**Supplement to the 7th Edition (2020) Florida Building Code, Residential**

**Note 1**: Throughout the document, change International Building Code to Florida Building Code, Building; change the International Energy Conservation Code tothe Florida Building Code, Energy Conservation; change the International Existing Building Code to Florida Building Code, Existing Building; change the International Fire code to Florida Fire Prevention Code; change International Fuel Gas Code to Florida Building Code, Fuel Gas; change the International Mechanical Code to Florida Building Code, Mechanical; change the International Plumbing Code to Florida Building Code, Plumbing; change the International Residential Code to Florida Building Code, Residential.

**PREFACE**

**……**

The model codes used for the Florida Building Code, 8th Edition (2023) include: the ~~2018~~ 2021 editions of the International Building Code®; the International Plumbing Code®; the International Mechanical Code®; the International Fuel Gas Code®; the International Residential Code®; the International Existing Building Code®; the International Energy Conservation Code®; the National Electrical Code, 20~~1720~~ edition; or substantive criteria from ASHRAE Standard 90.1-20~~16~~ 19. State and local codes adopted and incorporated into the code include the Florida Building Code, Accessibility, and special hurricane protection standards for the High-Velocity Hurricane Zone.

**……**

**Marginal Markings**

Solid vertical lines in the margins within the body of the code indicate a change from the requirements of the Florida Building Code, Fuel Gas, 7th Edition (20~~17~~20) to the Florida Building Code, Fuel Gas, 8th Edition (20~~20~~23) effective December 31, 20~~20~~23.

Sections deleted from the base code are designated “Reserved” in order to maintain the structure of the base code.

**Chapter 1 SCOPE AND ADMINISTRATION**

**SECTION R101**

**SCOPE AND GENERAL REQUIREMENTS**

**(CA9156 / CCC-ADM1-19 AS)**

 Add new text as follows:

**SECTION 102 APPLICABILITY**

**~~RESERVED~~**

**R102.~~7.~~1 Additions, alterations or repairs. *Additions*, *alterations* or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions*, *alterations,* repairs and relocations shall not cause an existing structure to become unsafe or adversely affect the performance of the building. less compliant with the provisions of this code than the existing building or structure was prior to the addition, alteration or repair. An existing building together with its additions shall comply with the height limits of this code. Where the alteration causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the International Existing Building Code shall apply.**

**(F8724)(RB163-19 AMPC2)**

**Chapter 2 DEFINITIONS**

**Revise as follows:**

**[RB]** **APPROVED AGENCY.** An established and recognized agency that is regularly engaged in conducting tests, furnishing inspection services or furnishing product certification, and has been *approved* by the building official. ~~For the definition applicable in Chapter 11, see Section N1101.6.~~

**(CA8464) (RB3-19 AS)**

**[MP] CLEANOUT.** An access opening in the drainage system ~~used~~ utilized for ~~the removal of possible obstruction and located to allow for~~ *~~access~~*~~.~~ the removal of obstructions.  Types of cleanouts include a removable plug or cap, and a removable fixture or fixture trap.

**(P8459) (RB4-18 AS)**

**[RB]** **EMERGENCY ESCAPE AND RESCUE OPENING.** An operable exterior window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency. (See also "Grade floor opening.")

**(F8466) (RB8-19 Part I AS)**

**EMERGENCY ESCAPE AND RESCUE OPENING** An operable exterior window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency.

**(F8468) (RB8-19 Part II AS)**

**Delete without substitution:**

**~~[RB]~~** **~~BATTERY SYSTEM, STATIONARY STORAGE.~~** ~~A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls and associated electrical~~ *~~equipment~~* ~~designed to provide electrical power to a building. The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.~~

**Add new definition as follows:**

**[RB] Energy Storage Systems (ESS).** One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

**(F8718)(RB153-19 AM)/ (F8720)(RB158-19 AS)/ (F8719/RB154-19 AMPC1)**

**RB]** **FIRE-RETARDANT-TREATED WOOD.** ~~Pressure-treated lumber and plywood that~~ Wood products that, when impregnated with chemicals by a pressure process or other means during manufacture, exhibit reduced surface burning characteristics and resist propagation of fire.

**(F8469) (RB9-19 AS)**

**GLASS MAT GYPSUM PANEL.**A gypsum panel consisting of a noncombustible core primarily of gypsum, surfaced with glass mat partially or completely embedded in the core.

**GYPSUM SHEATHING.** Gypsum panel products specifically manufactured with enhanced water resistance for use as a substrate for exterior surface materials.

**GYPSUM WALLBOARD.**A gypsum board used primarily as an interior surfacing for building structures.

**(S9464) (G4-19 Part II AS)**

**[RB]** **GRADE FLOOR OPENING.** A window or other opening located such that the ~~sill height~~ bottom of the clear opening is not more than 44 inches (1118 mm) above or below the finished ground level adjacent to the opening. (See also “Emergency escape and rescue opening.”)

**(F8470) (RB13-19 AS)**

**Revise as follows:**

**[RB]** **GRADE FLOOR EMERGENCY ESCAPE AND RESCUE OPENING.** ~~A window or other~~ An emergency and escape and rescue opening located such that the ~~sill~~ height of the bottom of the clear opening is not more than 44 inches (1118 mm) above or below the finished ground level adjacent to the opening. (See also “Emergency escape and rescue opening.”)

**[RB]** **EMERGENCY ESCAPE AND RESCUE OPENING.** An operable exterior window, door or similar device that provides for a means of escape and access for rescue in the event of an emergency. (See also “Grade floor emergency escape and rescue opening.”)

**(F8474) (RB14-19 AMPC1)**

**[MP] HOT WATER.** Water at a temperature greater than ~~or equal to 110°F (43°C).~~120°F (49°C).

**(P8679)(P58-18 Part II AS)**

**[RB]** **INSULATING SHEATHING.** ~~An insulating board~~ A rigid panel or board insulation material having a thermal resistance of not less than R-2 of the core material with properties suitable for use on walls, floors, roofs, or foundations.

**(S8480)(RB15-19 AS)**

**[RB]** **LOT.** A measured portion or parcel of land considered as a unit having fixed boundaries.

**[RB]** **LOT LINE.** ~~A line dividing one~~ *~~lot~~* ~~from another, or from a street or any public place.~~ The line that bounds a plot of ground described as a *lot* in the title to the property.

**(F8482)(RB17-19 AS)**

**LIVE LOADS.**Those loads produced by the use and occupancy of the building or other structure and do not include construction or environmental loads such as wind load, ~~snow load,~~ rain load, ~~earthquake load,~~ flood load or dead load.

**~~SEISMIC DESIGN CATEGORY (SDC).~~**~~A classification assigned to a structure based on its occupancy category and the severity of the design earthquake ground motion at the site.~~

**SHEAR WALL.**A general term for walls that are designed and constructed to resist racking from lateral loads ~~seismic and wind~~ by use of masonry, concrete, cold-formed steel or wood framing in accordance with Chapter 6 of this code and the associated limitations in Section R301.2 of this code.

**(S10013 AS)**

[BS] POSITIVE ROOF DRAINAGE. The drainage condition in which consideration has been made for all loading deflections of the roof deck, and and ~~additional~~ sufficient slope has been provided to ensure drainage of the roof within 48 hours of precipitation.

**(R10134 AM)**

**[RB]** **NONCOMBUSTIBLE MATERIAL.** ~~Materials that pass the test procedure for defining noncombustibility of elementary materials set forth in~~ A material that passes ASTM E136.

**(F8483)(RB19-19 AS)**

PROFESSIONAL SURVEYOR AND MAPPER. An individual who is licensed or registered to engage in the practice of surveying and mapping under Chapter 472, Florida Statutes.

**(SP10351 AM A1)**

**ROOF ASSEMBLY**.  A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly includes the roof covering roof deck~~,~~ and may include a *vapor retarder*, ~~substrate~~ ~~or~~ thermal barrier, insulation or similar substrate ~~and roof covering~~.

**ROOF COVERING**. The covering applied to the roof deck for weather resistance, fire classification or appearance.

**~~ROOF COVERING SYSTEM~~**~~. See “Roof assembly.”~~

**ROOF DECK**. The flat or sloped surface not including its supporting members or vertical supports.

**ROOF RECOVER**. The process of installing an additional roof covering over a prepared existing roof covering without removing the existing roof covering.

See also Section R202 of the *Florida Building Code, Energy Conservation*.

**ROOF REPAIR**. Reconstruction or renewal of any part of an existing roof for the purposes of its maintenance.

See also Section R202 of the *Florida Building Code, Energy Conservation*.

**ROOF REPLACEMENT**. The process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering.

**ROOF SECTION**. A separation or division of a roof area by existing joints, parapet walls, flashing (excluding valleys), difference of elevation (excluding hips and ridges), roof type or legal description; not including the roof area required for a proper tie-off with an existing system.

**ROOFTOP STRUCTURE.** An enclosed structure on or above the roof of any part of a building

**ROOF SYSTEM**.  A roof system consists of a *roof covering* and other interacting roofing components and may include *vapor retarder*, thermal barrier, insulation or other similar substrate. The system does not include the roof deck unless it is part of a single component serving as the roof covering and the *roof deck*.

**(R10015 AS)**

**PUSH-FIT FITTING.**A mechanical fitting that joins pipes or tubes and achieves a seal by mating the pipe or tube into the fitting.

**(P8773)(P89 Part II AM)**

**PRESS-CONNECT JOINT.** A permanent mechanical joint incorporating an elastomeric seal or an elastomeric seal and corrosion-resistant grip or bite ring. The joint is made with a pressing tool and jaw or ring approved by the fitting manufacturer.

**(M9289)(RM1-18 AS)**

**[RB] WINDBORNE DEBRIS REGION.**  Areas within *hurricane-prone regions* located in accordance with one of the following:

1.   Within 1 mile (1.61 km) of the ~~coastal~~ mean high-water line where an Exposure D condition exists upwind at the waterline and the ultimate design wind speed, V *ult*, is 130 mph (58 m/s) or greater.

2.   In areas where the ultimate design wind speed, V *ult*, is 140 mph (63.6 m/s) or greater; or Hawaii.

**(S9473)(G12-19 Part II AS)**

**[RB] FUEL CELL POWER SYSTEM, STATIONARY.** A stationary energy generation system that converts the chemical energy of a fuel and oxidant to electric energy (DC or AC electricity) by an electrochemical process.

**Field-fabricated fuel cell power system**. A stationary fuel cell power system that is assembled at the job site and is not a preengineered or prepackaged factory-assembled fuel cell power system.

**Preengineered fuel cell power system**. A stationary fuel cell power system consisting of components and modules that are produced in a factory, and shipped to the job site for assembly.

**Prepackaged fuel cell power system**. A stationary fuel cell power system that is factory assembled as a single, complete unit and shipped as a complete unit for installation at the job site.

**(F8723)(RB160-19 AM)**

**Copper Alloy.** A homogeneous mixture of not less than two metals where not less than 50 percent of the finished metal is copper.

**(Correlation with FGC – Chapter 2)**

**Sun Control Structure.**An accessory structure consisting of columns or posts supporting an open roof of girders, beams, or cross rafters with or without fixed or operational louvers serving to direct sunlight.

**(S10384 AM A2) with comment post October TAC meeting**

**[RB]** **STAIRWAY.** One or more flights of stairs, either interior or exterior, with the necessary landings and connecting platforms to form a continuous and uninterrupted passage from one level to another ~~within or attached to a building, porch or deck.~~

**(F8631)(RB107-19 AMPC1,2)**

 **CHAPTER 3 BUILDING PLANNING**

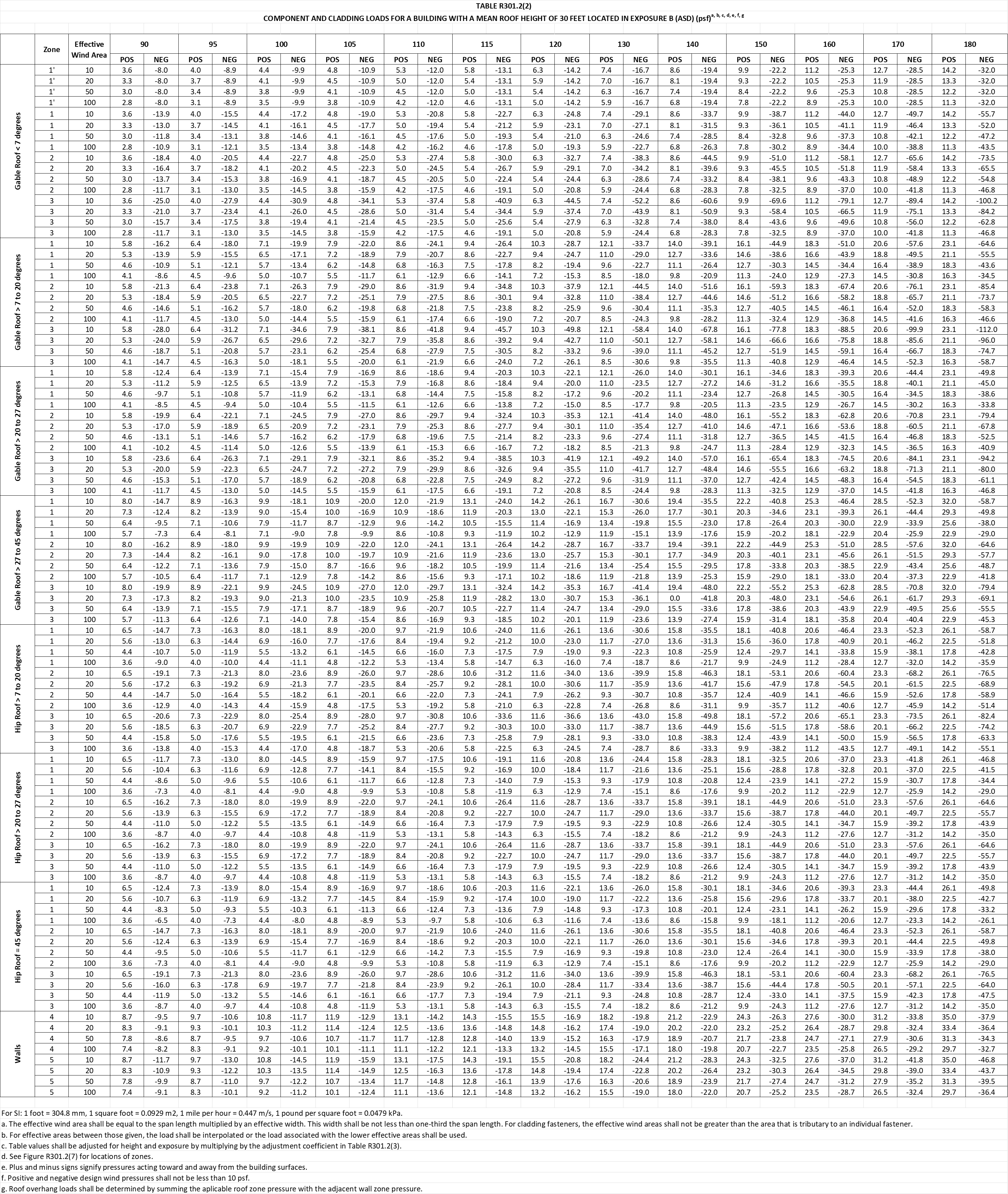
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| --- |
| **Revise as follows:**  **R301.1 Application.**Buildings and structures, and parts thereof, shall be constructed to safely support all loads, including dead loads, live loads, roof loads, flood loads, ~~snow loads,~~ and wind loads ~~and seismic loads~~ as prescribed by this code. The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets the requirements for the transfer of loads from their point of origin through the load-resisting elements to the foundation. Buildings and structures constructed as prescribed by this code are deemed to comply with the requirements of this section.    **Exception:**Buildings and structures located within the High Velocity Hurricane Zone shall comply with Sections R302 to R328, inclusive and the provisions of Chapter 44, Sections R301.2.5 and R406. In addition, buildings and structures located in flood hazard areas established in Table R301.2(1) shall comply with Sections R301.2.4, R301.2.5 and R322.  **Delete Figure R301.2(2) in its entirety and show as Reserved.**    **FIGURE R301.2(2)**  **SEISMIC DESIGN CATEGORIES—SITE CLASS D**  **Reserved**    **Delete Figure R301.2(5) in its entirety and show as Reserved.**    **FIGURE R301.2(5)**  **GROUND SNOW LOADS, Pg, FOR THE UNITED STATES (lb/ft2)**  **Reserved**  **Delete Sections R301.2.2 through R301.2.2.4 in their entirety and show as Reserved:**  **R301.2.2 Seismic provisions.** Reserved. ~~The seismic provisions of this code shall apply as follows:~~  ~~1.~~*~~Townhouses~~*~~in Seismic Design Categories C, D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~.~~  ~~2. Detached one- and two-family~~*~~dwellings~~*~~in Seismic Design Categories, D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~.~~    *Same for Sections R301.2.2.1 through R301.2.2.4.*  **Delete section in its entirety and show as Reserved:**  **R301.2.3 Snow loads.**  Reserved.~~Wood-framed construction, cold-formed, steel-framed construction and masonry and concrete construction, and structural insulated panel construction in regions with ground snow loads 70 pounds per square foot (3.35 kPa) or less, shall be in accordance with Chapters 5, 6 and 8. Buildings in regions with ground snow loads greater than 70 pounds per square foot (3.35 kPa) shall be designed in accordance with accepted engineering practice.~~  **Revise as follows:**  **R301.3 Story height.**The provisions of this code shall apply to buildings with *story heights*not exceeding the following:    (*no change to Items 1 through 5*)    Individual walls or wall studs shall be permitted to exceed these limits as permitted by Chapter 6 provisions, provided that *story heights*are not exceeded. An engineered design shall be provided for the wall or wall framing members where the limits of Chapter 6 are exceeded. Where the *story height*limits of this section are exceeded, the design of the building, or the noncompliant portions thereof, to resist wind ~~and seismic~~ loads shall be in accordance with the *Florida Building Code, Building*.  **Revise as follows:**  **R301.6 Roof load.**The roof shall be designed for the live load indicated in Table R301.6 ~~or the snow load indicated in Table R301.2(1), whichever is greater~~. |

