CHAPTER 4

RESIDENTIAL ENERGY EFFICIENCY

SECTION 401
GENERAL

401.1 Scope. This chapter applies to residential buildings.

401.2 Compliance. Projects shall comply with Sections 401, 402.4, 402.5, and 403.1, 403.2.2, 403.2.3, and 403.3 through 403.9 (referred to as the mandatory provisions) and either:

1. Sections 402.1 through 402.3, 403.2.1 and 404.1 (prescriptive); or
2. Section 405 (performance).

401.3 Energy performance level (EPL) display card. The building official shall require that an energy performance level (EPL) display card be completed and certified by the builder to be accurate and correct before final approval of the building for occupancy. Florida law (Section 553.9085, *Florida Statutes*) requires the EPL display card to be included as an addendum to each sales contract for both presold and nonpresold residential buildings. The EPL display card contains information indicating the energy performance level and efficiencies of components installed in a dwelling unit. The building official shall verify that the EPL display card completed and signed by the builder accurately reflects the plans and specifications submitted to demonstrate code compliance for the building. A copy of the EPL Display Card can be found in Appendix C.

SECTION 402
BUILDING THERMAL ENVELOPE

402.1 General (Prescriptive).

402.1.1 Component criteria. The *building thermal envelope* and air distribution system shall meet the requirements of Table 402.1.1.

402.1.1.1 *R*-value computation. Insulation material used in layers, such as framing cavity insulation and insulating sheathing, shall be summed to compute the component *R*-value. The manufacturer's settled *R*-value shall be used for blown insulation. Computed *R*-values shall not include an *R*-value for other building materials or air films.

402.1.1.2 *U*-factor alternative. An assembly with a *U*-factor equal to or less than that specified in Table 402.1.1.3 shall be permitted as an alternative to the corresponding component *R*-value in Table 402.1.1. All other prescriptive criteria of Table 402.1.1, the prescriptive criteria in Section 402.1.2.4 and footnotes to Table 402.1.1.3 shall be met.

402.1.1.3 Total UA alternative. If the total *building thermal envelope* UA (sum of *U*-factor times assembly area) is less than or equal to the total UA resulting from using the *U*-factors in Table 402.1.1.3 (multiplied by the same assembly area as in the proposed building), the building shall be considered in compliance with Table 402.1.1. All other prescriptive criteria of Table 402.1.1, the prescriptive criteria in Section 402.1.2.4 and footnotes to Table 402.1.1.3 shall be met. The UA calculation shall be done using a method consistent with the ASHRAE *Handbook of Fundamentals* and shall include the thermal bridging effects of framing materials. The SHGC requirements of Table 402.1.1 shall be met in addition to UA compliance.

402.1.2 Limitations to compliance by Section 402.

402.1.2.1 Electric space heating. Electric resistance space heating systems shall not be used when complying with this code by Section 402.

402.1.2.2 Air handlers in attics. Air handlers may not be installed in attics when complying with Section 402.

402.1.2.3 Maximum percent window area. The window area as a percentage of the conditioned floor area (CFA) shall not exceed 20 percent.

Exceptions: The following exceptions apply to additions.

1. When a fenestration(s) in an existing exterior wall is being removed or enclosed by an addition, an amount equal to the total area of this fenestration may be subtracted from the total glass area prior to determining the installed glass percentage.
2. Additions of 600 square feet (56 m^2) or less may have up to 50 percent glass to conditioned floor area.
3. Glass windows and doors that were previously located in an existing exterior wall that is being removed or enclosed by an addition do not have to comply with the *U*-factor and solar heat gain coefficient requirements in Table 402.1.1 when reinstalled as part of the addition.

402.1.2.4 Equipment efficiencies. Minimum equipment efficiencies for cooling, heating and water heating shall be code minimums as per Sections 503.

402.2 Specific insulation requirements (Prescriptive).

402.2.1 Ceilings with attic spaces. Reserved.

402.2.2 Ceilings without attic spaces. Where Section 402.1.1 would require insulation levels above R-30 and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30. This reduction of insulation from the requirements of Section 402.1.1 shall be limited to 500 square feet (46 m^2) or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the *U*-factor alternative approach in Section 402.1.1.2 and the total UA alternative in Section 402.1.1.3.

402.2.3 Access hatches and doors. Access doors from conditioned spaces to unconditioned spaces (e.g., attics

TABLE 402.1.1
COMPONENT EFFCIENCIES REQUIRED[a, l]

% Glazing[c]	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b]	CEILING *R*-VALUE	ROOF REFLECTANCE TESTED PER SECTION 405.6.2	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[i]	FLOOR *R*-VALUE/ SLAB *R*-VALUE[d]	DOOR *U*-FACTOR	DUCTS: *R*-VALUE/ LOCATION[k]	AIR HANDLER LOCATION[k]	AIR LEAKAGE TESTED PER SECTION 403.2.2.1
20%	0.65[j]	0.75	0.30	30	0.25	13	6/7.8	13/0	0.65	R-6/ Conditioned	Conditioned	Qn= 0.03

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. R-19 batts compressed into a nominal 2 × 6 framing cavity such that the *R*-value is reduced by R-1 or more shall be marked with the compressed batt *R*-value in addition to the full thickness *R*-value.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

c. Percent glazing shown shall be the maximum glazing allowed for compliance by Section 402. Percent glazing area shall be measured in window to floor area and shall include skylight area.

d. R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.

e. Reserved.

f. Reserved.

g. Reserved.

h. Reserved.

i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

j. For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code, Building* the maximum U-factor shall be 0.75.

k. Conditioned = entire distribution system located inside both the thermal and air barrier of the home. Unconditioned = any portion located in unconditioned space.

l. Limitations to compliance by Section 402 found in Section 402.1.2 shall be met.

