500 square feet (232 m²) of the sprayed area, or portion thereof, in each story.

1705A.13.6.2 Structural members. The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from beams, girders, trusses, columns and other structural members at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m²) of floor area or portion thereof in each story.

1705A.13.6.3 Primer, paint and encapsulant bond tests. Bond tests to qualify a primer, paint or encapsulant shall be conducted when the sprayed fire-resistant material is applied to a primed, painted or encapsulated surface for which acceptable bond-strength performance between these coatings and the fire-resistant material has not been determined. A bonding agent approved by the SFRM manufacturer shall be applied to a primed, painted or encapsulated surface where the bond strengths are found to be less than required values.

1705A.14 Mastic and intumescent fire-resistant coatings. Special inspections for mastic and intumescent fire-resistant coatings applied to structural elements and decks shall be in accordance with AWCI 12-B. Special inspections shall be based on the fire-resistance design as designated in the approved construction documents.

1705A.15 Exterior insulation and finish systems (EIFS). Special inspections shall be required for all EIFS applications.

Exceptions:

1. Special inspections shall not be required for EIFS applications installed over a water-resistive barrier with a means of draining moisture to the exterior.
2. Special inspections shall not be required for EIFS applications installed over masonry or concrete walls.

1705A.15.1 Water-resistive barrier coating. A water-resistive barrier coating complying with ASTM E 2570 requires special inspection of the water-resistive barrier coating when installed over a sheathing substrate.

1705A.16 Fire-resistant penetrations and joints. In high-rise buildings or in buildings assigned to Risk Category III or IV in accordance with Section 1604A.5, special inspections for through-penetrations, membrane penetration firestops, fire-resistant joint systems, and perimeter fire barrier systems that are tested and listed in accordance with Sections 714A.3.1.2, 714A.4.1.2, 715A.3 and 715A.4 shall be in accordance with Section 1705A.16.1 or 1705A.16.2.

1705A.16.1 Penetration firestops. Inspections of penetration firestop systems that are tested and listed in accordance with Sections 714A.3.1.2 and 714A.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1705A.16.2 Fire-resistant joint systems. Inspection of fire-resistant joint systems that are tested and listed in accordance with Sections 715A.3 and 715A.4 shall be conducted by an approved inspection agency in accordance with ASTM E 2393.

1705A.17 Special inspection for smoke control. Smoke control systems shall be tested by a special inspector.

1705A.17.1 Testing scope. The test scope shall be as follows:

1. During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.
2. Prior to occupancy and after sufficient completion for the purposes of pressure difference testing, flow measurements and detection and control verification.

1705A.17.2 Qualifications. Special inspection agencies for smoke control shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.

1705A.18 Shotcrete. All shotcrete work shall be continuously inspected during placing by an inspector specially approved for that purpose by the enforcement agency. The special shotcrete inspector shall check the materials, placing equipment, details of construction and construction procedure. The inspector shall furnish a verified report that of his or her own personal knowledge the work covered by the report has been performed and materials used and installed in every material respect in compliance with the duly approved plans and specifications.

1705A.18.1 Visual examination for structural soundness of in-place shotcrete. Completed shotcrete work shall be checked visually for reinforcing bar embedment, voids, rock pockets, sand streaks and similar deficiencies by examining a minimum of three 3-inch (76 mm) cores taken from three areas chosen by the design engineer which represent the worst congestion of reinforcing bars occurring in the project. Extra reinforcing bars may be added to noncongested areas and cores may be taken from these areas. The cores shall be examined by the special inspector and a report submitted to the enforcement agency prior to final approval of the shotcrete.
**Exception:** Shotcrete work fully supported on earth, minor repairs, and when, in the opinion of the enforcement agency, no special hazard exists.

**SECTION 1706A  DESIGN STRENGTHS OF MATERIALS**

1706A.1 Conformance to standards. The design strengths and permissible stresses of any structural material that are identified by a manufacturer’s designation as to manufacture and grade by mill tests, or the strength and stress grade is otherwise confirmed to the satisfaction of the building official, shall conform to the specifications and methods of design of accepted engineering practice or the approved rules in the absence of applicable standards.

1706A.2 New materials. For materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests as provided for in Section 1707A.

**SECTION 1707A  ALTERNATIVE TEST PROCEDURE**

1707A.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.

**SECTION 1708A  TEST SAFE LOAD**

1708A.1 Where required. Where proposed construction is not capable of being designed by approved engineering analysis, or where proposed construction design method does not comply with the applicable material design standard, the system of construction or the structural unit and the connections shall be subjected to the tests prescribed in Section 1710A. The building official shall accept certified reports of such tests conducted by an approved testing agency, provided that such tests meet the requirements of this code and approved procedures.