**(S10017 AM A1)**

|  |
| --- |
| **R301.2.1.1.1.2 Sun Control Structure Design.**A registered design professional shall design sun control structures.  **R301.2.1.1.1.2.1**Free-standing sun control structures shall be permitted to be designed to resist wind speeds for Risk Category I of Figure 1609.3(4) of the *Florida Building Code-Building.*Sun control structures relying on a host structure for support shall be designed for the Risk Category of the host structure.  **R301.2.1.1.1.2.2**Operable louvers shall be repositioned and locked in the vertical open position when wind speeds are predicted to be 75 mph or greater. The contractor shall post a legible and readily visible permanent decal or sign stating words to the effect that the operable louvers are to be locked in the vertically open position when wind speeds are predicted to be 75 mph and during a hurricane warning or alert as designated by the National Weather Service. The warning label should essentially read:  THIS SUN CONTROL STRUCTURE SHALL HAVE LOUVERED BLADES LOCKED IN THE VERTICAL POSITION DURING A HURRICANE WARNING OR ALERT AS DESIGNATED BY THE NATIONAL WEATHER SERVICE OR WHEN WIND SPEEDS ARE PREDICTED TO BE 75 MPH.  **R301.2.1.1.1.3 Electrical Installations.**All electrical components and installations shall comply with Chapter 34 of this Code. |
|  |

**(S10386 AM A1)**

**Delete Table R301.2(2) and replace with the following:**

****

**Revise Table R301.2(3) as follows:**

**TABLE R301.2(3)**

**HEIGHT AND EXPOSURE ADJUSTMENT COEFICIENTS FOR TABLE R301.2(2)**

|  |  |  |  |
| --- | --- | --- | --- |
| **MEAN ROOF HEIGHT**  **(ft)** | **EXPOSURE CATEGORY** | | |
| **B** | **C** | **D** |
| 15 | 0.82 | 1.21 | 1.47 |
| 20 | 0.89 | 1.29 | 1.55 |
| 25 | 0.94 | 1.35 | 1.61 |
| 30 | 1.00 | 1.40 | 1.66 |
| 35 | 1.05 | 1.45 | 1.70 |
| 40 | ~~1.09~~ 1.06 | 1.49 | 1.74 |
| 45 | ~~1.12~~ 1.10 | 1.53 | 1.78 |
| 50 | ~~1.16~~ 1.13 | 1.56 | 1.81 |
| 55 | ~~1.19~~ 1.16 | 1.59 | 1.84 |
| 60 | ~~1.22~~ 1.19 | 1.62 | 1.87 |

**Delete Figure R301.2(7) and replace with the following:**

**Diagram, engineering drawing

Description automatically generated**

**(S9971 Original plusA1)**

**Delete Figure R301.2(4) and replace with the following:**

**Diagram

Description automatically generated**

**FIGURE R301.2(4)**

**ULTIMATE DESIGN WIND SPEEDS, VULT**

**(S9960 AS)**

**Revise as follows:**

**TABLE R301.5**

**MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS (in pounds per square foot)**

| **USE** | **LIVE LOAD** |
| --- | --- |
| Uninhabitable attics without storageb | 10 |
| Uninhabitable attics with limited storageb, g | 20 |
| Habitable attics and attics served with fixed stairs | 30 |
| Balconies (exterior) and deckse | 40 |
| Fire escapes | 40 |
| Guards and handrailsd | 200h |
| Guard in-fill componentsf | 50h |
| Passenger vehicle garagesa | 50a |
| Rooms other than sleeping rooms | 40 |
| Sleeping rooms | 30 |
| Stairs | 40c |

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm2, 1 pound = 4.45 N.

a.            Elevated garage floors shall be capable of supporting a 2,000-pound load applied over a 20-square-inch area.

b.     Uninhabitable attics without storage are those where the clear height between joists and rafters is not more than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c.     Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.

d.            A single concentrated load applied in any direction at any point along the top.

e.            See Section R507.1 for decks attached to exterior walls.

f.      Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g.     Uninhabitable attics with limited storage are those where the clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1.     The attic area is accessed from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is not less than 30 inches.

2.     The slopes of the joists or truss bottom chords are not greater than 2 ~~inches~~ units vertical to 12 units horizontal.

3.     Required insulation depth is less than the joist or truss bottom chord member depth.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

h.     Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

**(S8558)(RB45-19 AS)**

**Revise as follows:**

**TABLE R301.5**

**MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS (in pounds per square foot)**

|  |  |
| --- | --- |
| **USE** | **LIVE LOAD** |
| Uninhabitable attics without storageb | 10 |
| Uninhabitable attics with limited storageb, g | 20 |
| Habitable attics and attics served with fixed stairs | 30 |
| Balconies (exterior) and deckse | 40 |
| Fire escapes | 40 |
| Guards ~~and handrails~~~~d~~ i | 200h,i |
| Guard in-fill componentsf | 50h |
| Handrails d | 200h |
| Passenger vehicle garagesa | 50a |
| Rooms other than sleeping rooms | 40 |
| Sleeping rooms | 30 |
| Stairs | 40c |

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm2, 1 pound = 4.45 N.

a.            Elevated garage floors shall be capable of supporting a 2,000-pound load applied over a 20-square-inch area.

b.     Uninhabitable attics without storage are those where the clear height between joists and rafters is not more than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c.     Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.

d.            A single concentrated load applied in any direction at any point along the top.

e.            See Section R507.1 for decks attached to exterior walls.

f.     Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g.     Uninhabitable attics with limited storage are those where the clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1.     The attic area is accessed from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is not less than 30 inches.

2.     The slopes of the joists or truss bottom chords are not greater than 2 inches vertical to 12 units horizontal.

3.     Required insulation depth is less than the joist or truss bottom chord member depth.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

h.     Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

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Where the top of a guard system is not required to serve as a handrail, Where the top of a guard system is not required to serve as a handrail, the single concentrated load shall be applied at any point along the top, in the vertical downward direction and in the horizontal direction away from the walking surface. Where the top of a guard is also serving as the handrail, a single concentrated load shall be applied in any direction at any point along the top. Concentrated load shall not be applied concurrently.

**(S8579)(RB46-19 AMPC1)**

**Revise as follows:**

**TABLE R301.5**

**MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS (in pounds per square foot)**

| **USE** | **LIVE LOAD** |
| --- | --- |
| Uninhabitable attics without storageb | 10 |
| Uninhabitable attics with limited storageb, g | 20 |
| Habitable attics and attics served with fixed stairs | 30 |
| Balconies (exterior) and deckse | 40 |
| Fire escapes | 40 |
| Guards ~~and handrails~~d | 200h |
| Guard in-fill componentsf | 50h |
| Handrails d | 200h |
| Passenger vehicle garagesa | 50a |
| Rooms other than sleeping rooms | 40 |
| Sleeping rooms | 30 |
| Stairs | 40c |

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm2, 1 pound = 4.45 N.

a.            Elevated garage floors shall be capable of supporting a 2,000-pound load applied over a 20-square-inch area.

b.     Uninhabitable attics without storage are those where the clear height between joists and rafters is not more than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c.     Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.

d.     A single concentrated load applied in any direction at any point along the top. For a guard not required to serve as a handrail, the load need not be applied to the top element of the guard in a direction parallel to such element.

e.            See Section R507.1 for decks attached to exterior walls.

f.      Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g.     Uninhabitable attics with limited storage are those where the clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1.     The attic area is accessed from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is not less than 30 inches.

2.     The slopes of the joists or truss bottom chords are not greater than 2 ~~inches~~ units vertical to 12 units horizontal.

3.     Required insulation depth is less than the joist or truss bottom chord member depth.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

h.     Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

**(S8580)(RB47-19 AS)**

**TABLE R301.5**

**MINIMUM UNIFORMLY DISTRIBUTED AND CONCENTRATED LIVE LOADS ~~(in pounds per square foot)~~**

| **OCCUPANCY OR USE** | **UNIFORM ~~LIVE~~LOAD**  **(psf)** | **CONCENTRATED LOAD**  **(lbs)** |
| --- | --- | --- |
| Uninhabitable attics without storageb | 10 | - |
| Uninhabitable attics with limited storageb, g | 20 | - |
| Habitable attics and attics served with fixed stairs | 30 | - |
| Balconies (exterior) and deckse | 40 | - |
| Fire escapes | 40 | - |
| Guards and handrailsd | ~~200~~ | 200h |
| Guard in-fill componentsf | ~~50~~ | 50h |
| Passenger vehicle garagesa | 50a | 2,000a |
| Rooms other than sleeping rooms | 40 | - |
| Sleeping rooms | 30 | - |
| Stairs | 40c | 300c |

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm2, 1 pound = 4.45 N.

a.     Elevated garage floors shall be capable of supporting the uniformly distributed live load or a 2,000-pound ~~load applied over a 20-square-inch area~~concentrated load applied on an area of 4 1/2 inches by 4 1/2 inches, whichever produces the greater stresses.

b.     Uninhabitable attics without storage are those where the clear height between joists and rafters is not more than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c.     Individual stair treads shall be ~~designed for~~capable of supporting the uniformly distributed live load or a 300-pound concentrated load ~~acting over~~applied on an area of ~~4 square~~2 inches by 2 inches, whichever produces the greater stresses.

d.            A single concentrated load applied in any direction at any point along the top.

e.            See Section R507.1 for decks attached to exterior walls.

f.      Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g.     Uninhabitable attics with limited storage are those where the clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1.     The attic area is accessed from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is not less than 30 inches.

2.            The slopes of the joists or truss bottom chords are not greater than 2 inches vertical to 12 units horizontal.

3.            Required insulation depth is less than the joist or truss bottom chord member depth.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

h.     Glazing used in handrail assemblies and guards shall be designed with a ~~safety~~load adjustment factor of 4. The ~~safety~~load adjustment factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

**(S8581)(RB48-19 AS)**

**TABLE R301.7**

**ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERSb, c**

|  |  |
| --- | --- |
| **STRUCTURAL MEMBER** | **ALLOWABLE**  **DEFLECTION** |
| Rafters having slopes greater than 3:12 with finished ceiling not attached to rafters | L/180 |
| Interior walls and partitions | H/180 |
| Floors | L/360 |
| Ceilings with brittle finishes (including plaster and stucco) | L/360 |
| Ceilings with flexible finishes (including gypsum board) | L/240 |
| All other structural members | L/240 |
| Exterior walls—wind loadsa with plaster or stucco finish | H/360 |
| Exterior walls—wind loadsa with other brittle finishes | H/240 |
| Exterior walls—wind loadsa with flexible finishes | H/120d |
| Lintels supporting masonry veneer wallse | L/600 |

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

a. For the purpose of the determining deflection limits herein, the wind load shall be permitted to be taken as 0.7 times the component and cladding (ASD) loads obtained from Table R301.2(2).

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

c. For aluminum structural members or panels used in roofs or walls of sunroom additions or patio covers, not supporting edge of glass or sandwich panels, the total load deflection shall not exceed L/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed L/175 for each glass lite or L/60 for the entire length of the member, whichever is more stringent. For sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed L/120.

d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of H/180.

e. Refer to Section R703.8.2. Dead load of supported materials shall be included when calculating the deflection of these members.

**(S8584)(RB52-19 AS)**

**R302.4.1 Through penetrations.**Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R302.4.1.1 or R302.4.1.2

**Exceptions:**

1.     Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be protected as follows:

11.1.        In concrete or masonry wall or floor assemblies, concrete, grout or mortar shall be permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating, provided that both of the following are complied with:

1.11.1.1.          The nominal diameter of the penetrating item is not more than 6 inches (152 mm).

1.21.1.2.          The area of the opening through the wall does not exceed 144 square inches (92 900 mm2).

21.2.        The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time temperature fire conditions under a positive pressure differential of not less than 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

2.     The annular space created by the penetration of water-filled fire sprinkler piping, provided that the annular space is filled using a material complying with item 1.2 of Exception 1.

**R302.4.2 Membrane penetrations.**Membrane penetrations shall comply with Section R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be installed so that the required fire-resistance rating will not be reduced.

**Exceptions:**

1.     Membrane penetrations of not more than 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0103 m2) in area provided that the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm). Such boxes on opposite sides of the wall shall be separated by one of the following:

1.1.  By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual noncommunicating stud cavities.

1.2.  By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose-fill, rockwool or slag mineral wool insulation.

1.3.  By solid fireblocking in accordance with Section R302.11.

1.4.  By protecting both boxes with listed putty pads.

1.5.  By other listed materials and methods.

2.     Membrane penetrations by listed electrical boxes of any materials provided that the boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise. Such boxes on opposite sides of the wall shall be separated by one of the following:

2.1.  By the horizontal distance specified in the listing of the electrical boxes.

2.2.  By solid fireblocking in accordance with Section R302.11.

2.3.  By protecting both boxes with listed putty pads.

2.4.  By other listed materials and methods.

3.     The annular space created by the penetration of a fire sprinkler or water-filled fire sprinkler piping, provided that ~~it~~ the annular space is covered by a metal escutcheon plate.

4.     Ceiling membrane penetrations by listed luminaires or by luminaires protected with listed materials that have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

**(F8593)(RB67-19 AMPC1)**

**Revise as follows:**

**R302.8 Foam plastics.**For requirements for foam plastics, see Section R316.

**R302.8.1** Foam plastics used as interior finishes shall comply with Section R316.5.10.

**(F8598)(RB70-19)**

**Add new text as follows:**

**~~R302.9.4~~ R302.9.5 High density polyethylene (HDPE) and polypropylene (PP).**Where high density polyethylene or polypropylene is used as an interior finish material, it shall be tested in accordance with NFPA 286 and comply with the requirements criteria in Section R302.9.4.

**(F8601)(RB71-19 AM)**

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

**Exceptions:**

1. ~~The~~ For habitable rooms other than kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.

2. For kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a local exhaust system is installed in accordance with Section M1505. ~~Where the openable glazing area is less than 4 percent of the kitchen floor area, ductless kitchen exhaust shall not be permitted.~~

~~23~~. The glazed areas need not be installed in rooms where Exception 1 is satisfied and artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.

~~3~~4. Use of sunroom and patio covers, as defined in Section R202, shall be permitted for natural ventilation if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening.

**(M8463)(RB3-18 AM)**

**Revise as follows:**

**R305.1 Minimum height. *Habitable space*, hallways and portions of *basements* containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm).**

Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

**Exceptions:**

1.   For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 7 feet (2134 mm).

2.   The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.

3.   Beams, girders, ducts or other obstructions in *basements* containing *habitable space* shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.

 4.     Beams and girders spaced apart not less than 36 inches in clear finished width shall project not more than 78 inches from the finished floor.

**(F8603)(RB80-19 AM)**

**Revise as follows:**

**R308.4.5 Glazing and wet surfaces.Glazing in walls, enclosures or fences containing, facing or ~~facing~~ adjacent to hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface shall be considered to be a hazardous location. This shall apply to single glazing and each pane in multiple glazing.**

**Exception:** Glazing that is more than 60 inches (1524 mm), measured horizontally ~~and in a straight line,~~ from the water’s edge of a bathtub, hot tub, spa, whirlpool or swimming pool or from the edge of a shower, sauna or steam room.

**(F8604)(RB82-19 AM)**

**R308.4.5 Glazing and wet surfaces.**

Glazing in walls, enclosures or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface shall be considered to be a hazardous location. This shall apply to single glazing and each pane in multiple glazing.

**Exceptions:**

**1.**    Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the water’s edge of a bathtub, hot tub, spa, whirlpool or swimming pool or from the edge of a shower, sauna or steam room.

**2.**   Outboard sacrificial panes in laminated insulating glass units in walls where the exterior of the unit is not exposed to any of the hazardous locations specified in Section R308.4.

**(F10397 AS)**

Revise as follows:

**R308.6.3 Screens, general.** For fully tempered or heat-strengthened glass, a ~~retaining~~ broken glass retention screen meeting the requirements of Section R308.6.7 shall be installed below the full area of the glass, except for fully tempered glass that meets ~~either~~ condition 1 or 2 listed in Section R308.6.5.

**R308.6.4 Screens with multiple glazing**. Where the inboard pane is fully tempered, heat-strengthened or wired glass, a ~~retaining~~ broken glass retention screen meeting the requirements of Section R308.6.7 shall be installed below the full area of the glass, except for ~~either~~ condition 1 or 2 listed in Section R308.6.5. Other panes in the multiple glazing shall be of any type listed in Section R308.6.2.

**R308.6.5 Screens not required.** Screens shall not be required where laminated glass complying with item 1 of Section R308.6.2 is used as single glazing or the inboard pane in multiple glazing.

Screens shall not be required where fully tempered glass is used as single glazing or the inboard pane in multiple glazing and either of the following conditions are met:

1.   The glass area is 16 square feet (1.49 m2) or less; the highest point of glass is not more than 12 feet (3658 mm) above a walking surface; the nominal glass thickness is not more than 3/16 inch (4.8 mm); and  ~~(for~~ , for multiple glazing ~~only)~~ only, the other pane or panes are fully tempered, laminated or wired glass.

2.   The glass area is greater than 16 square feet (1.49 m2); the glass is sloped 30 degrees (0.52 rad) or less from vertical; and the highest point of glass is not more than 10 feet (3048 mm) above a walking surface.

**R308.6.7 Screen characteristics.** The screen and its fastenings shall: be capable of supporting twice the weight of the glazing~~,~~ ; be firmly and substantially fastened to the framing members~~,~~ ; be installed within 4 inches (102mm) of the glass; and have a mesh opening of not ~~more~~ greater than 1 inch by 1 inch (25 mm by 25 mm).

**(F8606)(RB83-19 AS)**

**Revise as follows:**

**R309.3 Flood hazard areas.** Garages and carports ~~For buildings~~ located in flood hazard areas as established by Table R301.2(1) shall be constructed in accordance with Section R322.~~, garage floors shall be one of the following:~~

~~1. Elevated to or above the required lowest floor elevation as determined in accordance with Section R322.~~

~~2. Located below the required lowest floor elevation provided that the floors are at or above grade on not less than one side, are used solely for parking, building access or storage, meet the requirements of Section R322 and are otherwise constructed in accordance with this code.~~

**(SP8699)(RB141-19 AMPC2)**

**R310.1.1 Operational constraints and opening control devices.**

Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools or special knowledge. Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening.