TABLE 402.1.1.3
EQUIVALENT *U*-FACTORS[a, f.g]

FENESTRATION *U*-FACTOR[e]	SKYLIGHT *U*-FACTOR	CEILING *U*-FACTOR[h]	FRAME WALL *U*-FACTOR	MASS WALL *U*-FACTOR[b]	FLOOR *U*-FACTOR	BASEMENT WALL *U*-FACTOR[d]	CRAWL SPACE WALL *U*-FACTOR[c]
0.65	0.75	0.035	0.082	0.124	0.064	0.360	0.477

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall *U*-factors shall be a maximum of 0.165.

c. Basement wall *U*-factor of 0.360.

d. Foundation *U*-factor requirements shown in Table 402.1.1.3 include wall construction and interior air films but exclude soil conductivity and exterior air films. *U*-factors for determining code compliance in accordance with Section 402.1.1.3 (total UA alternative) shall be modified to include soil conductivity and exterior air films.

e. Window to floor area, including skylights, shall not exceed 20 percent. See Section 402.1.2.3.

f. Limitations to compliance by Section 402 found in Section 402.1.2 shall be met.

g. Ducts and air handlers shall be located inside both the thermal and air barrier of the home. Air leakage shall be no more than Qn = 0.03 when tested per Section 403.2.2.1.

h. Roof reflectance shall be no more than 0.25 in accordance with testing to Section 405.6.2.

and crawl spaces) shall be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces. Access shall be provided to all equipment that prevents damaging or compressing the insulation. A wood framed or equivalent baffle or retainer is required to be provided when loose fill insulation is installed, the purpose of which is to prevent the loose fill insulation from spilling into the living space when the attic access is opened, and to provide a permanent means of maintaining the installed *R*-value of the loose fill insulation.

402.2.4 Mass walls. Mass walls for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs.

402.2.5 Steel-frame ceilings, walls, and floors. Steel-frame ceilings, walls and floors shall meet the insulation requirements of Table 402.2.5(1) or shall meet the *U*-factor requirements in Table 402.1.1.3. The calculation of the *U*-factor for a steel-frame envelope assembly shall use a series- parallel path calculation method.

Exception: Steel frame wall assemblies with studs spaced at 24 inches (610 mm) on center shall be permitted to use the equivalent insulation requirements in Table 402.2.5(2):

Alternatively, steel frame wall assemblies shall be permitted to use the equivalencies established in ASHRAE/IESNA Standard 90.1 Appendix A, Tables A 3.3 and A3.4.

TABLE 402.2.5(1)
STEEL-FRAME CEILING, WALL AND FLOOR INSULATION (*R*-VALUE)

WOOD FRAME *R*-VALUE REQUIREMENT	COLD-FORMED STEEL EQUIVALENT *R*-VALUE[a]
Steel Truss Ceilings[b]	
R-30	R-38 or R-30 + 3 or R-26 + 5
R-38	R-49 or R-38 + 3
R-49	R-38 + 5
Steel Joist Ceilings[b]	
R-30	R-38 in 2 × 4 or 2 × 6 or 2 × 8 R-49 in any framing
R-38	R-49 in 2 × 4 or 2 × 6 or 2 × 8 or 2 × 10
Steel-Framed Wall	
R-13	R-13 + 5 or R-15 + 4 or R-21 + 3 or R-0 + 10
R-19	R-13 + 9 or R-19 + 8 or R-25 + 7
R-21	R-13 + 10 or R-19 + 9 or R-25 + 8
Steel Joist Floor	
R-13	R-19 in 2 × 6 R-19 + 6 in 2 × 8 or 2 × 10
R-19	R-19 + 6 in 2 × 6 R-19 + 12 in 2 × 8 or 2 × 10

a. Cavity insulation *R*-value is listed first, followed by continuous insulation *R*-value.
b. Insulation exceeding the height of the framing shall cover the framing.

TABLE 402.2.5(2)
STEEL FRAME WALL INSULATION *R*-VALUE FOR 24 INCH SPACING OF STUDS

Wood frame wall *R*-value requirement	Steel frame wall equivalent *R*-value at 24 inch spacing of studs
R-13	13 + 3.0 or 15 + 2.4 or 0 + 9.3
R-19	13 + 7.4 or 15 + 6.8 or 19 + 6.0 or 21 + 5.6
R-20	13 + 7.6 or 15 + 7.1 or 19 + 6.3 or 21 + 5.9
R-21	13 + 8.3 or 15 + 7.7 or 19 + 6.9 or 21 + 6.5

402.2.6 Floors. Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

402.2.7 Basement walls. Walls associated with conditioned basements shall be insulated from the top of the *basement wall* down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections 402.1.1 and 402.2.6.

402.2.8 Slab-on-grade floors. Reserved.

402.2.9 Crawl space walls. As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches (610 mm). Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the *Florida Building Code, Building*. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (153 mm) up the stem wall and shall be attached to the stem wall.

402.2.10 Masonry veneer. Insulation shall not be required on the horizontal portion of the foundation that supports a masonry veneer.

402.2.11 Thermally isolated sunroom insulation. The minimum ceiling insulation *R*-values shall be R-19. The minimum wall *R*-value shall be R-13 in all zones. New wall(s) separating a sunroom from *conditioned space* shall meet the *building thermal envelope* requirements.

402.2.12 Common walls/ceilings/floors. Walls, ceilings or floors common to separate conditioned tenancies shall be insulated to a minimum R-11, space permitting.

Exception: Mass common walls shall be insulated to a minimum of R-6.

402.2.13 Walls considered ceiling area. Wall areas that separate conditioned living space from unconditioned attic space (such as attic knee walls, walls on cathedral ceilings, skylight chimney shafts, gambrel roofs, etc.) shall be considered ceiling area. Such areas shall be included in calculations of ceiling area and shall have a minimum insulation value of R-19.

402.3 Fenestration. (Prescriptive).

402.3.1 *U*-factor. An area-weighted average of fenestration products shall be permitted to satisfy the *U*-factor requirements.

402.3.2 Glazed fenestration SHGC. An area-weighted average of fenestration products more than 50 percent glazed shall be permitted to satisfy the SHGC requirements.

402.3.3 Glazed fenestration exemption. Up to 15 square feet (1.4 m^2) of glazed fenestration per dwelling unit shall be permitted to be exempt from *U*-factor and SHGC requirements in Section 402.1.1. This exemption shall not apply to the *U*-factor alternative approach in Section 402.1.1.2 and the Total UA alternative in Section 402.1.1.3.