**SECTION 1709A  IN-SITU LOAD TESTS**

1709A.1 General. Whenever there is a reasonable doubt as to the stability or load-bearing capacity of a completed building, structure or portion thereof for the expected loads, an engineering assessment shall be required. The engineering assessment shall involve either a structural analysis or an in-situ load test, or both. The structural analysis shall be based on actual material properties and other as-built conditions that affect stability or load-bearing capacity, and shall be conducted in accordance with the applicable design standard. If the structural assessment determines that the load-bearing capacity is less than that required by the code, load tests shall be conducted in accordance with Section 1709A.2. If the building, structure or portion thereof is found to have inadequate stability or load-bearing capacity for the expected loads, modifications to ensure structural adequacy or the removal of the inadequate construction shall be required.

1709A.2 Test standards. Structural components and assemblies shall be tested in accordance with the appropriate referenced standards. In the absence of a standard that contains an applicable load test procedure, the test procedure shall be developed by a registered design professional and approved. The test procedure shall simulate loads and conditions of application that the completed structure or portion thereof will be subjected to in normal use.

1709A.3 In-situ load tests. In-situ load tests shall be conducted in accordance with Section 1709A.3.1 or 1709A.3.2 and shall be supervised by a registered design professional. The test shall simulate the applicable loading conditions specified in Chapter 16A as necessary to address the concerns regarding structural stability of the building, structure or portion thereof.

1709A.3.1 Load test procedure specified. Where a referenced standard contains an applicable load test procedure and acceptance criteria, the test procedure and acceptance criteria in the standard shall apply. In the absence of specific load factors or acceptance criteria, the load factors and acceptance criteria in Section 1709A.3.2 shall apply.

1709A.3.2 Load test procedure not specified. In the absence of applicable load test procedures contained within a standard referenced by this code or acceptance criteria for a specific material or method of construction, such existing structure shall be subjected to a test procedure developed by a registered design professional that simulates applicable loading and deformation conditions. For components that are not a part of the seismic load-resisting system, the test load shall be equal to two times the unfactored design loads. The test load shall be left in place for a period of 24 hours. The structure shall be considered to have successfully met the test requirements where the following criteria are satisfied:

1. Under the design load, the deflection shall not exceed the limitations specified in Section 1604A.3.
2. Within 24 hours after removal of the test load, the structure shall have recovered not less than 75 percent of the maximum deflection.
3. During and immediately after the test, the structure shall not show evidence of failure.

**SECTION 1710A  PRECONSTRUCTION LOAD TESTS**

1710A.1 General. In evaluating the physical properties of materials and methods of construction that are not capable of being designed by approved engineering analysis or do not comply with the applicable referenced standards, the structural adequacy shall be predetermined based on the load test criteria established in this section.
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1710A.2 Load test procedures specified. Where specific load test procedures, load factors and acceptance criteria are included in the applicable referenced standards, such test procedures, load factors and acceptance criteria shall apply. In the absence of specific test procedures, load factors or acceptance criteria, the corresponding provisions in Section 1710A.3 shall apply.

1710A.3 Load test procedures not specified. Where load test procedures are not specified in the applicable referenced standards, the load-bearing and deformation capacity of structural components and assemblies shall be determined on the basis of a test procedure developed by a registered design professional that simulates applicable loading and deformation conditions. For components and assemblies that are not a part of the seismic force-resisting system, the test shall be as specified in Section 1710A.3.1. Load tests shall simulate the applicable loading conditions specified in Chapter 16.

1710A.3.1 Test procedure. The test assembly shall be subjected to an increasing superimposed load equal to not less than two times the superimposed design load. The test load shall be left in place for a period of 24 hours. The tested assembly shall be considered to have successfully met the test requirements if the assembly recovers not less than 75 percent of the maximum deflection within 24 hours after the removal of the test load. The test assembly shall then be reloaded and subjected to an increasing superimposed load until either structural failure occurs or the superimposed load is equal to two and one-half times the load at which the deflection limitations specified in Section 1710A.3.2 were reached, or the load is equal to two and one-half times the superimposed design load. In the case of structural components and assemblies for which deflection limitations are not specified in Section 1710A.3.2, the test specimen shall be subjected to an increasing superimposed load until structural failure occurs or the load is equal to two and one-half times the desired superimposed design load. The allowable superimposed design load shall be taken as the lesser of:

1. The load at the deflection limitation given in Section 1710A.3.2.
2. The failure load divided by 2.5.
3. The maximum load applied divided by 2.5.

1710A.3.2 Deflection. The deflection of structural members under the design load shall not exceed the limitations specified in Section 1604.3.

1710A.4 Wall and partition assemblies. Load-bearing wall and partition assemblies shall sustain the test load both with and without window framing. The test load shall include all design load components. Wall and partition assemblies shall be tested both with and without door and window framing.

1710A.5 Exterior window and door assemblies. The design pressure rating of exterior windows and doors in buildings shall be determined in accordance with Section 1710A.5.1 or 1710A.5.2.