**(F10414 AS)**

**R310.2 Emergency escape and rescue openings.** Emergency escape and rescue openings shall have minimum dimensions ~~as specified in this section.~~in accordance with Sections 310.2.1 through 310.2.3.

## **R310.2.1 Minimum ~~opening area~~ size.** Emergency and escape rescue openings shall have a net clear opening of not less than 5.7 square feet (0.530 m2) . *~~The net clear opening~~* ~~dimensions required by this section shall be obtained by the normal operation of the~~ *~~emergency escape and rescue~~* ~~opening from the inside. The net clear height of the opening shall be not less than 24 inches (610 mm) and the net clear width shall be not less than 20 inches (508 mm).~~

**~~Exception:~~** *~~Grade floor openings~~* ~~or~~ *~~below~~*~~-~~*~~grade~~* *~~openings~~* ~~shall have a net clear opening area of not less than~~ The minimum net clear opening for *grade-floor* *emergency escape and rescue* *openings shall be* 5 square feet (0.465 m2).

**Add new text as follows:**

## **R310.2.2 Minimum dimensions.** The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

**Revise as follows:**

## ~~R310.2.2~~R310.2.3 ~~Window sill height.~~ Maximum height from floor. ~~Where a window is provided as the emergency~~ Emergency escape and rescue ~~opening~~ openings, ~~it~~ shall have ~~a sill height of not more than~~ the bottom of the clear opening not greater than 44 inches (1118 mm) above the floor~~; where the sill height is below~~ *~~grade~~*~~, it shall be provided with a window well in accordance with~~ ~~Section R310.2.3~~.

## 

**(F8623)(RB94-19 AS)**

## R310.2 Emergency escape and rescue openings. Emergency escape and rescue openings shall have minimum dimensions as specified in this section.

## R310.2.1 Minimum opening area. Emergency and escape rescue openings shall have a net clear opening of not less than 5.7 square feet (0.530 m2). The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. The net clear height of the opening shall be not less than 24 inches (610 mm) and the net clear width shall be not less than 20 inches (508 mm).

**Exception:** *Grade floor emergency escape and rescue openings* or *below*-*grade* *openings* shall have a net clear opening area of not less than 5 square feet (0.465 m2).

**(F8474) (RB14-19 AMPC1)**

**R311.7 Stairways.** Where required by this code or provided, *stairways* shall comply with this section.

**Exceptions:**

1. Stairways not within or serving a building, porch or deck.

2. Stairways leading to nonhabitable attics.

3. Stairways leading to *crawl spaces*.

**(F8631)(RB107-19 AMPC1,2)**

|  |
| --- |
| **Revise as follows:**    **R311.7.3 Vertical rise. A flight of stairs shall not have a vertical rise ~~larger~~ greater than ~~151~~ 12 feet 7 inches (3835 mm) between floor levels or landings.** |
| **(F8648)(RB110-19 AS)**  Revise as follows:    R311.7.5.1 Risers. The riser height shall be not more than 73/4 inches (196 mm). The riser height shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread ~~above at an angle not more than 30 degrees (0.51 rad) from the vertical.~~ above. At open risers, openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below shall not permit the passage of a 4-inch-diameter (102 mm) sphere.    **Exceptions:**    1.         The opening between adjacent treads is not limited on spiral stairways.  2.         The riser height of spiral stairways shall be in accordance with Section R311.7.10.1.  **(F8649)(RB111-19 AS)**  **R311.7.7 Stairway walking surface. The walking surface of treads and landings of stairways shall be sloped not steeper than one unit vertical in 48 ~~inches~~ units horizontal (2-percent slope).**    **Exception:** Where the surface of a landing is required elsewhere in the code to drain surface water, the walking surface of the landing shall be sloped not steeper than 1 unit vertical in 20 units horizontal (5-percent slope) in the direction of travel. |
| **(F8651)(RB113-19 AS)**  **Revise as follows:**    **R312.2.1 Window sills opening height.In dwelling units, where the ~~top~~ bottom of the ~~sill~~ clear opening of an operable window opening is located less than 24 inches (610 mm) above the finished floor and greater than 72 inches (1829 mm) above the finished *grade* or other surface below on the exterior of the building, the operable window shall comply with one of the following:**    1.   Operable window openings will not allow a 4-inch-diameter (102 mm) sphere to pass through where the openings are in their largest opened position.  2.   Operable windows are provided with window fall prevention devices that comply with ASTM F2090.  3.   Operable windows are provided with window opening control devices that comply with Section R312.2.2.  **(F8654)(RB121-19 AS)**    **Revise as follows:**      **R312.1.4 Exterior Plastic Composite guards. Plastic composite exterior ~~Exterior~~ *guards* shall comply with the requirements of Section ~~R507.10~~ R317.4.**  **(F9765)(RB185-19 AMPC1)** R312.2.2 Window opening control devices. Window opening control devices shall comply with ASTM F2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the net clear opening area of the window unit to less than the area required by Section R310.2.1 and R310.2.2. **(F8623)(RB94-19 AS)**  **Revise as follows:**  **R314.3.1 Installation near cooking appliances.** Smoke alarms shall not be installed in the following locations unless this would prevent placement of a smoke alarm in a location required by Section R314.3.  1.   Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking *appliance*.  2.   Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking *appliance*.  3.   Photoelectric smoke alarms shall not be installed less than 6 feet (1828 mm) horizontally from a permanently installed cooking *appliance*.  4.   Smoke alarms listed and marked “helps reduce cooking nuisance alarms” shall not be installed less than 6 feet (1828 mm) horizontally from a permanently installed cooking appliance.  **(F8661)(RB129-19 AS)**   |  | | --- | | **Revise as follows:**      **R316.3 Surface burning characteristics.** Unless otherwise allowed in Section R316.5, foam plastic, or foam plastic cores used as a component in manufactured assemblies, used in building construction shall comply with R316.3.1 or R316.3.2. ~~have a flame spread index of not more than 75 and shall have a smoke-developed index of not more than 450 when tested in the maximum thickness and density intended for use in accordance with ASTM E84 or UL 723.~~ Loose-fill-type foam plastic insulation shall be tested as board stock for the flame spread index and smoke-developed index.    **~~Exception:~~** ~~Foam plastic insulation more than 4 inches (102 mm) thick shall have a flame spread index of not more than 75 and a smoke-developed index of not more than 450 where tested at a thickness of not more than 4 inches (102 mm), provided that the end use is~~ *~~approved~~* ~~in accordance with Section R316.6 using the thickness and density intended for use.~~    **Add new text as follows:**    R316.3.1 Foam plastic insulation 4" thick or less.Foam plastic insulation installed at 4" thickness or less shall have a flame spread index of not more than 75 and shall have a smoke-developed index of not more than 450 where tested in the maximum thickness and density intended for use in accordance with ASTM E84 or UL 723.    **R316.3.2 Foam plastic insulation more than 4" thick.**Foam plastic insulation installed at more than 4 inches (102 mm) thickness shall have a flame spread index of not more than 75 and a smoke-developed index of not more than 450 where tested at a thickness of 4 inches (102 mm) in accordance with ASTM E84 or UL723, provided that the end use is approved in accordance with Section R316.6 using the thickness and density intended for use.  **(F8687)(RB132-19 AM)** | |  | |  |   **Revise as follows:**    **R316.3 Surface burning characteristics.** Unless otherwise allowed in Section R316.5, foam plastic, or foam plastic cores used as a component in manufactured assemblies, used in building construction shall have a flame spread index of not more than 75 and shall have a smoke-developed index of not more than 450 when tested in the maximum thickness and density intended for use in accordance with ASTM E84 or UL 723. Loose-fill-type foam plastic insulation shall be tested as board stock for the flame spread index and smoke-developed index.  **~~Exception~~Exceptions:**  1.     Foam plastic insulation, other than spray foam plastic insulation, more than 4 inches (102 mm) thick shall have a flame spread index of not more than 75 and a smoke-developed index of not more than 450 where tested at a thickness of ~~not more than~~ 4 inches (102 mm), provided that the end use is *approved* in accordance with Section R316.6 using the thickness and density intended for use.  2.     Spray foam plastic insulation more than 4 inches (102 mm) in thickness shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 where tested at a thickness of 4 inches (102 mm), and at the density intended for use, provided that the spray foam plastic is separated from the interior of a building by 1/2-inch (12.7 mm) gypsum wallboard, or by a material that has been tested in accordance with NFPA 275, and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test .    **(F8689)(RB133-19 AM)** |
| R316.5.13 Floors. The thermal barrier specified in Section R316.4 is not required to be installed on the walking surface of a structural floor system that contains foam plastic insulation where the foam plastic is covered by not ~~more~~ less than a nominal 1/2-inch-thick (12.7 mm) wood structural panel or equivalent. The thermal barrier specified in Section R316.4 is required on the underside of the structural floor system that contains foam plastic insulation where the underside of the structural floor system is exposed to the interior of the building.  **(F8691)(RB135-19 AS)** |

**R317.1 ~~Location required~~ Protection of wood members from decay.** . Protection of wood and wood-based products from decay shall be provided in the following locations by the use of naturally durable wood or wood that is preservative-treated in accordance with AWPA U1.

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1. ~~Wood joists or the bottom of a wood structural floor when closer than 18 inches (457 mm) or wood girders when closer than 12 inches (305 mm) to the exposed ground in~~ In crawl spaces or unexcavated area located within the periphery of the building foundation~~.~~, wood joists or the bottom of a wood structural floor where closer than 18 inches (457 mm) to exposed ground, wood girders where closer than 12 inches (305 mm) to exposed ground, and wood columns where closer than 8 inches (204 mm) to exposed ground.
2. Wood framing members, including columns, that rest directly on concrete or masonry exterior foundation walls and are less than 8 inches (203 mm) from the exposed ground.

3.   Sills and sleepers on a concrete or masonry slab that is in direct contact with the ground unless separated from such slab by an impervious moisture barrier.

4.   The ends of wood girders entering exterior masonry or concrete walls having clearances of less than 1/2 inch (12.7 mm) on tops, sides and ends.

5.   Wood siding, sheathing and wall framing on the exterior of a building having a clearance of less than 6 inches (152 mm) from the ground or less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather.

6.   Wood structural members supporting moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, unless separated from such floors or roofs by an impervious moisture barrier.

7.   Wood furring strips or other wood framing members attached directly to the interior of exterior masonry walls or concrete walls below *grade* except where an *approved* vapor retarder is applied between the wall and the furring strips or framing members.

8.   Portions of wood structural members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances where those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that would prevent moisture or water accumulation on the surface or at joints between members

Exception: Sawn lumber used in buildings located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use naturally durable or perservative-treated wood where the structure is exposed to the weather.

9. Wood columns in contact with basement floor slabs unless supported by concrete piers or metal pedestals projecting at least 1 inch (25 mm) above the concrete floor and separated from the concrete pier by an impervious moisture barrier.

|  |
| --- |
| **R317.1.1Field treatment.** Unchanged.  **R317.1.2 Ground contact.**Unchanged.  **~~R317.1.4 Wood columns.~~** ~~Wood columns shall be~~ *~~approved~~* ~~wood of natural decay resistance or~~ *~~approved~~*  ~~pressure-preservative-treated wood.~~  **~~Exceptions:~~**    ~~1. Columns exposed to the weather or in~~ *~~basements~~* ~~where supported by concrete piers or metal ped- estals projecting 1 inch (25 mm) above a concrete floor or 6 inches (152 mm) above exposed earth and the earth is covered by an~~ *~~approved~~* ~~impervious moisture barrier.~~  ~~2. Columns in enclosed crawl spaces or unexcavated areas located within the periphery of the building when supported by a concrete pier or metal pedestal at a height more than 8 inches (203 mm) from exposed earth and the earth is covered by an impervious moisture barrier.~~  ~~3. Deck posts supported by concrete piers or metal pedestals projecting not less than 1 inch (25 mm) above a concrete floor or 6 inches (152 mm) above exposed earth.~~ |

Delete without substitution:

~~R317.1.3~~ ~~Geographical areas.In geographical areas where experience has demonstrated a specific need,~~ ~~approved~~ ~~naturally durable or pressure-preservative-treated wood shall be used for those portions of wood members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances where those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that would prevent moisture or water accumulation on the surface or at joints between members. Depending on local experience, such members typically include:~~

 1.  ~~Horizontal members such as girders, joists and decking.~~

 2.  ~~Vertical members such as posts, poles and columns.~~

 3.  ~~Both horizontal and vertical members.~~

~~R317.1.5~~ ~~Exposed glued-laminated timbers.The portions of glued-laminated timbers that form the structural supports of a building or other structure and are exposed to weather and not properly protected by a roof, eave or similar covering shall be pressure treated with preservative, or be manufactured from naturally durable or preservative-treated wood.~~

**(F8693)(RB136-19 AS)/(S10116 AM A1)**

**R322.1.6 Protection of mechanical, plumbing and electrical systems.** Electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall be located at or above the elevation required in Section R322.2 or R322.3. Replacement of exterior equipment and exterior appliances damaged by flood shall meet the requirements of this section. If replaced as part of a substantial improvement, electrical systems, equipment and components; heating, ventilating, air conditioning and plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

**Exception:** Locating electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the required elevation in accordance with ASCE 24. Equipment for pools, spas and water features shall be permitted below the elevation required in Section R322.2 or R322.3 provided it is elevated to the extent practical and is anchored to prevent floatation and resist flood forces and is supplied by branch circuits that have ground-fault circuit interrupter protection.  Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

**(SP10257 AM A2 plus original)/ (SP8699)(RB141-19 AMPC2)**

**R322.1.10 As-built elevation documentation.** A licensed professional surveyor and mapper or registered design professional shall prepare and seal documentation of the elevations specified in Section R322.2 or R322.3.

**(SP10351 AM A1)**

**R322.2.1 Elevation requirements.**

1. Buildings and structures in flood hazard areas not including flood hazard areas designated as Coastal A Zones, shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.

2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated to a height above the highest adjacent grade of not less than the depth number specified in feet (mm) on the FIRM plus 1 foot (305 mm), or not less than 3 feet (915 mm) if a depth number is not specified.

3. Basement floors that are below grade on all sides shall be elevated to or above base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.

4. Attached garages and carports  ~~Garage and carport floors~~ shall comply with one of the following:

4.1. ~~They~~The floors shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.

4.2. ~~They~~The floors shall be at or above grade on not less than one side. Where ~~a~~ an attached garage or carport is enclosed by walls , the walls shall have flood openings that comply with Section R322.2.2 and the attached garage or carport shall be used solely for parking, building access or storage.

5. Detached accessory structures and detached garages shall comply with either of the following:

5.1. The floors shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.

5.2. The floors are permitted below the elevations required in Item 1 or Item 2, as applicable, provided such detached structures comply with

all of the following:

5.2.1. Are used solely for parking or storage.

5.2.2. Are one story and not larger than 600 square feet (55.75 m ).

5.2.3. Are anchored to resist flotation, collapse or lateral movement resulting from design flood loads.

5.2.4. Have flood openings that comply with Section R322.2.2.

5.2.5. Are constructed of flood damage-resistant materials that comply with Section R322.1.8.

5.2.6. Have mechanical, plumbing and electrical systems, if applicable, that comply with Section R322.1.6.

**Exception:** Enclosed areas below the elevation required in this section, including basements with floors that are not below grade on all sides, shall meet the requirements of Section 322.2.2.

**R322.3.2 Elevation requirements.**

1. Buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structure members supporting the lowest floor, with the exception of pilings, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher.

2. Basement floors that are below grade on all sides are prohibited.

3. Attached garages ~~Garages~~ used solely for parking, building access or storage, and carports shall comply with Item 1 or shall be at or above grade on not less than one side and, if enclosed with walls, such walls shall comply with Item ~~6~~ 7.

4. Detached accessory structures and detached garages shall comply with either of the following:

4.1. The bottom of the lowest horizontal structural member supporting the floors shall be elevated to or above the elevation required in

Item 1.

4.2. The floors are permitted below the elevations required in Item 1, provided such detached structures comply with all of the following:

4.2.1. Are used solely for parking or storage.

4.2.2. Are one story and not larger than 100 square feet (9.29 m).

4.2.3. Are anchored to resist flotation, collapse or lateral movement resulting from design flood loads.

5 ~~4~~. The use of fill for structural support is prohibited.

6 ~~5~~. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

7 ~~6~~. Walls and partitions enclosing areas below the ~~design flood~~ elevation required in this section shall meet the requirements of Sections R322.3.5 and R322.3.6.

**(SP10256 AS)/ (SP8700)(RB142-19 AS)/ (SP8699)(RB141-19 AMPC2)**

**R322.2.2 Enclosed area below required elevation.** Enclosed areas, including crawl spaces, that are below the elevation required in Section R322.2.1 shall:

1. Be used solely for parking of vehicles, building access or storage.

2. Be provided with flood openings that meet the following criteria and are installed in accordance with Section R322.2.2.1:

2.1. The total net area of non-engineered openings shall be not less than 1 square inch (645 mm2) for each square foot (0.093 m2) of enclosed area where the enclosed area is measured on the exterior of the enclosure walls, or the openings shall be designed as engineered openings and the construction documents shall include a statement by a registered design professional that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.7.2.2 of ASCE 24.

2.2. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.

2.3 The presence of louvers, blades, screens and faceplates or other covers and devices shall allow the automatic flow of floodwater into and out of the enclosed areas and shall be accounted for in the determination of the net open area.

**Exception:**The following are not required to comply with this section:

1. Elevator shafts.

2. Utility chases that protect utility lines from freezing, provided the utility chases are the minimum size necessary to protect the utility lines and do not provide access for a person to enter the space.