402.3.4 Opaque door exemption. One side-hinged opaque door assembly up to 24 square feet (2.22 m^2) in area is exempted from the *U*-factor requirement in Section 402.1.1. This exemption shall not apply to the *U*-factor alternative approach in Section 402.1.1.2 and the total UA alternative in Section 402.1.1.3.

402.3.5 Thermally isolated sunroom *U*-factor. New windows and doors separating the sunroom from *conditioned space* shall meet the *building thermal envelope* requirements.

402.3.6 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 402.1.1.

402.4 Air leakage (Mandatory).

402.4.1 Building thermal envelope. The *building thermal envelope* shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material:

1. All joints, seams and penetrations.
2. Site-built windows, doors and skylights.
3. Openings between window and door assemblies and their respective jambs and framing.
4. Utility penetrations.
5. Dropped ceilings or chases adjacent to the thermal envelope.
6. Knee walls.
7. Walls and ceilings separating a garage from conditioned spaces.
8. Behind tubs and showers on exterior walls.
9. Common walls between dwelling units.
10. Attic access openings.
11. Rim joist junction.
12. Other sources of infiltration.

402.4.2 Air sealing and insulation. Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options given by Section 402.4.2.1 or 402.4.2.2:

402.4.2.1 Testing option. Building envelope tightness and insulation installation shall be considered acceptable when tested air leakage is less than seven air changes per hour (ACH) when tested with a blower door at a pressure of 50 pascals (1 psf). Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed;
2. Dampers shall be closed, but not sealed, including exhaust, intake, makeup air, backdraft and flue dampers;
3. Interior doors shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling system(s) shall be turned off;
6. HVAC ducts shall not be sealed; and
7. Supply and return registers shall not be sealed.

402.4.2.2 Visual inspection option. Building envelope tightness and insulation installation shall be considered acceptable when the items listed in Table 402.4.2, applicable to the method of construction, are field verified. Where required by the *code official*, an *approved* party independent from the installer of the insulation shall inspect the air barrier and insulation.

402.4.3 Fireplaces. New wood-burning fireplaces shall have gasketed doors and outdoor combustion air.

402.4.4 Fenestration air leakage. Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cfm per square foot (1.5 L/s/m^2), and swinging doors no more than 0.5 cfm per square foot (2.6 L/s/m^2), when tested according to NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440 by an accredited, independent laboratory and *listed* and *labeled* by the manufacturer.

Exceptions: Site-built windows, skylights and doors.

402.4.5 Recessed lighting. Recessed luminaires installed in the *building thermal envelope* shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC-rated and *labeled* as meeting ASTM E 283 when tested at 1.57 psf (75 Pa) pressure differential with no more than 2.0 cfm (0.944 L/s) of air movement from the *conditioned space* to the ceiling cavity. All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

TABLE 402.4.2
AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA

COMPONENT	CRITERIA
Air barrier and thermal barrier	Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material. Air-permeable insulation is inside of an air barrier.
Ceiling/attic	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed. Attic access (except unvented attic), knee wall door, or drop down stair is sealed.
Walls	Corners and headers are insulated. Junction of foundation and sill plate is sealed.
Windows and doors	Space between window/door jambs and framing is sealed.
Rim joists	Rim joists are insulated and include an air barrier.
Floors (including above-garage and cantilevered floors)	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.
Crawl space walls	Insulation is permanently attached to walls. Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed.
Narrow cavities	Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.
Garage separation	Air sealing is provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures are air tight, IC rated, and sealed to drywall. Exception—fixtures in conditioned space.
Plumbing and wiring	Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.
Shower/tub on exterior wall	Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.
Electrical/phone box on exterior walls	Air barrier extends behind boxes or air sealed-type boxes are installed.
Common wall	Air barrier is installed in common wall between dwelling units.
HVAC register boots	HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.
Fireplace	Fireplace walls include an air barrier.

402.5 Maximum fenestration SHGC (Mandatory). The area-weighted average maximum fenestration SHGC permitted using trade-offs from Section 405 shall be 0.50.

Exception: If the window area-weighted average overhang depth for the entire dwelling unit is 4.0 feet or greater, the area-weighted average maximum SHGC requirement of 0.50 does not need to be met.

SECTION 403
SYSTEMS

403.1 Controls (Mandatory). At least one thermostat shall be provided for each separate heating and cooling system.

403.1.1 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 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).

403.1.2 Heat pump supplementary heat (Mandatory). Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

403.1.3 Humidity control. Where a humidistat is used for comfort dehumidification, it shall be capable of being set to

prevent the use of fossil fuel or electricity to reduce humidities below 60 percent.

403.2 Ducts.

403.2.1 Insulation (Prescriptive). Supply ducts, including air filter enclosures, air ducts and plenums, located in attics or on roofs shall be insulated to a minimum of R-8. All other ducts shall be insulated to a minimum of R-6.

Exceptions:

1. Ducts or portions thereof located completely inside the *building thermal envelope*.
2. Exhaust air ducts
3. Factory-installed plenums, casings or ductwork furnished as a part of tested and rated HVAC equipment.

403.2.2 Sealing (Mandatory). All ducts, air handlers, filter boxes and building cavities which form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers, shall be constructed and sealed in accordance with 503.2.7.2 of this code and shall be shown to meet duct tightness criteria in Section 403.2.2.1.

403.2.2.1 Duct tightness. Duct tightness shall be verified by testing to ASHRAE Standard 152. All ducts and air handlers shall be either located in conditioned space or tested by a Class 1 BERS rater to be "substantially leak free" by one of the following methods.

1. Post construction test: Leakage to outdoors shall be less than or equal to 3 cfm (84.9 L/min) per 100 ft^2 (9.29 m^2) of *conditioned floor area* or a total leakage less than or equal to 9 cfm (254 L/min) per 100 ft^2 (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 ft^2 (9.29 m^2) of *conditioned floor area* when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the roughed-in system, including the manufacturer's air handler 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 2 cfm (56.3 L/min) per 100 ft^2 (9.29 m^2) of *conditioned floor area*.

Exception:

Duct testing is not mandatory for buildings complying by Section 405 of this code.