Exception: Structural wind load design pressures for window units smaller than the size tested in accordance with Section 1710A.5.1 or 1710A.5.2 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 small unit shall be the same as the tested unit. Where such calculated design pressures are used, they shall be validated by an additional test of the window unit having the highest allowable design pressure.

1710A.5.1 Exterior windows and doors. Exterior windows and sliding doors shall be tested and labeled as conforming to AAMA/WDMA/CSA101/I.S.2/A440. Exterior side-hinged doors shall be tested and labeled as conforming to AAMA/WDMA/CSA101/I.S.2/A440 or comply with Section 1710A.5.2. Products tested and labeled as conforming to AAMA/WDMA/CSA 101/I.S.2/A440 shall not be subject to the requirements of Sections 2403A.2 and 2403A.3.

1710A.5.2 Exterior windows and door assemblies not provided for in Section 1710A.5.1. Exterior window and door assemblies shall be tested in accordance with ASTM E 330. Structural performance of garage doors and rolling doors shall be determined in accordance with either ASTM E 330 or ANSI/DASMA 108, and shall meet the acceptance criteria of ANSI/DASMA 108. Exterior window and door assemblies containing glass shall comply with Section 2403. The design pressure for testing shall be calculated in accordance with Chapter 16. Each assembly shall be tested for 10 seconds at a load equal to 1.5 times the design pressure.

1710A.6 Skylights and sloped glazing. Unit skylights and tubular daylighting devices (TDDs) shall comply with the requirements of Section 2405. All other skylights and sloped glazing shall comply with the requirements of Chapter 24.

1710A.7 Test specimens. Test specimens and construction shall be representative of the materials, workmanship and details normally used in practice. The properties of the materials used to construct the test assembly shall be determined on the basis of tests on samples taken from the load assembly or on representative samples of the materials used to construct the load test assembly. Required tests shall be conducted or witnessed by an approved agency.

SECTION 1711A
MATERIAL AND TEST STANDARDS

1711A.1 Joist hangers. Testing of joist hangers shall be in accordance with Sections 1711A.1.1 through 1711A.1.3, as applicable.

1711A.1.1 General. The vertical load-bearing capacity, torsional moment capacity and deflection characteristics of joist hangers shall be determined in accordance with ASTM D 1761 using lumber having a specific gravity of 0.49 or greater, but not greater than 0.55, as determined in accordance with AF&PA NDS for the joist and headers.

Exception: The joist length shall not be required to exceed 24 inches (610 mm).
1711A.1.2 Vertical load capacity for joist hangers. The vertical load-bearing capacity for the joist hanger shall be determined by testing a minimum of three joist hanger assemblies as specified in ASTM D 1761. If the ultimate vertical load for any one of the tests varies more than 20 percent from the average ultimate vertical load, at least three additional tests shall be conducted. The allowable vertical load-bearing of the joist hanger shall be the lowest value determined from the following:

1. The lowest ultimate vertical load for a single hanger from any test divided by three (where three tests are conducted and each ultimate vertical load does not vary more than 20 percent from the average ultimate vertical load).
2. The average ultimate vertical load for a single hanger from all tests divided by three (where six or more tests are conducted).
3. The average from all tests of the vertical loads that produce a vertical movement of the joist with respect to the header of 1/8 inch (3.2 mm).
4. The sum of the allowable design loads for nails or other fasteners utilized to secure the joist hanger to the wood members and allowable bearing loads that contribute to the capacity of the hanger.
5. The allowable design load for the wood members forming the connection.

1711A.1.2.1 Design value modifications for joist hangers. Allowable design values for joist hangers that are determined by Item 4 or 5 in Section 1711A.1.2 shall be permitted to be modified by the appropriate load duration factors as specified in AF&PA NDS but shall not exceed the direct loads as determined by Item 1, 2 or 3 in Section 1711A.1.2. Allowable design values determined by Item 1, 2 or 3 in Section 1711A.1.2 shall not be modified by load duration factors.

1711A.1.3 Torsional moment capacity for joist hangers. The torsional moment capacity for the joist hanger shall be determined by testing at least three joist hanger assemblies as specified in ASTM D 1761. The allowable torsional moment of the joist hanger shall be the average torsional moment at which the lateral movement of the top or bottom of the joist with respect to the original position of the joist is 1/8 inch (3.2 mm).

1711A.2 Concrete and clay roof tiles. Testing of concrete and clay roof tiles shall be in accordance with Sections 1711A.2.1 and 1711A.2.2, as applicable.

1711A.2.1 Overturning resistance. Concrete and clay roof tiles shall be tested to determine their resistance to overturning due to wind in accordance with SBCCI SSTD 11 and Chapter 15.

1711A.2.2 Wind tunnel testing. Where concrete and clay roof tiles do not satisfy the limitations in Chapter 16 for rigid tile, a wind tunnel test shall be used to determine the wind characteristics of the concrete or clay tile roof covering in accordance with SBCCI SSTD 11 and Chapter 15.