**R322.3.5 Walls below required elevation.** Walls and partitions are permitted below the elevation required in Section R322.3.2, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and

2. Are constructed with insect screening or open lattice; or

3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a resistance of not less than 10 (479 Pa) and not more than 20 pounds per square foot (958 Pa) as determined using allowable stress design; or

4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), as determined using allowable stress design, the construction documents shall include documentation prepared and sealed by a registered design professional that:

4.1. The walls and partitions below the required elevation have been designed to collapse from a water load less than that which would occur during the base flood.

4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code.

5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in Section R322.2.2, Item 2.

**Exception:**The following are not required to comply with this section:

1. Elevator shafts.

2. Utility chases that protect utility lines from freezing, provided the utility chases are the minimum size necessary to protect the utility lines and do not provide access for a person to enter the space.

**(SP10258 AS)/ (SP8699)(RB141-19 AMPC2)**

**R322.3.2 Elevation requirements.**

1. Buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structural members supporting the lowest floor, with the exception of pilings, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher. Where stem wall foundations are permitted in Coastal A Zones in accordance with R322.3.3, the bottom of the lowest horizontal structural member supporting the lowest floor is the top of the foundation wall, or top of the portion of the foundation wall, supporting the slab.

2. Basement floors that are below grade on all sides are prohibited.

3. Garages used solely for parking, building access or storage, and carports shall comply with Item 1 or shall be at or above grade on not less than one side and, if enclosed with walls, such walls shall comply with Item 6.

4.  The use of fill for structural support is prohibited.

5. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

**(SP10259 AS)**

**R322.3.3 Foundations.**Buildings and structures erected in coastal high-hazard areas and Coastal A Zones shall be supported on pilings or columns and shall be adequately anchored to such pilings or columns and shall comply with the following:

1. The space below the elevated building shall be either free of obstruction or, if enclosed with walls, the walls shall meet the requirements of Section R322.3.5.

2. Pilings shall be designed in accordance with ASCE 24 to have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift) and pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling.

3. Columns and their supporting foundations shall be designed in accordance with ASCE 24 to resist combined wave and wind loads, lateral and uplift, and shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the columns. Spread footing, mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the spread footing, mat, raft or other foundation is subject to scour or erosion from wave velocity flow conditions. If permitted, spread footing, mat, raft or other foundations that support columns shall be designed in accordance with ASCE 24.

4. Flood and wave loads shall be determined in accordance with ASCE 7 and shall include loads ~~those~~ associated with the design flood. Wind loads shall be those required by this code.

5. Foundation designs and construction documents shall be prepared and sealed in accordance with Section R322.3.9.

**Exception:**In Coastal A Zones, stem wall foundations supporting a floor system above and backfilled with soil or gravel to the underside of the floor system shall be permitted provided that the foundations are designed to account for wave action, debris impact, erosion and local scour. Where soils are susceptible to erosion and local scour, stem wall foundations shall have deep footings to account for the loss of soil.

**(SP10262 AS) (SP8702)(RB145-19 AS)**

**R322.2.2.1 Installation of openings.**The walls of enclosed areas shall have openings installed such that:

1.   There shall be not less than two openings on different sides of each enclosed area; if a building has more than one enclosed area ~~below the design flood elevation~~, each area shall have openings.

2.   The bottom of each opening shall be not more than 1 foot (305 mm) above the higher of the final interior grade or floor and the finished exterior grade immediately under each opening.

3.   Openings shall be permitted to be installed in doors and windows; doors and windows without installed openings do not meet the requirements of this section.

**R322.3.6 Enclosed areas below ~~design flood~~required elevation.**Enclosed areas below the ~~design flood~~elevation required in Section R322.3.2 shall be used solely for parking of vehicles, building access or storage.

**R322.3.7 Stairways and ramps.**Stairways and ramps that are located below the lowest floor elevations specified in Section R322.3.2 shall comply with one or more of the following:

1.   Be designed and constructed with open or partially open risers and guards.

2.   Stairways and ramps not part of the required means of egress shall be designed and constructed to break away during design flood conditions without causing damage to the building or structure, including foundation.

3.   Be retractable, or able to be raised to or above the lowest floor elevation, provided that the ability to be retracted or raised prior to the onset of flooding is not contrary to the means of egress requirements of the code.

4.   Be designed and constructed to resist flood loads and minimize transfer of flood loads to the building or structure, including foundation.

Areas below stairways and ramps shall not be enclosed with walls below the ~~design flood~~elevation required in Section R322.3.2 unless such walls are constructed in accordance with Section R322.3.5.

**(SP8699)(RB141-19 AMPC2)**

**Revise as follows:**

**R324.4.1.1 Roof load.**Portions of roof structures not covered with photovoltaic panel systems shall be designed for dead loads and roof loads in accordance with Sections R301.4 and R301.6. Portions of roof structures covered with photovoltaic panel systems shall be designed for the following load cases:

1. Dead load (including photovoltaic panel weight) ~~plus snow load in accordance with TableR301.2(1)~~.

2. Dead load (excluding photovoltaic panel weight) plus roof live load ~~or snow load, whichever is greater,~~ in accordance with Section R301.6.

**(S10017 AM A1)**

Revise as follows:

R324.3.1 Equipment listings. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction. Mounting systems *listed* and *labeled* in accordance with UL 2703 shall be installed in accordance with the manufacturer’s installation instructions and their listings.

**(S8707)(RB148-19 AS)**

R324.5 Building-integrated photovoltaic systems. Building-integrated photovoltaic (BIPV) systems that serve as roof coverings shall be designed and installed in accordance with Section R905.

R324.5.1 Photovoltaic shingles. Photovoltaic shingles shall comply with Section R905.16.

R324.5.2 Fire classification. *Building-integrated photovoltaic systems* shall have a fire classification in accordance with Section R902.3.

Add new text as follows:

R324.5.3 BIPV roof panels.BIPV roof panels shall comply with Section R905.17.

**(F8708)(RB149-19 AS)**

**Replace original text with the following:**

**SECTION R328**

**ENERGY STORAGE SYSTEMS**

**R328.1 General.** *Energy storage systems (ESS)* shall comply with the provisions of this section.

**Exceptions:**

1. *ESS listed* and *labeled* in accordance with UL 9540 and marked “For use in residential dwelling

units” where installed in accordance with the manufacturer’s instructions and NFPA 70.

2. ESS less than 1 kWh (3.6 megajoules).

**R328.2 Equipment listings.** *Energy storage systems (ESS)* shall be *listed* and *labeled* in accordance with UL 9540.

**Exception:** Where *approved*, repurposed unlisted battery systems from electric vehicles are allowed to be installed

outdoors or in detached sheds located not less than 5 feet (1524 mm) from exterior walls, property lines and public

ways.

**R328.3 Installation.** *ESS* shall be installed in accordance with the manufacturer’s instructions and their *listing*.

**R328.3.1 Spacing.** Individual units shall be separated from each other by not less than 3 feet (914 mm) except

where smaller separation distances are documented to be adequate based on large-scale fire testing complying with

Section 1207.1.5 of the *International Fire Code*.

**R328.4 Locations.** *ESS* shall be installed only in the following locations:

1. Detached garages and detached accessory structures.

2. Attached garages separated from the *dwelling unit* living space in accordance with Section R302.6.

3. Outdoors or on the exterior side of exterior walls located not less than 3 feet (914 mm) from doors and

windows directly entering the *dwelling unit*.

4. Enclosed utility closets, basements, storage or utility spaces within *dwelling units* with finished or

noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be

provided with not less than 5/8-inch (15.9 mm) Type X gypsum wallboard. *ESS* shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

**R328.5 Energy ratings.** Individual *ESS* units shall have a maximum rating of 20 kWh. The aggregate rating of the *ESS* shall not exceed:

1. 40 kWh within utility closets, basements and storage or utility spaces.

2. 80 kWh in attached or detached garages and detached accessory structures.

3. 80 kWh on exterior walls.

4. 80 kWh outdoors on the ground. *ESS* installations exceeding the permitted individual or

aggregate ratings shall be installed in accordance with Section 1207 of the *International Fire Code*.

**R328.6 Electrical installation.** *ESS* shall be installed in accordance with NFPA 70. Inverters shall be *listed* and

*labeled* in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid

shall use inverters *listed* for utility interaction.

**R328.7 Fire detection.** Rooms and areas within *dwelling units*, basements and attached garages in which *ESS* are

installed shall be protected by smoke alarms in accordance with Section R314. A heat detector, *listed* and interconnected to the smoke alarms, shall be installed in locations within *dwelling units* and attached garages where smoke alarms cannot be installed based on their listing.

**R328.8 Protection from impact.** *ESS* installed in a location subject to vehicle damage shall be protected by *approved* barriers.

**R328.9 Ventilation.** Indoor installations of *ESS* that produce hydrogen or other flammable gases during charging shall be provided with mechanical *ventilation* in accordance with Section M1307.4.

**R328.10 Electric vehicle use.** The temporary use of an *owner* or occupant’s electric-powered vehicle to power a

*dwelling unit* while parked in an attached or detached garage or outdoors shall comply with the vehicle manufacturer’s instructions and NFPA 70.

**R328.11 Documentation and labeling.** The following information shall be provided:

1. A copy of the manufacturer’s installation, operation, maintenance and decommissioning instructions shall

be provided to the owner or placed in a conspicuous location near the *ESS* equipment.

2. A label on the installed system containing the contact information for the qualified maintenance and

service providers.

**(F8718)(RB153-19 AM)/ (F8720) (RB158-19 AS)/ (F8719/RB154-19 AMPC1)**

|  |
| --- |
| **SECTION R329 STATIONARY ENGINE GENERATORS**    **R329.1 General.Stationary engine generators shall be *listed* and labeled in accordance with UL 2200 and shall comply with this section. The connection of stationary engine generators to the premise wiring system shall be by means of a *listed* transfer switch.**    **R329.2 Installation.The installation of stationary engine generators shall be in an *approved* location and in accordance with the *listing*, the manufacturer’s installation instructions, and Chapters 34 through 43.** |
| **(F8722)(RB159-19 AS)** |

**Add new text as follows:**

**SECTION R330  
STATIONARY FUEL CELL POWER SYSTEMS**

**R330.1 General.** *Stationary fuel cell power systems* in new and existing buildings and structures shall comply with ~~Section 1206 of the~~*~~International Fire Code~~ the Florida Fire Prevention* Code.

**(F8723)(RB160-19 AM)**

|  |
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|  |
|  |

**Chapter 4 FOUNDATIONS**

**Replace the original Mod in its entirety with the following language:**

**Revise as follows:**

**R401.1 Application.**The provisions of this chapter shall control the design and construction of the foundation and foundation spaces for buildings. In addition to the provisions of this chapter, the design and construction of foundations in flood hazard areas as established by Table R301.2(1) shall meet the provisions of Section R322. Wood foundations shall be designed and installed in accordance with AWC PWF.

**Exception:**The provisions of this chapter shall be permitted to be used for wood foundations only in the following situations:

1. In buildings that have no more than two floors and a roof.

2. Where interior *basement*and foundation walls are constructed at intervals not exceeding 50 feet (15 240 mm).

3. Buildings and structures located within the High-Velocity Hurricane Zone shall comply with the provisions of Chapter 44 and, as applicable, Section R322 in flood hazard areas.

~~Wood foundations in Seismic Design Category D0, D1 or D2 shall be designed in accordance with accepted engineering practice.~~

**Revise as follows:**

**TABLE R403.1(1)**

**MINIMUM WIDTH AND THICKNESS FOR CONCRETE FOOTINGS FOR LIGHT-FRAME CONSTRUCTION (inches)a, b**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **~~SNOW LOAD OR~~ ROOF LIVE LOAD** | **STORY AND TYPE OF STRUCTURE WITH LIGHT FRAME** | **LOAD-BEARING VALUE OF SOIL (psf)** | | | | | |
| **1500** | **2000** | **2500** | **3000** | **3500** | **4000** |

(*no change to table values*)

**Revise as follows:**

**TABLE R403.1(2)**

**MINIMUM WIDTH AND THICKNESS FOR CONCRETE FOOTINGS FOR LIGHT-FRAME CONSTRUCTION WITH BRICK VENEER (inches)a, b**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **~~SNOW LOAD OR~~ ROOF LIVE LOAD** | **STORY AND TYPE OF STRUCTURE WITH LIGHT FRAME** | **LOAD-BEARING VALUE OF SOIL (psf)** | | | | | |
| **1500** | **2000** | **2500** | **3000** | **3500** | **4000** |

(*no change to table values*)

**Revise as follows:**

**TABLE R403.1(3)**

**MINIMUM WIDTH AND THICKNESS FOR CONCRETE FOOTINGS**

**WITH CAST-IN-PLACE CONCRETE OR FULLY GROUTED MASONRY WALL CONSTRUCTION (inches)a, b**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **~~SNOW LOAD OR~~ ROOF LIVE LOAD** | **STORY AND TYPE OF STRUCTURE WITH LIGHT FRAME** | **LOAD-BEARING VALUE OF SOIL (psf)** | | | | | |
| **1500** | **2000** | **2500** | **3000** | **3500** | **4000** |

(*no change to table values*)

**Delete section in its entirety:**

**~~R403.1.6.1 Foundation anchorage in Seismic Design Categories C, D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~.~~**~~In addition to the requirements of Section R403.1.6, the following requirements shall apply to wood light-frame structures in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~and wood light-frame townhouses in Seismic Design Category C.~~

~~1. Plate washers not less than 0.229 inch by 3 inches by 3 inches (5.8 mm by 76 mm by 76 mm) in size shall be provided for all anchor bolts over the full length of required~~*~~braced wall lines~~*~~except where~~*~~approved~~*~~anchor straps are used. Properly sized cut washers shall be permitted for anchor bolts in wall lines not containing~~*~~braced wall panels~~*~~. The hole in the plate washer is permitted to be diagonally slotted with a width of up to 3/16 inch (5 mm) larger than the bolt diameter and a slot length not to exceed 13/4 inches (44 mm), provided that a standard cut washer is placed between the plate washer and the nut.~~

~~2. Interior braced wall plates shall have anchor bolts spaced at not more than 6 feet (1829 mm) on center and located within 12 inches (305 mm) of the ends of each plate section when supported on a continuous foundation.~~

~~3. Interior bearing wall sole plates shall have anchor bolts spaced at not more than 6 feet (1829 mm) on center and located within 12 inches (305 mm) of the ends of each plate section when supported on a continuous foundation.~~

~~4. The maximum anchor bolt spacing shall be 4 feet (1219 mm) for buildings over two stories in height.~~

~~5. Stepped cripple walls shall comply with Section R602.3.~~

~~6. Where continuous wood foundations in accordance with Section R404.2 are used, the force transfer shall have a capacity equal to or greater than the connections required by Item 1 of this section or the~~*~~braced wall panel~~*~~shall be connected to the wood foundations in accordance with the~~*~~braced wall panel~~*~~-to-floor fastening requirements of Section R602.3.~~

**Revise as follows:**

**R403.4.1 Crushed stone footings.**Clean crushed stone shall be free from organic, clayey or silty soils. Crushed stone shall be angular in nature and meet ASTM C33, with the maximum size stone not to exceed 1/2 inch (12.7 mm) and the minimum stone size not to be smaller than 1/16 inch (1.6 mm). Crushed stone footings for precast foundations shall be installed in accordance with Figure R403.4(1) and Table R403.4. Crushed stone footings shall be consolidated using a vibratory plate in a maximum of 8-inch (203 mm) lifts. ~~Crushed stone footings shall be limited to Seismic Design Categories A, B and C.~~

**Revise as follows:**

**TABLE R404.1.1(2)**

**8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d**= **5 INCHESa, c, f**

(*no change to table values*)

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches i~~n Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~.

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R404.1.1(3)**

**10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d > 6.75 INCHESa, c, f**

(*no change to table values*)

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches i~~n Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~.

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R404.1.1(4)**

**12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d**> **8.75 INCHESa, c, f**

(*no change to table values*)

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches i~~n Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~.

(*no change to remaining notes*)

**Revise as follows:**

**R404.1.2.1 Masonry foundation walls.**Concrete masonry and clay masonry foundation walls shall be constructed as set forth in Table R404.1.1(1), R404.1.1(2), R404.1.1(3) or R404.1.1(4) and shall also comply with applicable provisions of Section R606. ~~In buildings assigned to Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~, concrete masonry and clay masonry foundation walls shall also comply with Section R404.1.4.1.~~ Rubble stone masonry foundation walls shall be constructed in accordance with Sections R404.1.8 and R606.4.2. ~~Rubble stone masonry walls shall not be used in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~.~~

**Revise as follows:**

**R404.1.3.2 Reinforcement for foundation walls.**Concrete foundation walls shall be laterally supported at the top and bottom. Horizontal reinforcement shall be provided in accordance with Table R404.1.2(1). Vertical reinforcement shall be provided in accordance with Table R404.1.2(2), R404.1.2(3), R404.1.2(4), R404.1.2(5), R404.1.2(6), R404.1.2(7) or R404.1.2(8). Vertical reinforcement for flat *basement*walls retaining 4 feet (1219 mm) or more of unbalanced backfill is permitted to be determined in accordance with Table R404.1.2(9). For *basement*walls supporting above-grade concrete walls, vertical reinforcement shall be the greater of that required by Tables R404.1.2(2) through R404.1.2(8) or by Section R608.6 for the above-grade wall. ~~In buildings assigned to Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~, concrete foundation walls shall also comply with Section R404.1.4.2.~~

**Revise as follows:**

**R404.1.3.3.1 Compressive strength.**The minimum specified compressive strength of concrete, *f**c*, shall comply with Section R402.2 and shall be not less than 2,500 psi (17.2 MPa) at 28 days ~~in buildings assigned to Seismic Design Category A, B or C and 3000 psi (20.5 MPa) in buildings assigned to Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~.