403.2.3 Building cavities. Building framing cavities shall not be used as supply ducts.

403.2.4 Air-handling units. Air handling units shall not be installed in the attic when a home is brought into code compliance by Section 402. Air-handling units shall be allowed in attics for compliance by Section 405 only if the following conditions are met:

1. The service panel of the equipment is located within 6 feet (1829 mm) of an attic access.
2. A device is installed to alert the owner or shut the unit down when the condensation drain is not working properly.
3. The attic access opening is of sufficient size to replace the air handler.
4. A notice is posted on the electric service panel indicating to the homeowner that the air handler is located in the attic. Said notice shall be in all capitals, in 16 point type, with the title and first paragraph in bold:

NOTICE TO HOMEOWNER

A PART OF YOUR AIR-CONDITIONING SYSTEM, THE AIR HANDLER, IS LOCATED IN THE ATTIC. FOR PROPER, EFFICIENT, AND ECONOMIC OPERATION OF THE AIR-CONDITIONING SYSTEM, YOU MUST ENSURE THAT REGULAR MAINTENANCE IS PERFORMED.

YOUR AIR-CONDITIONING SYSTEM IS EQUIPPED WITH ONE OR BOTH OF THE FOLLOWING: (1) A DEVICE THAT WILL ALERT YOU WHEN THE CONDENSATION DRAIN IS NOT WORKING PROPERLY OR (2) A DEVICE THAT WILL SHUT THE SYSTEM DOWN WHEN THE CONDENSATION DRAIN IS NOT WORKING. TO LIMIT POTENTIAL DAMAGE TO YOUR HOME, AND TO AVOID DISRUPTION OF SERVICE, IT IS RECOMMENDED THAT YOU ENSURE PROPER WORKING ORDER OF THESE DEVICES BEFORE EACH SEASON OF PEAK OPERATION.

403.2.5 Air distribution system sizing and design (Mandatory). All air distribution systems shall be sized and designed in accordance with recognized engineering standards such as ACCA Manual D or other standards based on the following:

1. Calculation of the supply air for each room shall be based on the greater of the heating load or sensible cooling load for that room.
2. Duct size shall be determined by the supply air requirements of each room, the available static pressure, and the total equivalent length of the various duct runs.
3. Friction loss data shall correspond to the type of material used in duct construction

403.3 Mechanical system piping insulation (Mandatory). Mechanical system piping capable of carrying fluids above 105°F (41°C) or below 55°F (13°C) shall be insulated to a minimum of R-3.

403.4 Hot water systems (Mandatory).

403.4.1 Circulating hot water systems, insulation (Mandatory). All circulating service hot water piping shall be insulated to at least R-2. Circulating hot water systems shall

include an automatic or readily *accessible* manual switch that can turn off the hot- water circulating pump when the system is not in use. Pipe insulation buried underground shall be as specified by the manufacturer for underground use.

403.4.2 Heat traps. Storage water heaters not equipped with integral heat traps and having vertical pipe risers shall have heat traps installed on both the inlets and outlets. External heat traps shall consist of either a commercially available heat trap or a downward and upward bend of at least $3^1/_2$ inches (89 mm) in the hot water distribution line and cold water line located as close as possible to the storage tank.

403.4.3 Water heater efficiencies.

403.4.3.1 Storage water heater temperature controls.

403.4.3.1.1 Automatic controls. Service water heating systems shall be equipped with automatic temperature controls capable of adjustment from the lowest to the highest acceptable temperature settings for the intended use. The minimum temperature setting range shall be from 100°F to 140°F (38°C to 60°C).

403.4.3.1.2 Shut down. A separate switch or a clearly marked circuit breaker shall be provided to permit the power supplied to electric service systems to be turned off. A separate valve shall be provided to permit the energy supplied to the main burner(s) of combustion types of service water heating systems to be turned off.

403.4.3.2 Water heater efficiencies. Residential sized water heaters shall meet the minimum efficiencies of this section. Water heating systems not covered in this section shall meet the minimum efficiencies listed for that system in Section 504 of this code.

403.4.3.2.1 Electric water heaters. All automatic electric storage water heaters having a storage capacity of 120 gallons (454 L) or less and an input rating of 12 kw or less shall, when tested in accordance with the DOE *Uniform Test Method for Measuring the Energy Consumption of Water Heaters*, Appendix E to Subpart B, 10 CFR Part 430, meet the performance minimums listed in Table 403.4.3.2.

403.4.3.2.2 Gas- and oil-fired water heater efficiencies. All gas- and oil-fired automatic storage water heaters with capacities of 100 gallons or less and an input rating of 75,000 Btu/h or less (gas) or 105,000 Btu/h or less (oil) shall, when tested in accordance with the DOE *Uniform Test Method for Measuring the Energy Consumption of Water Heaters*, Appendix E to Subpart B, 10 CFR Part 430, meet the performance minimums listed in Table 403.4.3.2.

403.4.3.2.2.1 Gas instantaneous or tankless water heaters. All gas-fired instantaneous (tankless) water heaters that a) initiate heating based on sensing water flow, b) are designed to deliver water at a controlled temperature of less than 180 °F (82 °C), c) have an input less than 200,000 Btu/h (210 MJ/h), d) have a manufacturer's specified storage capacity of less than 2 gallons (7.6 liters) and, e) have either a fixed or variable burner input shall, when tested in accordance with the DOE *Uniform Test Method for Measuring the Energy Consumption of Water Heaters*, Appendix E to Subpart B, Title 10 CFR 430, meet the performance minimums established in Title 10 CFR 430.32, *Energy and Water Conservation Standards and Effective Dates*.

403.4.3.2.2.2 Combination service water heating and space heating equipment. Service water heating equipment used to provide additional functions (e.g. space heating) as part of a combination (integrated) system shall comply with minimum performance requirements for water heating equipment. For combined gas storage tank water heating and space heating systems tested to ANSI/ASHRAE 124, the EF used shall be the effective water heating efficiency (CA_{ef}) listed for the appliance by the Gas Appliance Manufacturer's Association (GAMA). For combined gas instantaneous (tankless) water heating and space heating systems, the EF used shall be determined in accordance with the DOE *Uniform Test Method for Measuring the Energy Consumption of Water Heaters*, Appendix E to Subpart B, Title 10 CFR 430.

Combination systems utilizing a storage tank water heater as the heat source for space heating purposes with input ratings of 105,000 Btu/h (360 m^3/kW) or less shall utilize a water heater listed by the Gas Appliance Manufacturer's Association (GAMA). Changeouts of burners or heating elements to increase capacity shall not be made unless the unit has been listed at that capacity by GAMA.

403.4.3.2.3 Solar water heating systems. Solar systems for domestic hot water production are rated by the annual solar energy factor of the system. The solar energy factor of a system shall be determined from the Florida Solar Energy Center *Directory of Certified Solar Systems*. Solar collectors shall be tested in accordance with ISO Standard 9806, *Test Methods for Solar Collectors*, and SRCC Standard TM-1, *Solar Domestic Hot Water System and Component Test Protocol*. Collectors in installed solar water heating systems should meet the following criteria:

1. Be installed with a tilt angle between 10 degrees and 40 degrees of the horizontal; and
2. Be installed at an orientation within 45 degrees of true south.

TABLE 403.4.3.2
MINIMUM PERFORMANCE STANDARDS
WATER HEATING EQUIPMENT: FIRED STORAGE
WATERHEATER MINIMUM ENERGY FACTORS (EF)

	TANK VOLUME (GALLONS)								
TYPE/VOLUME	20	30	40	50	60	70	80	100	120
ELECTRIC: Up to 120 gallon or 12kW input	.94	.93	.92	.90	.88	—	.86	.84	.81
GAS: Up to 100 gallon or 75,000 Btu/h input	.63	.61	.59	.58	.55	.53	—	.48	—
OIL: Up to 50 gallon or 75,000 Btu/h input	—	.53	.51	.50	—	—	—	—	—

403.5 Mechanical ventilation (Mandatory). Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

403.5.1 Ventilation air. Residential buildings designed to be operated at a positive indoor pressure or for mechanical ventilation shall meet the following criteria:

1. The design air change per hour minimums for residential buildings in ASHRAE 62, *Ventilation for Acceptable Indoor Air Quality*, shall be the maximum rates allowed for residential applications.
2. No ventilation or air-conditioning system make-up air shall be provided to conditioned space from attics, crawlspaces, attached enclosed garages or outdoor spaces adjacent to swimming pools or spas.
3. If ventilation air is drawn from enclosed space(s), then the walls of the space(s) from which air is drawn shall be insulated to a minimum of R-11 and the ceiling shall be insulated to a minimum of R-19, space permitting, or R-10 otherwise.

403.6 Heating and cooling equipment (Mandatory).

403.6.1 Equipment sizing. Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on the equipment loads calculated in accordance with Manual J or other approved heating and cooling calculation methodologies, based on building loads for the directional orientation of the building. The manufacturer and model number of the outdoor and indoor units (if split system) shall be submitted along with the sensible and total cooling capacities at the design conditions described in Section 302.1. This Code does not allow designer safety factors, provisions for future expansion or other factors which affect equipment sizing. System sizing calculations shall not include loads created by local intermittent mechanical ventilation such as standard kitchen and bathroom exhaust systems.

403.6.1.1 Cooling equipment capacity. Cooling only equipment shall be selected so that its total capacity is not less than the calculated total load but not more than 1.15 times greater than the total load calculated according to the procedure selected in Section 403.6, or the closest available size provided by the manufacturer's product lines. The corresponding latent capacity of the equipment shall not be less than the calculated latent load.

The published value for ARI total capacity is a nominal, rating-test value and shall not be used for equipment sizing. Manufacturer's expanded performance data shall be used to select cooling-only equipment. This selection shall be based on the outdoor design dry bulb temperature for the load calculation (or entering water temperature for water-source equipment), the blower CFM provided by the expanded performance data, the design value for entering wet bulb temperature, and the design value for entering dry bulb temperature.

Design values for entering wet bulb and dry bulb temperature shall be for the indoor dry bulb and relative humidity used for the load calculation and shall be adjusted for return side gains if the return duct(s) is installed in an unconditioned space.

Exceptions:

1. Attached single- and multiple-family residential equipment sizing may be selected so that its cooling capacity is less than the calculated total sensible load but not less than 80 percent of that load.
2. When signed and sealed by a Florida-registered engineer, in attached single- and multiple-family units, the capacity of equipment may be sized in accordance with good design practice.

403.6.1.2 Heating equipment capacity.

403.6.1.2.1 Heat Pumps. Heat pump sizing shall be based on the cooling requirements as calculated according to Section 403.6.1.1 and the heat pump total cooling capacity shall not be more than 1.15 times greater than the design cooling load even if the design heating load is 1.15 times greater than the design cooling load.

403.6.1.2.2 Electric resistance furnaces. Electric resistance furnaces shall be sized within 4 kW of the design requirements calculated according to the procedure selected in Section 403.6.1.

403.6.1.2.3 Fossil fuel heating equipment. The capacity of fossil fuel heating equipment with natural draft atmospheric burners shall not be less than the design load calculated in accordance with Section 403.6.1.

403.6.1.3 Extra capacity required for special occasions. Residences requiring excess cooling or heating equipment capacity on an intermittent basis, such as anticipated additional loads caused by major entertainment events, shall have equipment sized or controlled to prevent continuous space cooling or heating within that space by one or more of the following options:

1. A separate cooling or heating system is utilized to provide cooling or heating to the major entertainment areas.

2. A variable capacity system sized for optimum performance during base load periods is utilized.

403.6.2 Equipment performance standards.

403.6.2.1 Equipment ratings. Equipment efficiency ratings shall be obtained from a nationally recognized certification program directory, or from a manufacturer's rating certified to be in compliance with an approved Department of Energy (DOE) or Air-conditioning, Heating and Refrigeration Institute (AHRI) rating procedure. Equipment efficiencies shall be based on the standard rating conditions contained in the test standard referenced in Chapter 6 that is appropriate for that equipment. Minimum ratings for products covered under the *National Appliance Energy Conservation Act of 1987* shall be those determined for Region IV and used for the Federal Trade Commission's required appliance labeling.