**Revise as follows:**

**R404.1.3.3.7.1 Steel reinforcement.**Steel reinforcement shall comply with the requirements of ASTM A615, A706, or A996. ASTM A996 bars produced from rail steel shall be Type R. ~~In buildings assigned to Seismic Design Category A, B or C, t~~The minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa). ~~In buildings assigned to Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~, reinforcing steel shall comply with the requirements of ASTM A706 for low-alloy steel with a minimum yield strength of 60,000 psi (Grade 60) (414 MPa).~~

**Delete section in its entirety and show as Reserved:**

**R404.1.3.4 Requirements for Seismic Design Category C.** Reserved.~~Concrete foundation walls supporting above-grade concrete walls in townhouses assigned to Seismic Design Category C shall comply with ACI 318, ACI 332 or PCA 100 (see Section R404.1.3).~~

**Delete section in its entirety and show as Reserved:**

**R404.1.4 Seismic Design Category D0, D1 or D2.** Reserved.

**R404.1.4.1 Masonry foundation walls.** Reserved.~~In buildings assigned to Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~, as established in Table R301.2(1), masonry foundation walls shall comply with this section. In addition to the requirements of Table R404.1.1(1), plain masonry foundation walls shall comply with the following:~~

~~1. Wall height shall not exceed 8 feet (2438 mm).~~

~~2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).~~

~~3. Minimum nominal thickness for plain masonry foundation walls shall be 8 inches (203 mm).~~

~~4. Masonry stem walls shall have a minimum vertical reinforcement of one No. 4 (No. 13) bar located a maximum of 4 feet (1219 mm) on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings.~~

~~Foundation walls, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be constructed in accordance with Table R404.1.1(2), R404.1.1(3) or R404.1.1(4). Masonry foundation walls shall have two No. 4 (No. 13) horizontal bars located in the upper 12 inches (305 mm) of the wall.~~

**R404.1.4.2 Concrete foundation walls.** Reserved.~~In buildings assigned to Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~, as established in Table R301.2(1), concrete foundation walls that support light-frame walls shall comply with this section, and concrete foundation walls that support above-grade concrete walls shall comply with ACI 318, ACI 332 or PCA 100 (see Section R404.1.3). In addition to the horizontal reinforcement required by Table R404.1.2(1), plain concrete walls supporting light-frame walls shall comply with the following.~~

~~1. Wall height shall not exceed 8 feet (2438 mm).~~

~~2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).~~

~~3. Minimum thickness for plain concrete foundation walls shall be 7.5 inches (191 mm) except that 6 inches (152 mm) is permitted where the maximum wall height is 4 feet, 6 inches (1372 mm).~~

~~Foundation walls less than 7.5 inches (191 mm) in thickness, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be provided with horizontal reinforcement in accordance with Table R404.1.2(1), and vertical reinforcement in accordance with Table R404.1.2(2), R404.1.2(3), R404.1.2(4), R404.1.2(5), R404.1.2(6), R404.1.2(7) or R404.1.2(8). Where Tables R404.1.2(2) through R404.1.2(8) permit plain concrete walls, not less than No. 4 (No. 13) vertical bars at a spacing not exceeding 48 inches (1219 mm) shall be provided.~~

**Revise as follows:**

**R404.1.5.3 Pier and curtain wall foundations.**Use of pier and curtain wall foundations shall be permitted to support light-frame construction not more than two stories in height, provided the following requirements are met:

1. All load-bearing walls shall be placed on continuous concrete footings placed integrally with the exterior wall footings.

2. The minimum actual thickness of a load-bearing masonry wall shall be not less than 4 inches (102 mm) nominal or 33/8 inches (92 mm) actual thickness, and shall be bonded integrally with piers spaced in accordance with Section R606.6.4.

3. Piers shall be constructed in accordance with Sections R606.7 and R606.7.1, and shall be bonded into the load-bearing masonry wall in accordance with Section R606.13.1 or R606.13.1.1.

4. The maximum height of a 4-inch (102 mm) loadbearing masonry foundation wall supporting wood-frame walls and floors shall be not more than 4 feet (1219 mm).

5. Anchorage shall be in accordance with Section R403.1.6, Figure R404.1.5(1), or as specified by engineered design accepted by the *building official*.

6. The unbalanced fill for 4-inch (102 mm) foundation walls shall not exceed 24 inches (610 mm) for solid masonry or 12 inches (305 mm) for hollow masonry.

7. Reserved. ~~In Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~, prescriptive reinforcement shall be provided in the horizontal and vertical direction. Provide minimum horizontal joint reinforcement of two No. 9 gage wires spaced not less than 6 inches (152 mm) or one 1/4-inch-diameter (6.4 mm) wire at 10 inches (254 mm) on center vertically. Provide minimum vertical reinforcement of one No. 4 bar at 48 inches (1220 mm) on center horizontally grouted in place.~~

**Revise as follows:**

**R404.1.8 Rubble stone masonry.**Rubble stone masonry foundation walls shall have a minimum thickness of 16 inches (406 mm), shall not support an unbalanced backfill exceeding 8 feet (2438 mm) in height, shall not support a soil pressure greater than 30 pounds per square foot per foot (4.71 kPa/m)~~, and shall not be constructed in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~, D~~~~2~~~~or townhouses in Seismic Design Category C, as established in Figure R301.2(2)~~.

**Delete section in its entirety and show as Reserved:**

**R404.1.9.4 Seismic design of masonry piers.** Reserved.~~Masonry piers in~~*~~dwellings~~*~~located in Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~, and townhouses in Seismic Design Category C, shall be designed in accordance with accepted engineering practice.~~

**Revise as follows:**

**R404.5.2 Precast concrete foundation design drawings.**Precast concrete foundation wall design drawings shall be submitted to the *building official*and *approved*prior to installation. Drawings shall include, at a minimum, the following information:

1. Design loading as applicable.

2. Footing design and material.

3. Concentrated loads and their points of application.

4. Soil bearing capacity.

5. Maximum allowable total uniform load.

6. Reserved. ~~Seismic design category.~~

7. Basic wind speed.

**Revise as follows:**

**R407.3 Structural requirements.**The columns shall be restrained to prevent lateral displacement at the bottom end. Wood columns shall be not less in nominal size than 4 inches by 4 inches (102 mm by 102 mm). Steel columns shall be not less than 3-inch-diameter (76 mm) Schedule 40 pipe manufactured in accordance with ASTM A53 Grade B or *approved*equivalent.

**Exception:**~~In Seismic Design Categories A, B and C, c~~Columns not more than 48 inches (1219 mm) in height on a pier or footing are exempt from the bottom end lateral displacement requirement within under-floor areas enclosed by a continuous foundation.

**(S10018 AM A1)**

**TABLE R404.1.1(1)**

**PLAIN MASONRY FOUNDATION WALLSf**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MAXIMUM UNSUPPORTED WALL HEIGHT (feet)** | **MAXIMUM UNBALANCED BACKFILL HEIGHTc (feet)** | **PLAIN MASONRYa MINIMUM NOMINAL WALL THICKNESS (inches)** | | |
| **Soil classesb** | | |
| **GW, GP, SW and SP** | **GM, GC, SM, SM-SC and ML** | **SC, MH, ML-CL and inorganic CL** |

**TABLE R404.1.1(2)**

**8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 5 INCHESa, c, f**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MAXIMUM UNSUPPORTED WALL HEIGHT** | **HEIGHT OF UNBALANCED BACKFILLe** | **MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)b, c** | | |
| **Soil classes and lateral soil loadd (psf per foot below grade)** | | |
| **GW, GP, SW and SP soils 30** | **GM, GC, SM, SM-SC and ML soils 45** | **SC, ML-CL and inorganic CL soils 60** |

**TABLE R404.1.1(3)**

**10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 6.75 INCHESa, c, f**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MAXIMUM UNSUPPORTED WALL HEIGHT** | **HEIGHT OF UNBALANCED BACKFILLe** | **MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)b, c** | | |
| **Soil classes and later soil loadd (psf per foot below grade)** | | |
| **GW, GP, SW and SP soils 30** | **GM, GC, SM, SM-SC and ML soils 45** | **SC, ML-CL and inorganic CL soils 60** |

**TABLE R404.1.1(4)**

**12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 8.75 INCHESa, c, f**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MAXIMUM UNSUPPORTED WALL HEIGHT** | **HEIGHT OF UNBALANCED BACKFILLe** | **MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)b, c** | | |
| **Soil classes and lateral soil loadd (psf per foot below grade)** | | |
| **GW, GP, SW and SP soils 30** | **GM, GC, SM, SM-SC and ML soils 45** | **SC, ML-CL and inorganic CL soils 60** |

**TABLE R404.1.2(1)**

**MINIMUM HORIZONTAL REINFORCEMENT FOR CONCRETE BASEMENT WALLSa, b**

|  |  |
| --- | --- |
| **MAXIMUM UNSUPPORTED ~~HEIGHT OF BASEMENT~~ WALL HEIGHT (feet)** | **LOCATION OF HORIZONTAL REINFORCEMENT** |

**TABLE R404.1.2(8)**

**MINIMUM VERTICAL REINFORCEMENT FOR 6-, 8-, 10- AND 12-INCH NOMINAL FLAT BASEMENT WALLSb, c, d, e, f, h, i, k, n, o**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **MAXIMUM UNSUPPORTED WALL HEIGHT (feet)** | **MAXIMUM UNBALANCED BACKFILL HEIGHTg (feet)** | **MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)** | | | | | | | | | | | |
| **Soil classesa and design lateral soil (psf per foot of depth)** | | | | | | | | | | | |
| **GW, GP, SW, SP 30** | | | | **GM, GC, SM, SM-SC and ML 45** | | | | **SC, ML-CL and inorganic CL 60** | | | |
| **Minimum nominal wall thickness (inches)** | | | | | | | | | | | |
| **6** | **8** | **10** | **12** | **6** | **8** | **10** | **12** | **6** | **8** | **10** | **12** |

**(S8747)(RB168-19 AS)**

**SECTION R408  
UNDER-FLOOR SPACE**

**Revise as follows:**

**R408.1 ~~Ventilation.~~ Moisture Control.** The under-floor space between the bottom of the floor joists and the earth under any building (except space occupied by a *basement*) shall ~~have ventilation openings through foundation walls or exterior walls. The minimum net area of ventilation openings shall be not less than 1 square foot (0.0929 m~~~~2~~~~) for each 150 square feet (14 m~~~~2~~~~) of under-floor space area, unless the ground surface is covered by a Class 1 vapor retarder material. Where a Class 1 vapor retarder material is used, the minimum net area of ventilation openings shall be not less than 1 square foot (0.0929 m~~~~2~~~~) for each 1,500 square feet (140 m~~~~2~~~~) of under-floor space area. One such ventilating opening shall be within 3 feet (914 mm) of each corner of the~~ building comply with Section R408.2 or Section R408.3.

**R408.2 Openings for under-floor ventilation.** Ventilation openings through foundation or exterior walls surrounding the under-floor space shall be provided in accordance with this section. The minimum net area of ventilation openings shall be not less than 1 square foot (0.0929 m2) for each 150 square feet (14 m2) of under-floor area. One ventilation opening shall be within 3 feet (915 mm) of each external corner of the ~~building.~~ under-floor space. Ventilation openings shall be covered for their height and width with any of the following materials provided that the least dimension of the covering shall not exceed 1/4 inch (6.4 mm), and operational louvers are permitted:

1.  Perforated sheet metal plates not less than 0.070 inch (1.8 mm) thick.

2.  Expanded sheet metal plates not less than 0.047 inch (1.2 mm) thick.

3.  Cast-iron grill or grating.

4.  Extruded load-bearing brick vents.

5.  Hardware cloth of 0.035 inch (0.89 mm) wire or heavier.

6.  Corrosion-resistant wire mesh, with the least dimension being 1/8 inch (3.2 mm) thick.

**~~Exception~~ Exceptions:**

1. The total area of ventilation openings shall be permitted to be reduced to 1/1,500 of the under-floor area where the ground surface is covered with an *approved* Class I vapor retarder material ~~and the required openings are placed to provide cross ventilation of the space. The installation of operable louvers shall not be prohibited.~~

2. Where the ground surface is covered with an approved class 1 vapor retarder material, ventilation openings are not required to be within 3 feet (915 mm) of each external corner of the under-floor space provided the openings are placed to provide cross ventilation of the space.

**R408.3 Unvented crawl space.** ~~Ventilation openings in~~For unvented under-floor spaces ~~specified in Sections R408.1 and R408.2 shall not be required where~~the following items ~~are~~shall be provided:

1. Exposed earth ~~is~~shall be covered with a continuous Class I vapor retarder. Joints of the vapor retarder shall overlap by 6 inches (152 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend not less than 6 inches (152 mm) up the stem wall and shall be attached and sealed to the stem wall or insulation.

2. One of the following ~~is~~shall be provided for the under-floor space:

2.1. Continuously operated mechanical exhaust ventilation at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m2) of crawl space floor area, including an air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.11 of this code.

2.2. Conditioned air supply sized to deliver at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m2) of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.11 of this code.

2.3. Plenum in existing structures complying with Section M1601.5, if under-floor space is used as a plenum.

2.4. Dehumidification sized to provide 70 pints (33 liters) of moisture removal per day for every 1,000 square feet (93 m2) of crawl space floor area.

**(S8762)(RB176-19 AS)**

**SECTION R408  
UNDER-FLOOR SPACE**

**Revise as follows:**

**R408.3 Unvented crawl space.**Ventilation openings in under-floor spaces specified in Sections R408.1 and R408.2 shall not be required where the following items are provided:

1.   Exposed earth is covered with a continuous Class I vapor retarder. Joints of the vapor retarder shall overlap by 6 inches (152 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend not less than 6 inches (152 mm) up the stem wall and shall be attached and sealed to the stem wall or insulation.

2.   One of the following is provided for the under-floor space:

2.1. Continuously operated mechanical exhaust ventilation at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m2) of crawl space floor area, including an air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.11 of this code.

2.2. Conditioned air supply sized to deliver at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m2) of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.11 of this code.

2.3. Plenum in existing structures complying with Section M1601.5, if under-floor space is used as a plenum.

2.4. Dehumidification sized ~~to provide 70 pints (33 liters) of moisture removal per day for every 1,000 square feet (93 m2) of crawl space floor area.~~ in accordance with the manufacturer's specifications.

**(S8764)(RB177-19 AS)**

**Chapter 5 FLOORS**

**R502.11.4 Truss design drawings.**Truss design drawings, prepared in compliance with Section R502.11.1, shall be submitted to the *building official*and *approved*prior to installation. Truss design drawings shall be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, the information specified as follows:

*Items 1 – 3:  no changes*

4. Design loads as applicable:

4.1. Top chord live load.

4.2. Top chord dead load.

4.3. Bottom chord live load.

4.4. Bottom chord dead load.

4.5. Concentrated loads and their points of application.

4.6. Controlling wind ~~and earthquake~~ loads.

*Items 5 – 12: no changes*

**Revise as follows:**

**TABLE R507.5**

**DECK BEAM SPAN LENGTHSa, b (ft. - in.)**

(*no change to table values*)

a. ~~Ground snow load, l~~Live load = 40 psf, dead load = 10 psf, L/? = 360 at main span, L/? = 180 at cantilever with a 220-pound point load applied at the end.

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R507.6**

**DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft. - in.)**

(*no change to table values*)

b. ~~Ground snow load, l~~Live load = 40 psf, dead load = 10 psf, L/? = 360.

c. ~~Ground snow load, l~~Live load = 40 psf, dead load = 10 psf, L/? = 360 at main span, L/ ? = 180 at cantilever with a 220-pound point load applied to end.

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R507.8.1.3(1)**

**DECK LEDGER CONNECTION TO BAND JOISTa, b**

**(Deck live load = 40 psf, deck dead load = 10 psf~~, snow load~~**~~=~~**~~40 psf~~)**

(*no change to table values*)

b. Reserved. ~~Snow load shall not be assumed to act concurrently with live load.~~

(*no change to remaining notes*)

**(S10019 AS)**

R507.8.1.2 Band joist details.

Band joists attached by a ledger shall be a minimum 2-inch-nominal (51 mm), solid-sawn, spruce-pine-fir lumber or a minimum 1-inch ~~by 9 1/2-inch~~(25 mm~~× 241 mm~~) ~~dimensional, Douglas fir laminated veneer lumber.~~ nominal engineered wood rim boards specified in R502.1.7. Band joists attached by a ledger shall be fully supported by a wall or sill plate below.

**(S10104 AS)**

**Add new text as follows:**

**R507.9 Exterior guards**. Guards shall be constructed to meet the requirements of Sections R301.5 and R312, and this section.

**R507.9.1 Support of guards**. Where guards are supported on deck framing, guard loads shall be transferred to the deck framing with a continuous load path to the deck joists.

**R507.9.1.1 Guards supported by side of deck framing.** Where guards are connected to the interior or exterior side of a deck joist or beam, the joist or beam shall be connected to the adjacent joists to prevent rotation of the joist or beam. Connections relying only on fasteners in end grain withdrawal are not permitted.

**R507.9.1.2 Guards supported on top of deck framing.** Where guards are mounted on top of the decking, the guards shall be connected to the deck framing or blocking and installed in accordance with manufacturer’s instructions to transfer the guard loads to the adjacent joists.

**R507.9.2 Wood posts at deck guards.** Where 4-inch by 4-inch (102 mm by 102 mm) wood posts support guard loads applied to the top of the guard, such posts shall not be notched at the connection to the supporting structure.

**R507.9.3 Plastic composite guards.** Plastic composite guards shall comply with the provisions of Section R507.2.2.

**R507.9.4 Other guards.** Other guards shall be in accordance with either manufacturer’s instructions or accepted engineering principles.