403.6.2.1.1 Equipment efficiency verification. Equipment covered under the *Federal Energy Policy Act of 1992* (EPACT) shall comply with U.S. Department of Energy certification requirements. For other equipment, if a certification program exists for a product covered in Tables 503.2.3(1) through (8) and it includes provisions for verification and challenge of equipment efficiency ratings, then the product shall be either listed in the certification program or, alternatively, the ratings shall be verified by an independent laboratory test report. If no certification program exists for a product covered in Tables 503.2.3(1) through (8) the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Where components such as indoor or outdoor coils from different manufacturers are used, a Florida-registered engineer shall specify component efficiencies whose combined efficiency meets the minimum equipment efficiency requirements.

403.6.2.2 Minimum efficiencies for cooling equipment. Cooling equipment installed in residential units shall meet the minimum efficiencies of Tables 503.2.3(1) through 503.2.3(3) and 503.2.3(6) through 503.2.3(8) in Chapter 5 of this code for the type of equipment installed. Equipment used to provide water heating functions as part of a combination system shall satisfy all stated requirements for the appropriate space heating or cooling category.

403.6.2.3 Minimum efficiencies for heating equipment. Heating equipment installed in residential units shall meet the minimum efficiencies of Tables 503.2.3(2) through 503.2.3(5) of Chapter 5 of this code for the type of equipment installed.

Exception: Existing mechanical systems undergoing alteration need not meet the minimum equipment Efficiencies of this section except to preserve the original approval or listing of the equipment

403.6.2.3.1 Gas and oil-fired furnaces. Gas-fired and oil-fired forced air furnaces with input ratings greater than 225,000 Btu/h shall also have an intermittent ignition or interrupted device (IID) and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for furnaces where combustion air is drawn from the conditioned space. All furnaces with input ratings greater than 225,000 Btu/h, including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75 percent of the input.

403.6.2.3.2 Central electric furnaces. Central electric furnaces greater than 10 kW shall be divided into at least two stages and controlled by an outdoor thermostat, multistage indoor thermostat, or combinations thereof.

403.7 Systems serving multiple dwelling units (Mandatory). Systems serving multiple dwelling units shall comply with Sections 503 and 504 in lieu of Section 403.

403.8 Snow melt system controls (Mandatory). Reserved.

403.9 Swimming pools, inground spas, and portable spas (Mandatory). The energy requirements for residential pools and inground spas shall be as specified in Sections 403.9.1 through 403.9.4 and ANSI/APSP-15. The energy requirements for portable spas shall be in accordance with Section 403.9.5 and ANSI/APSP-14.

403.9.1 Pool and spa heaters. All pool heaters shall be equipped with a readily *accessible* on-off switch that is mounted outside the heater to allow shutting off the heater without adjusting the thermostat setting.

403.9.1.1 Gas and oil-fired pool and spa heaters. All gas- and oil-fired pool and spa heaters shall have a minimum thermal efficiency of 78 percent for heaters manufactured before April 16, 2013 and not less than 82 percent for heaters manufactured on or after April 16, 2013 when tested in accordance with ANSI Z 21.56. Pool heaters fired by natural gas or LPG shall not have continuously burning pilot lights.

403.9.1.2 Heat pump pool heaters. Heat pump pool heaters shall have a minimum COP of 4.0 when tested in accordance with AHRI 1160, Table 2, Standard Rating Conditions–Low Air Temperature. A test report from an independent laboratory is required to verify procedure compliance.

403.9.2 Time switches. Time switches shall be installed to control swimming pool heaters and pumps that can automatically turn the heaters and pumps off and on according to a preset schedule.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Where pumps are required to operate solar- and waste-heat-recovery pool heating systems.

3. Where pumps are powered exclusively from on-site renewable generation.

403.9.3 Covers. Heated swimming pools and inground permanently installed spas shall be equipped with a vapor-retardant cover on or at the water surface or a liquid cover or other means proven to reduce heat loss.

Exception: Outdoor pools deriving over 70 percent of the energy for heating from site-recovered energy or solar energy source computed over an operating season.

403.9.4 Residential pool pumps and pump motors. Pool filtration pump motors shall meet the following requirements.

1. Pool pump motors shall not be split-phase, shaded-pole or capacitor start-induction run types.
2. Pool pumps and pool pump motors with a total horsepower (HP) of greater than or equal to 1 HP shall have the capability of operating at two or more speeds. The low speed shall have a rotation rate of no more than $^1/_2$ of the motor's maximum rotation rate.
3. Pool pumps motor controls shall have the capability of operating the pool pump at a minimum of two speeds. The default circulation speed shall be the residential filtration speed, with a higher speed override capability for a temporary period not to exceed one normal cycle or 24 hours, whichever is less.

Exception: Solar pool heating systems shall be permitted to run at higher speeds during periods of usable solar heat gain.

403.9.5 Portable spa standby power. Portable electric spa standby power shall not be greater than 5(2/3V) watts where V equals the total volume, in gallons, when spas are measured in accordance with the spa industry test protocol provided in ANSI/APSP-14.

SECTION 404
ELECTRICAL POWER AND LIGHTING SYSTEMS

404.1 Lighting equipment. A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.

SECTION 405
SIMULATED PERFORMANCE ALTERNATIVE (Performance)

405.1 Scope. This section establishes criteria for compliance using simulated energy performance analysis. Such analysis shall include heating, cooling, and service water heating energy only.

405.2 Mandatory requirements. Compliance with this section requires that the mandatory provisions identified in Section 401.2 be met. All supply and return ducts not completely inside the *building thermal envelope* shall be insulated to a minimum of R-6.

405.2.1 Ceiling insulation. Ceilings shall have an insulation level of at least R-19, space permitting. For the purposes of this code, types of ceiling construction that are considered to have inadequate space to install R-19 include single assembly ceilings of the exposed deck and beam type and concrete deck roofs. Such ceiling assemblies shall be insulated to at least a level of R-10.

405.3 Performance-based compliance. Compliance based on simulated energy performance requires that a proposed residence (*proposed design*) be shown to have an annual energy cost that is less than or equal to 80 percent of the annual energy cost of the *standard reference design* as specified in Normative Appendix B, Section B-1.1.1 to make the code 20 percent more stringent than the "2007" (Effective October 31, 2007) Florida energy code's *Standard Reference Design* (Baseline) features.

405.4 Documentation.

405.4.1 Compliance software tools. Documentation verifying that the methods and accuracy of the compliance software tool shall conform to the provisions of this section and be provided to the *code official*. Compliance software provisions and overall stringency shall be as described in Normative Appendix B.

405.4.2 Compliance report. The compliance software tool shall generate a Form 405 report that documents that the *proposed design* complies with Section 405.3. The compliance documentation shall be submitted to the building official before a building permit is issued and shall include the following information:

1. Address or other identification of the residence;
2. An inspection checklist documenting the building component characteristics of the *proposed design* as listed in Appendix B, Table B-1.1.2(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.

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) orientation.

405.4.3 Additional documentation. The *code official* shall require the following documents:

1. An EPL Display Card signed by the builder providing the building component characteristics of the *proposed design* shall be provided to the purchaser of the home at time of title transfer.
2. Documentation of the component efficiencies used in the software calculations for the *proposed design*.

405.5 Calculation requirements for glazing.

405.5.1 Glass areas. All glazing areas of a residence, including windows, sliding glass doors, glass in doors, sky-

lights, etc. shall include the manufacturer's frame area in the total window area. Window measurements shall be as specified on the plans and specifications for the residence.

Exception: When a window in existing exterior walls is enclosed by an addition, an amount equal to the area of this window may be subtracted from the glazing area for the addition for that overhang and orientation.

405.5.2 Overhangs. Overhang effect is measured by *overhang separation,* which is the vertical measure of the distance from the top of a window to the bottom of the overhang. The overhang for adjustable exterior shading devices shall be determined at its most extended position. Nonpermanent shading devices such as canvas awnings shall not be considered overhangs. Permanently attached wood and metal awnings may be considered overhangs.

Table 405.5.2(1) Specifications for the Standard Reference and Proposed Designs. [Moved to Normative Appendix B, Table B-1.1.2(1)]

Table 405.5.2(2) Default Distribution System Efficiencies For Proposed Designs. Reserved.

405.5.3 Doors with glazing. For doors that are opaque or where the glass is less than one-third of the area of the door, the total door area shall be included in the door calculation. For unlabeled sliding glass doors or when glass areas in doors is greater than or equal to one-third of the area of the door, the glazing portion shall be included in the glazing calculation and the opaque portion of the door shall be included in the door calculation. When glass area in doors is greater than or equal to one-third of the area of the door, the door shall be included in the glazing calculation as a total fenestration using the tested *U*-factor and solar heat gain coefficient.

405.6 Requirements specific to credit options. Credit may be claimed in the software compliance calculation for technologies that meet prescriptive criteria specified below for various options.

405.6.1 Installation criteria for homes claiming the radiant barrier option. The sheet radiant barrier or IRCC options may be claimed where the radiant barrier system is to be installed in one of the configurations depicted in Figure 405.6.1 and the following conditions are met:

1. It shall be fabricated over a ceiling insulated to a minimum of R-19 with conventional insulation and shall not be used as a means to achieve partial or whole compliance with a minimum attic insulation level of R-19. Either a sheet type or spray applied interior radiation control coating (IRCC) may be used.
2. If the radiant barrier material has only one surface with high reflectivity or low emissivity it shall be facing downward toward the ceiling insulation.
3. The attic airspace shall be vented in accordance with Section R806 of the *Florida Building Code, Residential.*
4. The radiant barrier system shall conform to ASTM C 1313, *Standard Specification for Sheet Radiant Barriers for Building Construction Applications*, or ASTM C 1321, *Standard Practice for Installation and Use of Interior Radiation Control Coating Systems (IRCCS) in Building Construction* as appropriate for the type of radiant barrier to be installed. The operative surface shall have an emissivity not greater than 0.06 for sheet radiant barriers or 0.25 for interior radiation control coatings as demonstrated by independent laboratory testing according to ASTM C 1371.
5. The radiant barrier system (RBS) shall conform with ASTM C 1158, *Use and Installation of Radiant Barrier Systems (RBS) in Building Constructions for Sheet Radiant Barriers*, or ASTM C 1321, *Standard Practice for Installation and Use of Interior Radiation Control Coating Systems (IRCCS) in Building Construction for IRCC systems*.
6. The radiant barrier shall be installed so as to cover gable ends without closing off any soffit, gable or roof ventilation.

405.6.2 Installation criteria for homes claiming the cool roof option. The cool roof option may be claimed where the roof to be installed has a tested solar reflectance of greater than 4 percent when evaluated in accordance with ASTM methods E 903, C 1549, E 1918 or CRRC Method #1. Emittance values provided by the roofing manufacturer in accordance with ASTM C 1371 shall be used when available. In cases where the appropriate data are not known, emittance shall be the same as the Standard Reference Design. Testing of a qualifying sample of the roofing material shall be performed by an approved independent laboratory with these results provided by the manufacturer.

405.6.3 Installation criteria for homes using the unvented attic assembly option. The unvented attic assembly option may be used if the criteria in Section R806.4 of the *Florida Building Code, Residential* have been met.

405.6.4 Installation criteria for homes using the cross ventilation option. The cross ventilation option may be used if the following criteria have been met.