**(F9765)(RB185-19 AMPC1)**

**TABLE R507.5**

**DECK BEAM SPAN LENGTHS~~a, b, g~~ ~~(feet - inches)~~**

| **SPECIESc** | **SIZEd** | **EFFECTIVE DECK JOIST SPAN LENGTHh**  **~~LESS THAN OR EQUAL TO:~~(feet)** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **6** | **8** | **10** | **12** | **14** | **16** | **18** |
| **DECK BEAM SPAN LENGTH a,b,g (feet-inches)** | | | | | | |
| Southern pine | 1 – 2 × 6 | 4-11 | 4-0 | 3-7 | 3-3 | 3-0 | 2-10 | 2-8 |
| 1 – 2 × 8 | 5-11 | 5-1 | 4-7 | 4-2 | 2-10 | 3-7 | 3-5 |
| 1 – 2 × 10 | 7-0 | 6-0 | 5-5 | 4-11 | 4-7 | 4-3 | 4-0 |
| 1 – 2 × 12 | 8-3 | 7-1 | 6-4 | 5-10 | 5-5 | 5-0 | 4-9 |
| 2 – 2 × 6 | 6-11 | 5-11 | 5-4 | 4-10 | 4-6 | 4-3 | 4-0 |
| 2 – 2 × 8 | 8-9 | 7-7 | 6-9 | 6-2 | 5-9 | 5-4 | 5-0 |
| 2 – 2 × 10 | 10-4 | 9-0 | 8-0 | 7-4 | 6-9 | 6-4 | 6-0 |
| 2 – 2 × 12 | 12-2 | 10-7 | 9-5 | 8-7 | 8-0 | 7-6 | 7-0 |
| 3 – 2 × 6 | 8-2 | 7-5 | 6-8 | 6-1 | 5-8 | 5-3 | 5-0 |
| 3 – 2 × 8 | 10-10 | 9-6 | 8-6 | 7-9 | 7-2 | 6-8 | 6-4 |
| 3 – 2 × 10 | 13-0 | 11-3 | 10-0 | 9-2 | 8-6 | 7-11 | 7-6 |
| 3 – 2 × 12 | 15-3 | 13-3 | 11-10 | 10-9 | 10-0 | 9-4 | 8-10 |
| Douglas fir-larche,hem-fire,spruce-pine-fire,redwood,western cedars,ponderosa pinef,red pinef | 3 × 6 or 2 – 2 x 6 | 5-5 | 4-8 | 4-2 | 3-10 | 3-6 | 3-1 | 2-9 |
| 3 × 8 or 2 – 2 × 8 | 6-10 | 5-11 | 5-4 | 4-10 | 4-6 | 4-1 | 3-8 |
| 3 × 10 or 2 – 2 × 10 | 8-4 | 7-3 | 6-6 | 5-11 | 5-6 | 5-1 | 4-8 |
| 3 × 12 or 2 – 2 × 12 | 9-8 | 8-5 | 7-6 | 6-10 | 6-4 | 5-11 | 5-7 |
| 4 × 6 | 6-5 | 5-6 | 4-11 | 4-6 | 4-2 | 3-11 | 3-8 |
| 4 × 8 | 8-5 | 7-3 | 6-6 | 5-11 | 5-6 | 5-2 | 4-10 |
| 4 × 10 | 9-11 | 8-7 | 7-8 | 7-0 | 6-6 | 6-1 | 5-8 |
| 4 × 12 | 11-5 | 9-11 | 8-10 | 8-1 | 7-6 | 7-0 | 6-7 |
| 3 – 2 × 6 | 7-4 | 6-8 | 6-0 | 5-6 | 5-1 | 4-9 | 4-6 |
| 3 – 2 × 8 | 9-8 | 8-6 | 7-7 | 6-11 | 6-5 | 6-0 | 5-8 |
| 3 – 2 × 10 | 12-0 | 10-5 | 9-4 | 8-6 | 7-10 | 7-4 | 6-11 |
| 3 – 2 × 12 | 13-11 | 12-1 | 10-9 | 9-10 | 9-1 | 8-6 | 8-1 |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a.  Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied at the end.

b.  Beams supporting deck joists from one side only.

c.  No. 2 grade, wet service factor.

d.  Beam depth shall be greater than or equal to depth of joists with a flush beam condition.

e.  Includes incising factor.

f.  Northern species. Incising factor not included.

g.  Beam cantilevers are limited to the adjacent beam’s span divided by 4.

h. For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor from the following table.

|  |  |
| --- | --- |
| C/J | Joist span factor |
| 0 (no cantilever) | 0.66 |
| 1/12 (0.87) | 0.72 |
| 1/10 (0.10) | 0.80 |
| 1/8 (0.125) | 0.84 |
| 1/6 (0.167) | 0.90 |
| 1/4 (0.250) | 1.00 |

J = actual joist span length (feet)

C= actual joist cantilever length (feet)

**(S8788)(RB190-19 AS)**

**CHAPTER 6 WALL CONSTRUCTION**

**R606.2.8.2 Masonry serving as the lateral-force-resisting system ~~in Seismic Design Categories A, B and C~~.**Mortar for masonry serving as the lateral-force-resisting system ~~in Seismic Design Categories A, B and C~~ shall be Type M, S or N mortar.

**Revise as follows:**

**R606.2.8 Mortar.**Except for mortars listed in Sections R606.2.9, R606.2.10 and R606.2.11, mortar for use in masonry construction shall meet the proportion specifications of Table R606.2.8 or the property specifications of ASTM C270. The type of mortar shall be in accordance with Sections R606.2.8.1~~,~~ and R606.2.8.2 ~~and R606.2.8.3~~.

**Delete section in its entirety:**

**~~R606.2.8.3 Masonry in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~.~~**~~Mortar for masonry serving as the lateral-force-resisting system in Seismic Design Categories D0, D1 and D2 shall be Type M or S Portland cement-lime or mortar cement mortar.~~

**Revise as follows:**

**R606.4.4 Parapet walls.**Unreinforced solid masonry parapet walls shall be not less than 8 inches (203 mm) thick and their height shall not exceed four times their thickness. Unreinforced hollow unit masonry parapet walls shall be not less than 8 inches (203 mm) thick, and their height shall not exceed three times their thickness. ~~Masonry parapet walls in areas subject to wind loads of 30 pounds per square foot (1.44 kPa) located in Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~, or on townhouses in Seismic Design Category C shall be reinforced in accordance with Section R606.1.~~

**Revise as follows:**

**R608.2 Applicability limits.**The provisions of this section shall apply to the construction of exterior concrete walls for buildings not greater than 60 feet (18 288 mm) in plan dimensions, floors with clear spans not greater than 32 feet (9754 mm) and roofs with clear spans not greater than 40 feet (12 192 mm). Buildings shall not exceed 35 feet (10 668 mm) in mean roof height or two stories in height above grade. Floor/ceiling dead loads shall not exceed 10 pounds per square foot (479 Pa), roof/ceiling dead loads shall not exceed 15 pounds per square foot (718 Pa) and *attic*live loads shall not exceed 20 pounds per square foot (958 Pa). Roof overhangs shall not exceed 2 feet (610 mm) of horizontal projection beyond the exterior wall and the dead load of the overhangs shall not exceed 8 pounds per square foot (383 Pa).

Walls constructed in accordance with the provisions of this section shall be limited to buildings subjected to a maximum design wind speed of 160 mph (72 m/s) Exposure B, 136 mph (61 m/s) Exposure C and 125 mph (56 m/s) Exposure D. ~~Walls constructed in accordance with the provisions of this section shall be limited to detached one- and two-family~~*~~dwellings~~*~~and townhouses assigned to Seismic Design Category A or B, and detached one- and two-family~~*~~dwellings~~*~~assigned to Seismic Design Category C.~~

Buildings that are not within the scope of this section shall be designed in accordance with PCA 100 or ACI 318.

**Revise as follows:**

**TABLE R608.8(2)**

**MAXIMUM ALLOWABLE CLEAR SPANS FOR 4-INCH-NOMINAL THICK FLAT LINTELS IN LOAD-BEARING WALLSa, b, c, d, e, f, m**

**ROOF CLEAR SPAN 40 FEET AND FLOOR CLEAR SPAN 32 FEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LINTEL DEPTH Dg (inches)** | **NUMBER OF BARS AND BAR SIZE IN TOP AND BOTTOM OF LINTEL** | **STEEL YEILD STRENGTHh, fy (psi)** | **DESIGN LOAD CONDITION DETERMINED FROM TABLE R608.8(1)** | | | | | | | | | | | |
| **1** | **2** | | **3** | | | **4** | | | **5** | | |
| **~~Maximum ground snow load (psf)~~** | | | | | | | | | | | |
| **~~-~~** | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** |
| **Maximum clear span of lintel (feet – inches)** | | | | | | | | | | | |

(*Delete all table values under the maximum ground snow load of 70 psf.  Remainder of table is unchanged)*

e. Reserved. ~~Linear interpolation is permitted between ground snow loads and between lintel depths.~~

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R608.8(3)**

**MAXIMUM ALLOWABLE CLEAR SPANS FOR 6-INCH-NOMINAL THICK FLAT LINTELS IN LOAD-BEARING WALLSa, b, c, d, e, f, m**

**ROOF CLEAR SPAN 40 FEET AND FLOOR CLEAR SPAN 32 FEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LINTEL DEPTH Dg (inches)** | **NUMBER OF BARS AND BAR SIZE IN TOP AND BOTTOM OF LINTEL** | **STEEL YEILD STRENGTHh, fy (psi)** | **DESIGN LOAD CONDITION DETERMINED FROM TABLE R608.8(1)** | | | | | | | | | | | |
| **1** | **2** | | **3** | | | **4** | | | **5** | | |
| **~~Maximum ground snow load (psf)~~** | | | | | | | | | | | |
| **~~-~~** | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** |
| **Maximum clear span of lintel (feet – inches)** | | | | | | | | | | | |

(*Delete all table values under the maximum ground snow load of 70 psf.  Remainder of table is unchanged)*

e. Reserved. ~~Linear interpolation is permitted between ground snow loads and between lintel depths.~~

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R608.8(4)**

**MAXIMUM ALLOWABLE CLEAR SPANS FOR 8-INCH-NOMINAL THICK FLAT LINTELS IN LOAD-BEARING WALLSa, b, c, d, e, f, m**

**ROOF CLEAR SPAN 40 FEET AND FLOOR CLEAR SPAN 32 FEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LINTEL DEPTH Dg (inches)** | **NUMBER OF BARS AND BAR SIZE IN TOP AND BOTTOM OF LINTEL** | **STEEL YEILD STRENGTHh, fy (psi)** | **DESIGN LOAD CONDITION DETERMINED FROM TABLE R608.8(1)** | | | | | | | | | | | |
| **1** | **2** | | **3** | | | **4** | | | **5** | | |
| **~~Maximum ground snow load (psf)~~** | | | | | | | | | | | |
| **~~-~~** | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** |
| **Maximum clear span of lintel (feet – inches)** | | | | | | | | | | | |

(*Delete all table values under the maximum ground snow load of 70 psf.  Remainder of table is unchanged)*

e. Reserved. ~~Linear interpolation is permitted between ground snow loads and between lintel depths.~~

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R608.8(5)**

**MAXIMUM ALLOWABLE CLEAR SPANS FOR 10-INCH-NOMINAL THICK FLAT LINTELS IN LOAD-BEARING WALLSa, b, c, d, e, f, m**

**ROOF CLEAR SPAN 40 FEET AND FLOOR CLEAR SPAN 32 FEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LINTEL DEPTH Dg (inches)** | **NUMBER OF BARS AND BAR SIZE IN TOP AND BOTTOM OF LINTEL** | **STEEL YEILD STRENGTHh, fy (psi)** | **DESIGN LOAD CONDITION DETERMINED FROM TABLE R608.8(1)** | | | | | | | | | | | |
| **1** | **2** | | **3** | | | **4** | | | **5** | | |
| **~~Maximum ground snow load (psf)~~** | | | | | | | | | | | |
| **~~-~~** | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** |
| **Maximum clear span of lintel (feet – inches)** | | | | | | | | | | | |

(*Delete all table values under the maximum ground snow load of 70 psf.  Remainder of table is unchanged)*

e. Reserved. ~~Linear interpolation is permitted between ground snow loads and between lintel depths.~~

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R608.8(6)**

**MAXIMUM ALLOWABLE CLEAR SPANS FOR 6-INCH-THICK WAFFLE-GRID LINTELS IN LOAD-BEARING WALLSa, b, c, d, e, f, o**

**MAXIMUM ROOF CLEAR SPAN 40 FEET AND MAXIMUM FLOOR SPAN 32 FEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LINTEL DEPTH Dg (inches)** | **NUMBER OF BARS AND BAR SIZE IN TOP AND BOTTOM OF LINTEL** | **STEEL YEILD STRENGTHh, fy (psi)** | **DESIGN LOAD CONDITION DETERMINED FROM TABLE R608.8(1)** | | | | | | | | | | | |
| **1** | **2** | | **3** | | | **4** | | | **5** | | |
| **~~Maximum ground snow load (psf)~~** | | | | | | | | | | | |
| **~~-~~** | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** |
| **Maximum clear span of lintel (feet – inches)** | | | | | | | | | | | |

(*Delete all table values under the maximum ground snow load of 70 psf.  Remainder of table is unchanged)*

e. Reserved. ~~Linear interpolation is permitted between ground snow loads and between lintel depths.~~

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R608.8(7)**

**MAXIMUM ALLOWABLE CLEAR SPANS FOR 8-INCH-THICK WAFFLE-GRID LINTELS IN LOAD-BEARING WALLSa, b, c, d, e, f, o**

**MAXIMUM ROOF CLEAR SPAN 40 FEET AND MAXIMUM FLOOR SPAN 32 FEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LINTEL DEPTH Dg (inches)** | **NUMBER OF BARS AND BAR SIZE IN TOP AND BOTTOM OF LINTEL** | **STEEL YEILD STRENGTHh, fy (psi)** | **DESIGN LOAD CONDITION DETERMINED FROM TABLE R608.8(1)** | | | | | | | | | | | |
| **1** | **2** | | **3** | | | **4** | | | **5** | | |
| **~~Maximum ground snow load (psf)~~** | | | | | | | | | | | |
| **~~-~~** | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** |
| **Maximum clear span of lintel (feet – inches)** | | | | | | | | | | | |

(*Delete all table values under the maximum ground snow load of 70 psf.  Remainder of table is unchanged)*

e. Reserved. ~~Linear interpolation is permitted between ground snow loads and between lintel depths.~~

(*no change to remaining notes*)

**Revise as follows:**

**TABLE R608.8(8)**

**MAXIMUM ALLOWABLE CLEAR SPANS FOR 6-INCH-THICK SCREEN-GRID LINTELS IN LOAD-BEARING WALLSa, b, c, d, e, f, p**

**ROOF CLEAR SPAN 40 FEET AND FLOOR CLEAR SPAN 32 FEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LINTEL DEPTH Dg (inches)** | **NUMBER OF BARS AND BAR SIZE IN TOP AND BOTTOM OF LINTEL** | **STEEL YEILD STRENGTHh, fy (psi)** | **DESIGN LOAD CONDITION DETERMINED FROM TABLE R608.8(1)** | | | | | | | | | | | |
| **1** | **2** | | **3** | | | **4** | | | **5** | | |
| **~~Maximum ground snow load (psf)~~** | | | | | | | | | | | |
| **~~-~~** | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** | | **~~30~~** | **~~70~~** |
| **Maximum clear span of lintel (feet – inches)** | | | | | | | | | | | |

(*Delete all table values under the maximum ground snow load of 70 psf.  Remainder of table is unchanged)*

e. Reserved. ~~Linear interpolation is permitted between ground snow loads and between lintel depths.~~

(*no change to remaining notes*)

**Revise as follows:**

**R610.2 Applicability limits.**The provisions of this section shall control the construction of exterior structural insulated panel walls and interior load-bearing structural insulated panel walls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist or truss span and not greater than two stories in height with each wall not greater than 10 feet (3048 mm) high. Exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Structural insulated panel walls constructed in accordance with the provisions of this section shall be limited to sites where the ultimate design wind speed (*Vult*) is not greater than 155 miles per hour (69 m/s), Exposure B or 140 miles per hour (63 m/s) Exposure C~~, the ground snow load is not greater than 70 pounds per square foot (3.35 kPa), and the seismic design category is A, B or C~~.

**Revise as follows:**

**TABLE R610.5(1)**

**MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP OR LIGHT-FRAME ROOF ONLY (inches)a**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BUILDING WIDTH (ft)** | | | | | | | | | | | | | | | | | |
| **ULTIMATE DESIGN WIND SPEED Vult (mph)** | | **~~SNOW LOAD (psf)~~** | **24** | | | **28** | | | **32** | | | **36** | | | **40** | | |
| **Exp. B** | **Exp. C** | **Wall Height (ft)** | | | **Wall Height (ft)** | | | **Wall Height (ft)** | | | **Wall Height (ft)** | | | **Wall Height (ft)** | | |
| **8** | **9** | **10** | **8** | **9** | **10** | **8** | **9** | **10** | **8** | **9** | **10** | **8** | **9** | **10** |
| 110 | - | ~~20~~ | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| ~~30~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ |
| ~~50~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ |
| ~~70~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ |
| 115 | - | ~~20~~ | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| ~~30~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ |
| ~~50~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ |
| ~~70~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ |
| 130 | 110 | ~~20~~ | 4.5 | 4.5 | 6.5 | 4.5 | 4.5 | 6.5 | 4.5 | 4.5 | 6.5 | 4.5 | 4.5 | DR | 4.5 | 4.5 | DR |
| ~~30~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ |
| ~~50~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~6.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ |
| ~~70~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| 140 | 120 | ~~20~~ | 4.5 | 6.5 | DR | 4.5 | 6.5 | DR | 4.5 | DR | DR | 4.5 | DR | DR | 4.5 | DR | DR |
| ~~30~~ | ~~4.5~~ | ~~6.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ |
| ~~50~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~70~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |

(*no change to table notes*)

**Revise as follows:**

**TABLE R610.5(2)**

**MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP OR LIGHT-FRAME ONE STORY AND ROOF ONLY (inches)a**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BUILDING WIDTH (ft)** | | | | | | | | | | | | | | | | | |
| **ULTIMATE DESIGN WIND SPEED Vult (mph)** | | **~~SNOW LOAD (psf)~~** | **24** | | | **28** | | | **32** | | | **36** | | | **40** | | |
| **Exp. B** | **Exp. C** | **Wall Height (ft)** | | | **Wall Height (ft)** | | | **Wall Height (ft)** | | | **Wall Height (ft)** | | | **Wall Height (ft)** | | |
| **8** | **9** | **10** | **8** | **9** | **10** | **8** | **9** | **10** | **8** | **9** | **10** | **8** | **9** | **10** |
| 110 | - | ~~20~~ | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 6.5 | 4.5 | 4.5 | DR | 4.5 | 4.5 | DR |
| ~~30~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~6.5~~ | ~~DR~~ |
| ~~50~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~70~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| 115 | - | ~~20~~ | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 6.5 | 4.5 | 4.5 | DR | 4.5 | 4.5 | DR | 4.5 | DR | DR |
| ~~30~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~6.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ |
| ~~50~~ | ~~4.5~~ | ~~4.5~~ | ~~6.5~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~70~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| 130 | 110 | ~~20~~ | 4.5 | 4.5 | 6.5 | 4.5 | 4.5 | DR | 4.5 | 4.5 | DR | 4.5 | DR | DR | 4.5 | DR | DR |
| ~~30~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~6.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~50~~ | ~~4.5~~ | ~~4.5~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~70~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| 140 | 120 | ~~20~~ | 4.5 | 6.5 | DR | 4.5 | DR | DR | 4.5 | DR | DR | DR | DR | DR | DR | DR | DR |
| ~~30~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~50~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~70~~ | ~~4.5~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |

(*no change to table notes*)

**Revise as follows:**

**TABLE R610.8**

**MAXIMUM SPANS FOR 11 7/8-INCH OR DEEPER SIP HEADERS (feet)a, c, d**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **LOAD CONDITION** | **~~SNOW LOAD (psf)~~** | **BUILDINGb WIDTH (feet)** | | | | |
| **24** | **38** | **32** | **36** | **40** |
| Supporting roof only | ~~20~~ | 4 | 4 | 4 | 4 | 2 |
| ~~30~~ | ~~4~~ | ~~4~~ | ~~4~~ | ~~2~~ | ~~2~~ |
| ~~50~~ | ~~2~~ | ~~2~~ | ~~2~~ | ~~2~~ | ~~2~~ |
| ~~70~~ | ~~2~~ | ~~2~~ | ~~2~~ | ~~DR~~ | ~~DR~~ |
| Supporting roof and one-story | ~~20~~ | 2 | 2 | DR | DR | DR |
| ~~30~~ | ~~2~~ | ~~2~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~50~~ | ~~2~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |
| ~~70~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ | ~~DR~~ |

(*no change to table notes*)

**(S10020 AS)/ (S9170) CCC-IRC7-19 AS)**

**Revise as follows:**

**R608.1 General.** Exterior concrete walls shall be designed and constructed in accordance with the provisions of this

section or in accordance with the provisions of PCA 100, ACI 318 or ACI 332. Where PCA 100, ACI 318, ACI 332 or the provisions of this section are used to design concrete walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

**R608.5.1 Concrete and materials for concrete.** Materials used in concrete, and the concrete itself, shall conform

to requirements of this section, PCA 100, ACI 318 or ACI 332.

**(S8859)(RB213-19 AMPC1)**

**Revise as follows:**

**R609.1 General.** This section prescribes performance and construction requirements for exterior windows and doors installed in walls. Windows and doors shall be installed in accordance with the fenestration manufacturer’s written instructions. Window and door openings shall be flashed in accordance with Section R703.4. Written installation instructions shall be provided by the fenestration manufacturer for each window or door.

**(S8860)(RB214-19 AM)**

**R609.3.1 Comparative analysis.**

Structural wind load design pressures for window and door units different than the size tested in accordance with Section R609.3 shall be permitted to be different than the design value of the tested unit where determined in accordance with one of the following comparative analysis methods:

1.Structural wind load design pressures for window and door units other than the size tested in accordance with Section R609.3 shall be permitted to be different than the design value of the tested unit provided such different pressures are determined by accepted engineering analysis. All components of the alternate size assembly shall be the same as the tested or labeled assembly: however, lineal components shall be permitted to vary in length compared to the tested or labeled assembly.

**Exceptions:**

1.Operable windows and doors rated in this manner shall comply with the following:

a.For windows and doors (other than sliding or bi-fold), the frame area of the alternate size unit shall not exceed the frame area of the tested approved unit.

b.For sliding or bi-fold doors, the panel area of the alternate size unit shall not exceed the panel area of the tested approved unit.

c.Shall vary from the tested approved unit only in width, height or load requirements.

d.Shall not exceed 100 percent of the proportional deflection for fiber stress of the intermediate members of the approved unit.

e.Shall not exceed 100 percent of the concentrated load at the juncture of the intermediate members and the frame of the approved unit.

f.Shall not exceed the air and water infiltration resistance of the tested approved unit.

g.Shall not exceed the maximum cyclic pressure of the tested approved unit when tested per TAS 201 and TAS 203 or ASTM E1886 and ASTM E1996 where applicable.

2.Nonoperable windows and doors rated in this manner shall comply with the following:

a.The frame area of the alternate size unit shall not exceed the frame area of the tested approved unit.

b.Shall vary from the tested approved unit only in width, height or load requirements.

c.The maximum uniform load distribution (ULD) of any side shall be equal to the uniform load carried by the side divided by the length of the side.

d.The ULD of any member shall not exceed the ULD of the corresponding member of the tested approved unit.

e.The ULD of each member shall be calculated in accordance with standard engineering analysis.

f.Shall not exceed the air and water infiltration resistance of the tested approved unit.

g.Shall not exceed the maximum cyclic pressure of the tested approved unit when tested per TAS 201 and TAS 203 or ASTM E1886 and ASTM E1996 where applicable.

2.In accordance with WDMA I.S.11 or AAMA 2502.

**(S10426 AS)**

**CHAPTER 7 WALL COVERING**

![](data:image/png;base64;base64,)

![](data:image/png;base64;base64,)

**Committee Modification:**

**TABLE R702.3.5**

**MINIMUM THICKNESS AND APPLICATION OF GYPSUM BOARD AND GYPSUM PANEL PRODUCTS**

*(portions of the table and footnotes not shown remain unchanged)*

c.  Where cold-formed steel framing is used with a clinching design to receive nails by two edges of metal, the nails shall be not less than 5/8 inch longer than the gypsum board or gypsum panel product thickness and shall have ringed shanks. Where the cold-formed steel framing has a nailing groove formed to receive the nails, the nails shall have barbed shanks or be ~~5d, 13~~~~1~~~~/~~~~2~~~~gage,~~ 0.086 inch diameter 15/8 inches long, 15/64-inch head for 1/2-inch gypsum board or gypsum panel product; and ~~6d, 13 gage,~~ 0.099 inch diameter 17/8 inches long, 15/64-inch head for 5/8-inch gypsum board or gypsum panel product.

**(S8863)(RB216-19 AM)**

**For revision use text as highlighted in yellow**

**Delete and substitute as follows:**

## ~~R702.7~~ ~~Vapor retarders. Class I or II vapor retarders are required on the interior side of frame walls in Climate Zones 5, 6, 7, 8 and Marine 4.~~

**~~Exceptions~~:**

1. ~~Basement walls.~~

2. ~~Below-grade portion of any wall.~~

3. ~~Construction where moisture or its freezing will not damage the materials.~~

## 

## R702.7 Vapor retarders. Class I or II vapor retarders are required Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls in Climate Zones 5, 6, 7, 8 and Marine 4.of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or Table R702.7(4) where applicable. An approved design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. The climate zone shall be determined in accordance with Section R301.1.

**Exceptions:**

1. Basement walls.

2. Below-grade portion of any wall.

3. Construction where moisture accumulation, condensation, or its freezing of moisture will not damage the materials.

**Add new text as follows:**

**R702.7(1)**

**VAPOR RETARDER MATERIALS AND CLASSES**

|  |  |
| --- | --- |
| CLASS | ACCEPTABLE MATERIALS |
| I | Sheet polyethylene, nonperforated aluminum foil, or other approved materials with a perm rating of less than or equal to 0.1. |
| II | Kraft-faced fiberglass batts, vapor retarder paint, or other approved materials applied in accordance with the manufacturer's installation instructions for a perm rating greater than 0.1 and less than or equal to 1.0. |
| III | Latex paint, enamel paint, or other approved materials applied in accordance with the manufacturer's installation instructions for a perm rating of greater than 1.0 and less than or equal to 10.0. |

**R702.7(2)**

**VAPOR RETARDER OPTIONS**

|  |  |  |  |
| --- | --- | --- | --- |
| CLIMATE ZONE | VAPOR RETARDER CLASS | | |
| CLASS Ia | CLASS IIa | CLASS III |
| 1,2 | Not Permitted | Not Permitted | Permitted |
| 3 | Not Permitted | Permittedc | Permitted |
| 4 (except Marine 4) | Not Permitted | Permittedc | See Table R702.7(3) |
| Marine 4, 5, 6, 7, 8 | Permittedb | Permittedc |

a. Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.

b. Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.

c. Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table R702.7(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B).

**Revise as follows:**

**TABLE ~~R702.7.1~~ R702.7(3)**

**CLASS III VAPOR RETARDERS**

|  |  |
| --- | --- |
| **CLIMATE ZONE** | **CLASS III VAPOR RETARDERS PERMITTED FOR:a, b** |
| ~~Marine~~ 4 | Vented cladding over wood structural panels. |
| Vented cladding over fiberboard. |
| Vented cladding over gypsum. |
| Continuous insulation with R-value ≥ 2.5 over 2 × 4 wall. |
| Continuous insulation with R-value ≥ 3.75 over 2 × 6 wall. |
| 5 | Vented cladding over wood structural panels. |
| Vented cladding over fiberboard. |
| Vented cladding over gypsum. |
| Continuous insulation with R-value ≥ 5 over 2 × 4 wall. |
| Continuous insulation with R-value ≥ 7.5 over 2 × 6 wall. |
| 6 | Vented cladding over fiberboard. |
| Vented cladding over gypsum. |
| Continuous insulation with R-value ≥ 7.5 over 2 × 4 wall. |
| Continuous insulation with R-value ≥ 11.25 over 2 × 6 wall. |
| 7 ~~and 8~~ | Continuous insulation with R-value ≥ 10 over 2 × 4 wall. |
| Continuous insulation with R-value ≥ 15 over 2 × 6 wall. |
| 8 | Continuous insulation with R-value >= 12.5 over 2 x 4 wall. |
| Continuous insulation with R-value >= 20 over 2 x 6 wall. |

For SI: 1 pound per cubic foot = 16 kg/m3.

~~a. Spray foam with a maximum permeance of 1.5 perms at the installed thickness, applied to the interior cavity side of wood structural panels, fiberboard, insulating sheathing or gypsum is deemed to meet the continuous insulation requirement where the spray foam~~ *~~R~~*~~-value meets or exceeds the specified continuous insulation~~ *~~R~~*~~-value.~~

a. ​​​​Vented cladding shall include vinyl, polypropylene, or horizontal aluminum siding, brick veneer with a clear airspace as specified in Table R703.8.4, and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

**Add new text as follows:**

**R702.7(4)**

**CONTINUOUS INSULATION WITH CLASS II VAPOR RETARDER**

|  |  |
| --- | --- |
| CLIMATE ZONE | CLASS II VAPOR RETARDERS PERMITTED FORa |
| 3 | Continuous insulation with R-value >= 2 |
| 4, 5, and 6 | Continuous insulation with R-value >= 3 over 2x4 wall.  Continuous insulation with R-value >= 5 over 2x6 wall. |
| 7 | Continuous insulation with R-value >= 5 over 2x4 wall.  Continuous insulation with R-value >= 7.5 over 2x6 wall. |
| 8 | Continuous insulation with R-value >= 7.5 over 2x4 wall.  Continuous insulation with R-value >= 10 over 2x6 wall. |

a. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class II vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

**Delete and substitute as follows:**

## ~~R702.7.1~~ ~~Class III vapor retarders. Class III vapor retarders shall be permitted where any one of the conditions in Table R702.7.1 is met.~~

## R702.7.1 Spray foam plastic insulation for moisture control with Class II and III vapor retarders. ~~Class III vapor retarders shall be permitted where any one of the conditions in Table R702.7.1 is met.~~ For purposes of compliance with Tables R702.7(3) and R702.7(4), spray foam with a maximum permeance of 1.5 perms at the installed thickness applied to the interior side of wood structural panels, fiberboard, insulating sheathing or gypsum shall be deemed to meet the continuous insulation moisture control requirement in accordance with one of the following conditions:

1. The spray foam R-value is equal to or greater than the specified continuous insulation R-value.

2. The combined R-value of the spray foam and continuous insulation is equal to or greater than the specified continuous insulation R-value.

**Delete without substitution:**

## ~~R702.7.2~~ ~~Material vapor retarder class. The~~ *~~vapor retarder class~~* ~~shall be based on the manufacturer’s certified testing or a tested assembly.~~

~~The following shall be deemed to meet the class specified:~~

1. ~~Class I: Sheet polyethylene, on perforated aluminum foil.~~

2. ~~Class II: Kraft-faced fiberglass batts.~~

3. ~~Class III: Latex or enamel paint.~~

## 

## ~~R702.7.3~~ ~~Minimum clear airspaces and vented openings for vented cladding. For the purposes of this section, vented cladding shall include the following minimum clear airspaces. Other openings with the equivalent vent area shall be permitted.~~

1. ~~Vinyl polypropylene or horizontal aluminum siding applied over a weather-resistive barrier as specified in Table R703.3(1).~~

2. ~~Brick veneer with a clear airspace as specified in Table R703.8.4.~~

3. ~~Other approved vented claddings.~~

**Committee Modification:**

**R702.7 Vapor retarders.**Vapor retarder materials shall be classified in accordance with Table R702.7(1).  A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or Table R702.7(4) where applicable. An approved design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. The climate zone shall be determined in accordance with Section N1101.7 (R301.1).

**Exceptions:**

1.  Basement walls.

2.  Below-grade portion of any wall.

3.  Construction where accumulation, condensation, or freezing of moisture will not damage the materials.

4.  A vapor retarder shall not be required in Climate Zones 1, 2, and 3.

**R702.7(2)**

**VAPOR RETARDER OPTIONS**

|  |  |  |  |
| --- | --- | --- | --- |
| CLIMATE ZONE | VAPOR RETARDER CLASS | | |
| CLASS Ia | CLASS IIa | CLASS III |
| 1,2 | Not Permitted | Not Permitted | Permitted |
| 3, 4 (except Marine 4) | Not Permitted | Permittedc | Permitted |
| ~~4 (except Marine 4)~~ | ~~Not Permitted~~ | ~~Permitted~~~~c~~ | See Table R702.7(3) |
| Marine 4, 5, 6, 7, 8 | Permittedb | Permittedc |

*(No further changes to the footnotes)*

**TABLE R702.7(3)**

**CLASS III VAPOR RETARDERS**

*(No further changes to the table or portion of the footnotes not shown)*

|  |  |
| --- | --- |
| **CLIMATEZONE** | **CLASS III VAPOR RETARDERS PERMITTED FOR:a, b** |
| Marine 4 | Vented cladding over wood structural panels. |
| Vented cladding over fiberboard. |
| Vented cladding over gypsum. |
| Continuous insulation with R-value ≥ 2.5 over 2 × 4 wall. |
| Continuous insulation with R-value ≥ 3.75 over 2 × 6 wall. |

a. ​​​​Vented cladding shall include vinyl, polypropylene, or horizontal aluminum siding, or brick veneer with a clear airspace as specified in Table R703.8.4(1), ~~and~~ or other approved vented claddings.

**(S8864)(RB223-19 AM)/ (S8865)(RB230-19 AS)**

**Delete and substitute as follows:**

**~~R703.2~~ ~~Water-resistive barrier. One layer of No. 15 asphalt felt, free from holes and breaks, complying with ASTM D226 for Type 1 felt or other approved water-resistive barrier shall be applied over studs or sheathing of all exterior walls. No.15 asphalt felt shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm). Other~~ *~~approved~~* ~~materials shall be installed in accordance with the~~ *~~water-resistive barrier~~* ~~manufacturer’s installation instructions. The No. 15 asphalt felt or other approved~~ *~~water-resistive barrier~~* ~~material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1.~~**

**R703.2 Water-resistive barrier.** Not fewer than one layer of *water-resistive barrier* shall be applied over studs or

sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. Water-resistive

barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.

2. ASTM E2568, Type 1 or 2.

3. ASTM E331 in accordance with Section R703.1.1.

4. Other approved materials in accordance with the manufacturer’s installation instructions.

5. No.15 asphalt felt and *water-resistive barriers* complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

**(S8867)(RB233-19 AM)**

Revise table as follows:

**TABLE R702.7(2)** **VAPOR RETARDER OPTIONS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CLIMATE ZONE** | | **VAPOR RETARDER CLASS** | | |
| CLASS Ia | CLASS IIa | CLASS III |
| 1, 2 | | Not Permitted | Not Permitted | Permitted |
| 3, 4 (except Marine 4) | | Not Permitted | Permittedc | Permitted |
| Marine 4, 5, 6, 7, 8 | | Permittedb | Permittedc | See Table R702.7(3) |
| a. | | Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by the ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones. | | | | |
| b. | | Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design. | | | | |
| c. | | Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing or insulated siding installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table R702.7(4) and the Class II vapor retarder shall have vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B). | | | | |

**(S9841 AS)**

Revise as follows:

**R703.3.3 Minimum fastener length and penetration.** Fasteners shall have the greater of the minimum length specified in Table R703.3(1) or as required to provide a minimum penetration into the framing as follows:

1.           Fasteners for horizontal aluminum siding, steel siding, particleboard panel siding, wood structural panel siding in accordance with ANSI/APA-PRP 210, fiber-cement panel siding and fiber-cement lap siding installed over foam plastic sheathing shall penetrate not less than 11/2 inches (38 mm) into framing or shall be in accordance with the manufacturer’s installation instructions.

2.           Fasteners for hardboard panel and lap siding shall penetrate not less than 11/2 inches (38 mm) into the framing.