1. Operable aperture areas totaling a minimum of 12 percent of the floor area of the room shall be provided for all primary living areas and main bedrooms.
2. Insect screens shall be provided for all windows and doors to be considered operable aperture area. All screened entry doors and interior doors in the ventilated areas shall be provided with either (1) mechanically attached door stops (or similar devices) to hold the door in an open position or (2) operable louvers.
3. The total aperture area shall be provided by a minimum of two distinct windows. Each window shall

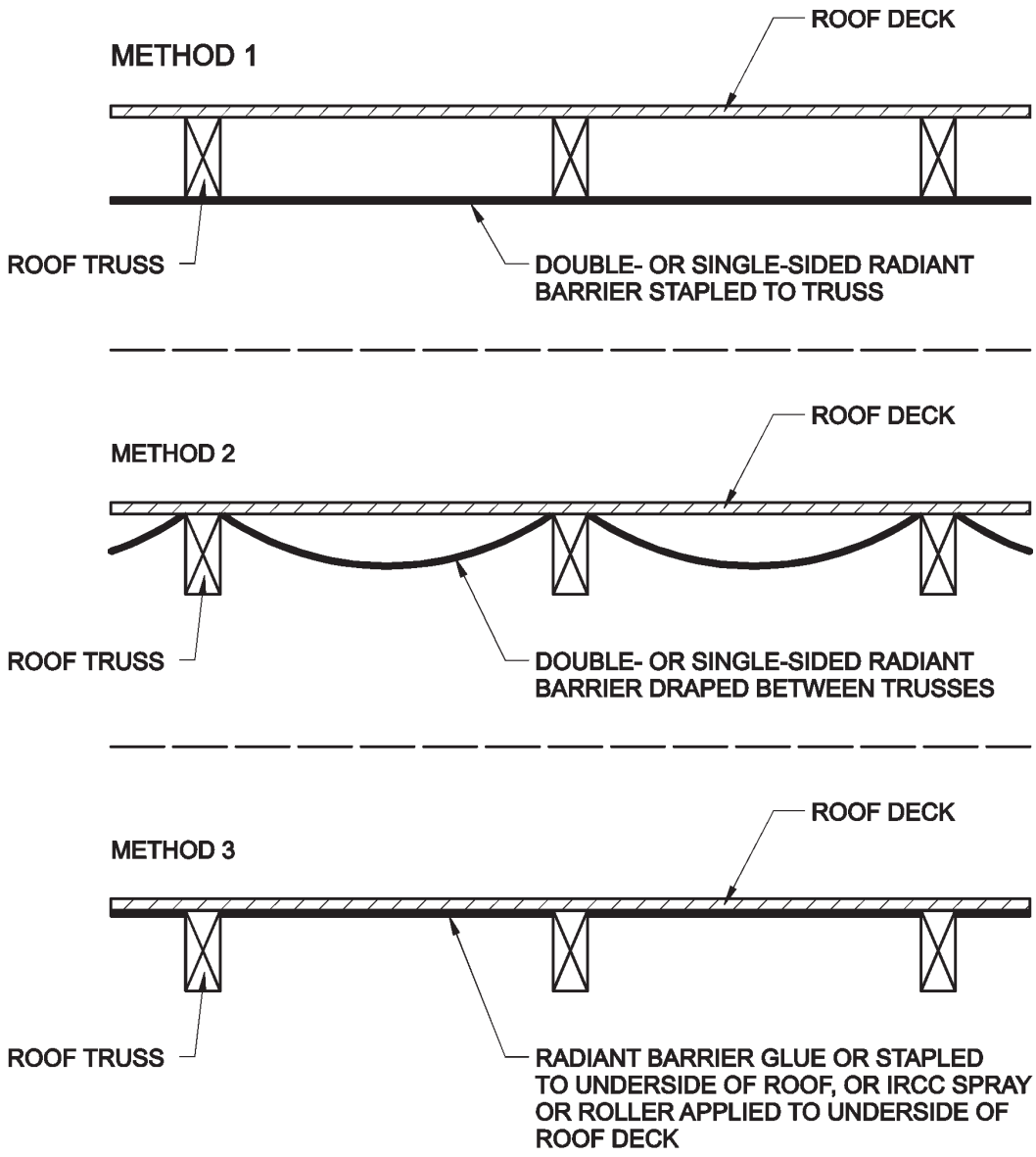

FIGURE 405.6.1
ACCEPTABLE ATTIC RADIANT BARRIER CONFIGURATIONS

provide not more than 70 percent of the total aperture area. The windows (or sliding glass doors) shall be placed in adjacent or opposite walls. The windows may be placed on a single outside wall if wing walls are used.

4. Where wing walls are included in the building design for ventilation purposes, they shall be placed between windows to create a high-pressure and a low-pressure zone on each window. Wing walls shall extend from the ground to eve height, be located on the windward side of the building, and extend outward from the building a distance at least equal to one-half the width of the window. NOTE: This technique is effective only for areas which experience significant and continuous winds during the cooling months.

405.6.5 Installation criteria for homes using the whole house fan option. The whole house fan option may be used if the following criteria have been met.

1. The whole house fan has been sized to provide a minimum of 20 air changes per hour for the entire house.
2. The fan installed shall have a free air cfm rating of at least three times the square footage of the conditioned area of the house.
3. To ensure adequate air exhaust, the house attic shall have gable, ridge or wind turbine vents whose total opening area is equal to four times the ceiling cutout area for the whole house fan. Soffit vents shall not be included in the exhaust vent area.

405.6.6 Installation criteria for homes claiming the heat recovery unit (HRU) option. The heat recovery unit option may be used for installation of a waste heat recovery unit (HRU) on either an air conditioner or a heat pump where the heat recovery unit has a minimum net useful heat exchange effect of 50 percent and meets the following criteria:

1. The net useful heat exchange effect shall be demonstrated by either a Form 400D prominently displayed on the unit with test results clearly visible for inspection or by an ARDM certified refrigerant desuperheater seal affixed to the unit.
2. The net useful heat exchange effect shall have been determined by an independent laboratory testing to AHRI Standard 470.
3. If more than one air conditioning system is installed in a residence and only one HRU is installed, energy load shall be based on the gallon capacity of the water heater to which it is coupled and the total capacity of the water heaters in the residence. In such case, the HRU shall be attached to the system serving the daytime primary living areas (family room, living room, kitchen, dining room and adjacent bedrooms and bathrooms).

405.6.7 Installation criteria for homes claiming the dedicated heat pump option. The dedicated heat pump option may be used for a dedicated heat pump (also known as a heat pump water heater) installed either with a tank (an integral unit) or without tank (add on to another water heater) based on the COP or energy factor (EF) of the system on which it is installed. No minimum rating is required for this equipment.