3.           Fasteners for vinyl siding and insulated vinyl siding shall be installed in accordance with Section R703.11 or R703.13. ~~over wood or wood structural panel sheathing shall penetrate not less than 11/4 inches (32 mm) into sheathing and framing combined. Vinyl siding and insulated vinyl siding shall be permitted to be installed with fasteners penetrating to or through wood or wood structural sheathing of minimum thickness as specified by the manufacturer’s instructions or test report, with or without penetration into the framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend not less than 1/4 inch (6.4 mm) beyond the opposite face of the sheathing. Fasteners for vinyl siding and insulated vinyl siding installed over foam plastic sheathing shall be in accordance with Section R703.11.2. Fasteners for vinyl siding and insulated vinyl siding installed over fiberboard or gypsum sheathing shall penetrate not less than 11/4 inches (32 mm) into framing.~~

4.           Fasteners for vertical or horizontal wood siding shall penetrate not less than 11/2 inches (38 mm) into studs, studs, and wood sheathing combined or blocking.

5.           Fasteners for siding material installed over foam plastic sheathing shall have sufficient length to accommodate foam plastic sheathing thickness and to penetrate framing or sheathing and framing combined, as specified in Items 1 through 4.

Add new text as follows:

R703.3.4. Fasteners for polypropylene siding shall be installed in accordance with Section R703.14.

**(S9846 AS)**

**R703.3.5 Siding clearance at wall and adjacent surfaces.**

Unless otherwise specified by the material manufacturer, or this code, siding shall have a clearance of at least 6 inches (152 mm) from grade and at least 1/2 inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

**(S9848 AM A2)**

**R703.4 Flashing.**

Approved metal flashing, vinyl flashing, self-adhered membranes and mechanically attached flexible flashing shall be applied shingle-fashion or in accordance with the manufacturer’s instructions. Metal flashing shall be corrosion resistant. Fluid-applied membranes used as flashing shall be applied in accordance with the manufacturer's instructions. All flashing shall be applied in a manner to prevent the entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. All exterior fenestration products shall be sealed at the juncture with the building wall with a sealant complying with AAMA 800 or ASTM C920 Class 25 Grade NS or greater for proper joint expansion and contraction, ASTM C1281, AAMA 812, or other approved standard as appropriate for the type of sealant. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714. The flashing shall extend to the surface of the exterior wall finish. Approved flashings shall be installed at the following locations:

1.    Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier complying with Section 703.2 for subsequent drainage. Mechanically attached flexible flashings shall comply with AAMA 712. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:

1.1   The fenestration manufacturer’s installation and flashing instructions, or for applications not addressed in the fenestration manufacturer’s instructions, in accordance with the flashing or water-resistive barrier manufacturer’s instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall incorporate flashing or protection at the head and sides.

1.2     In accordance with the flashing design or method of a registered design professional.

1.3     In accordance with other approved methods.

1.4 In accordance with FMA/AAMA 100, FMA/AAMA 200, FMA/WDMA 250, FMA/AAMA/WDMA 300, ~~or~~ FMA/AAMA/WDMA 400, or FMA/AAMA/WDMA 2710.

2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.

3. Under and at the ends of masonry, wood or metal copings and sills.

4. Continuously above all projecting wood trim.

5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.

6. At wall and roof intersections.

7. At built-in gutters.

**(S10229 AM)**

**Revise as follows:**

**TABLE R702.3.6**

**ALLOWABLE (ASD) SHEAR CAPACITY FOR HORIZONTAL WOOD-FRAMED GYPSUM BOARD DIAPHRAGM CEILING ASSEMBLIES**

(*no change to table values*)

a. Values are not cumulative with other horizontal diaphragm values and are for short-term loading caused by wind ~~or seismic~~ loading. Values shall be reduced 25 percent for normal loading.

b. Reserved. ~~Values shall be reduced 50 percent in Seismic Design Categories D0, D1, D2 and E.~~

(*no change to remaining notes*)

**Revise as follows:**

**R703.8 Anchored stone and masonry veneer, general.**Anchored stone and masonry veneer shall be installed in accordance with this chapter, Table R703.3(1) and Figure R703.8. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first story above grade plane and shall not exceed 5 inches (127 mm) in thickness. See Section R602.3 for wall bracing requirements for masonry veneer for wood-framed construction and Section R603.1 for wall bracing requirements for masonry veneer for cold-formed steel construction. The provisions of this section are limited to areas where the ultimate design wind speed, V*ult,*is less than 165 mph. Where the ultimate design wind speed, V*ult,*equals or exceeds 165 mph, anchored stone and masonry veneer shall comply with TMS 402/ACI 530/ASCE 5.

**Exceptions:**

1. ~~For buildings in Seismic Design Categories A, B and C, e~~Exterior stone or masonry veneer, as specified in Table R703.8(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.8(1) above a noncombustible foundation.

2. Reserved. ~~For detached one- or two-family dwellings in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~, exterior stone or masonry veneer, as specified in Table R703.8(2), with a backing of wood framing shall be permitted to the height specified in Table R703.8(2) above a noncombustible foundation.~~

**Revise as follows:**

**TABLE R703.8(1)**

**STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS,**

**WOOD OR STEEL FRAMING~~, SEISMIC DESIGN CATEGORIES A, B AND C~~**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **~~SEISMIC DESIGN CATEGORY~~** | **NUMBER OF WOOD- OR STEEL-FRAMED STORIES** | **MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATIONa (feet)** | **MAXIMUM NOMINAL THICKNESS OF VENEER (inches)** | **MAXIMUM WEIGHT OF VENEER (psf)b** | **WOOD- OR STEEL-FRAMED STORY** |
| ~~A or B~~ | Steel: 1 or 2  Wood: 1, 2 or 3 | 30 | 5 | 50 | All |
| ~~C~~ | ~~1~~ | ~~30~~ | ~~5~~ | ~~50~~ | ~~1 only~~ |
| ~~2~~ | ~~30~~ | ~~5~~ | ~~50~~ | ~~top~~ |
| ~~bottom~~ |
| ~~Wood only: 3~~ | ~~30~~ | ~~5~~ | ~~50~~ | ~~top~~ |
| ~~middle~~ |
| ~~bottom~~ |

**Delete Table R703.8(2) in its entirety:**

**~~TABLE R703.8(2)~~**

**~~STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS,~~**

**~~ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D~~~~0~~~~, D~~~~1~~~~AND D~~~~2~~**

**Revise as follows:**

**R703.8.2 Exterior veneer support.**~~Except in Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~, e~~Exterior masonry veneers having an installed weight of 40 pounds per square foot (195 kg/m2) or less shall be permitted to be supported on wood or cold-formed steel construction. Where masonry veneer supported by wood or cold-formed steel construction adjoins masonry veneer supported by the foundation, there shall be a movement joint between the veneer supported by the wood or cold-formed steel construction and the veneer supported by the foundation. The wood or cold-formed steel construction supporting the masonry veneer shall be designed to limit the deflection to 1/600 of the span for the supporting members. The design of the wood or cold-formed steel construction shall consider the weight of the veneer and any other loads.

**Revise as follows:**

**R703.8.4.1 Size and spacing.**Veneer ties, if strand wire, shall be not less in thickness than No. 9 U.S. gage [(0.148 inch) (4 mm)] wire and shall have a hook embedded in the mortar joint, or if sheet metal, shall be not less than No. 22 U.S. gage by [(0.0299 inch) (0.76 mm)] 7/8 inch (22 mm) corrugated. Each tie shall support not more than 2.67 square feet (0.25 m2) of wall area and shall be spaced not more than 32 inches (813 mm) on center horizontally and 24 inches (635 mm) on center vertically.

**Exceptions:**

1. Reserved. ~~In Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~or townhouses in Seismic Design Category C or in wind areas of more than 30 pounds per square foot pressure (1.44 kPa), each tie shall support not more than 2 square feet (0.2 m~~~~2~~~~) of wall area.~~

2. Where the ultimate design wind speed, V*ult*, exceeds 140 mph, each tie shall support not more than 1.8 square feet (0.167 m2) of wall area and anchors shall be spaced at a maximum 18 inches (457 mm) horizontally and vertically.

**Revise as follows:**

**TABLE R703.8.4(1)**

**TIE ATTACHMENT AND AIRSPACE REQUIREMENTS**

(*no change to table values*)

a. Reserved. ~~In Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~, the minimum tie fastener shall be an 8d ring-shank nail (2 ½  in. x 0.131 in.) or a No. 10 screw extending through the steel framing a minimum of three exposed threads.~~

(*no change to remaining notes*)

**(S10021 AS)**

**Revise as follows:**

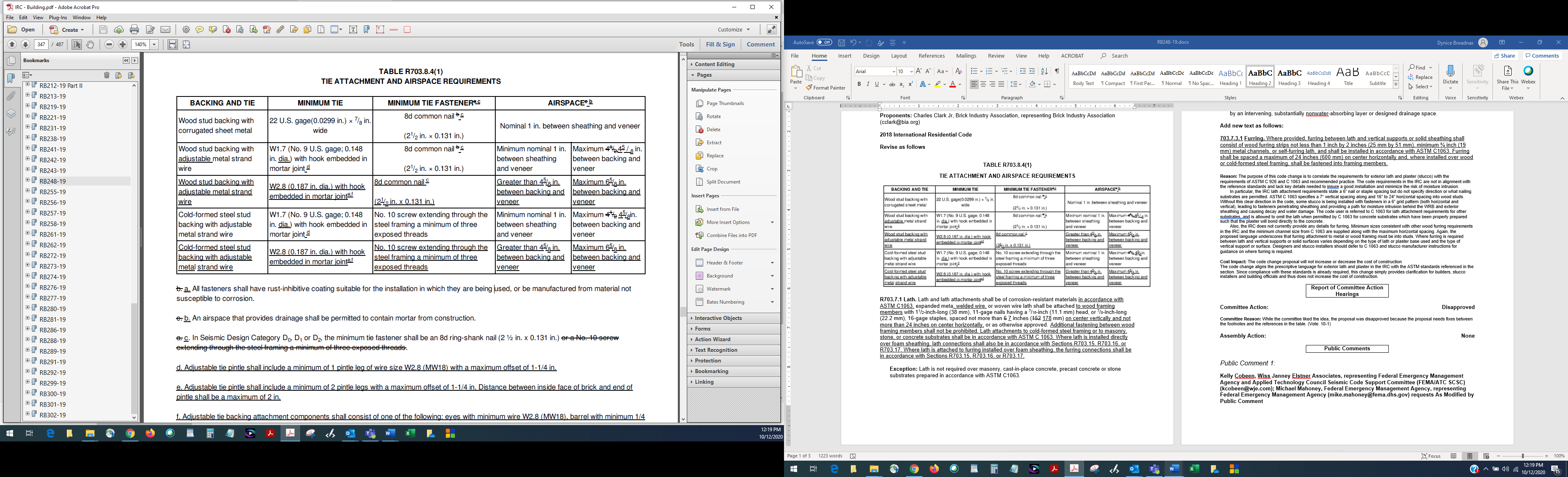
**R703.5 Wood, hardboard and wood structural panel siding.** Wood, hardboard, and wood structural panel siding shall be installed in accordance with this section and Table R703.3(1). Hardboard siding shall comply with CPA/ANSI A135.6. ~~Hardboard siding used as architectural trim shall comply with CPA/ANSI A 135.7.~~

|  |
| --- |
|  |
| **(S8876)(RB239-19 AS)**  **Revise as follows:**    **R703.8.4 Anchorage.** Masonry veneer shall be anchored directly to the supporting wall studs with corrosion-resistant metal ties embedded in mortar or grout and extending into the veneer a minimum of 11/2 inches (38 mm), with not less than 5/8-inch (15.9 mm) mortar or grout cover to outside face. Masonry veneer shall conform to Table R703.8.4(1). ~~For~~ Where the masonry veneer tie attachment is fastened to wood structural panel not less than 7/16 performance category through insulating sheathing not greater than 2 inches (51 mm) in thickness  ~~to not less than 7/16 performance category wood structural panel~~, see Table R703.8.4(2). Where Table R703.8.4(2) is used, attachment to the wood studs behind the sheathing is not required.  **(S8883)(RB247-19 AM** |

**Revise as follows – revision to be consistent with the original mod and public comment 1**

**TABLE R703.8.4(1)**

**TIE ATTACHMENT AND AIRSPACE REQUIREMENTS**



~~b.~~ a. All fasteners shall have rust-inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion.

~~c.~~ b. An airspace that provides drainage shall be permitted to contain mortar from construction.

~~a.~~ c. In Seismic Design Category D0, D1 or D2, the minimum tie fastener shall be an 8d ring-shank nail (2 ½ in. x 0.131 in.) ~~or a No. 10 screw extending through the steel framing a minimum of three exposed threads~~.

d. Adjustable tie pintle shall include a minimum of 1 pintle leg of wire size W2.8 (MW18) with a maximum offset of 1-1/4 in.

e. Adjustable tie pintle shall include a minimum of 2 pintle legs with a maximum offset of 1-1/4 in. Distance between inside face of brick and end of pintle shall be a maximum of 2 in.

f. Adjustable tie backing attachment components shall consist of one of the following: eyes with minimum wire W2.8 (MW18), barrel with minimum 1/4 in. outside dia., or plate with minimum thickness of 0.074 in. and minimum width of 1-1/4 in.

**Public comment 1**

**Modify as follows:**

**TABLE R703.8.4(1)**

**TIE ATTACHMENT AND AIRSPACE REQUIREMENTS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BACKING AND TIE** | **MINIMUM TIE** | **MINIMUM TIE FASTENER~~c~~a** | **AIRSPACEb** | |
| Wood stud backing with corrugated sheet metal | 22 U.S. gage(0.0299 in.) × 7/8 in. wide | 8d common nail c  (21/2 in. × 0.131 in.) | Nominal 1 in. between sheathing and veneer | |
| Wood stud backing with adjustable metal strand wire | W1.7 (No. 9 U.S. gage; 0.148 in. dia) with hook embedded in mortar jointd | 8d common nail c  (21/2 in. × 0.131 in.) | Minimum nominal 1 in. between backing and veneer | Maximum 45/8 in. between backing and veneer |
| Wood stud backing with adjustable metal strand wire | W2.8 (0.187 in. dia.) with hook embedded in mortar jointe,f | 8d common nail c  (21/2 in. x 0.131 in.) | Greater than 45/8 in. between backing and veneer | Maximum 65/8 in. between backing and veneer |
| Cold-formed steel stud backing with adjustable metal strand wire | W1.7 (No. 9 U.S. gage; 0.148 in. dia.) with hook embedded in mortar jointd | No. 10 screw extending through the steel framing a minimum of three exposed threads | Minimum nominal 1 in. between sheathingand veneer | Maximum 45/8in. between backing and veneer |
| Cold-formed steel stud backing with adjustable metal strand wire | W2.8 (0.187 in. dia.) with hook embedded in mortar jointe,f | No. 10 screw extending through the steel framing a minimum of three exposed threads | Greater than 45/8 in. between backing and veneer | Maximum 65/8 in. between backing and veneer |

a. All fasteners shall have rust-inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion.

b. An airspace that provides drainage shall be permitted to contain mortar from construction.

c. In Seismic Design Category D0, D1 or D2, the minimum tie fastener shall be an 8d ring-shank nail (2 ½ in. x 0.131 in.) .

d. Adjustable tie pintle shall include a minimum of 1 pintle leg of wire size W2.8 (MW18) with a maximum offset of 1-1/4 in.

e. Adjustable tie pintle shall include a minimum of 2 pintle legs with a maximum offset of 1-1/4 in. Distance between inside face of brick and end of pintle shall be a maximum of 2 in.

f. Adjustable tie backing attachment components shall consist of one of the following: eyes with minimum wire W2.8 (MW18), barrel with minimum 1/4 in. outside dia., or plate with minimum thickness of 0.074 in. and minimum width of 1-1/4 in.

**(S8885)(RB248-19 AMPC1)**

|  |
| --- |
| **R703.11.1 Installation.** Vinyl siding, ~~soffit~~ insulated vinyl siding, and accessories shall be installed in accordance with the manufacturer’s installation instructions.    R703.11.1.2 Penetration depth. Unless specified otherwise by the manufacturer’s instructions or in accordance with Table R703.3(1), fasteners shall penetrate into building framing. The total penetration into the sheathing, furring, framing, or other nailable substrate shall be a minimum of 11/4 inches (32 mm). ~~Where specified by the manufacturer’s instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or another nailable substrate of minimum thickness specified by the instructions or test report without penetrating into the framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend a minimum of 1/4 inch (6.4 mm) beyond the opposite face of the sheathing or nailable substrate.~~  R703.11.1.3 Spacing. Unless specified otherwise by the manufacturer’s instructions, the maximum spacing between fasteners for horizontal siding shall be 16 inches (406 mm), and for vertical siding 12 inches (305 mm) both horizontally and vertically. Where specified by the manufacturer’s instructions and supported by a test report, alternative fastener spacing is permitted.  **(S9847 AM A2)**  **R703.11.1 Installation.**  Vinyl siding, insulated vinyl siding, and compatible accessories shall be installed in accordance with the *manufacturer’s installation instructions.*  **Add new text as follows:**  **R703.11.1.4 Starter Strip.**The first course of horizontal siding shall be secured using a starter strip as specified in the manufacturer’s installation instructions. See Figure R703.1.4 (1).Where the first course of siding has to be cut or trimmed, the bottom edge shall be secured with utility trim and snap locks as specified by the manufacturer's installation instructions.  **Diagram, engineering drawing  Description automatically generated**  **Figure R703.11.1.4 (1)Typical Starter Stripa**  **a.**Figure R703.11.4.1(1) illustrates typical installation details. See manufacturer's installation instructions for actual installation details.    **R703.11.1.5 Utility Trim.**  Where horizontal siding has to be cut or trimmed below windows and at the top of walls, the top edge of the siding shall be secured with utility trim and snap locks or as specified by the manufacturer’s installation instructions. See Figures R703.11.1.5 (1) and R703.11.1.5 (2).  **Diagram  Description automatically generated**  **Figure R703.11.1.5 (1) Typical Snap Lock & Utility Trima**  **a.**Figure R703.11.5.(1) illustrates typical installation details. See manufacturer's installation instructions for actual installation details  **Diagram, engineering drawing  Description automatically generated**  **Figure R703.11.1.5 (2) Typical Snap Lock & Utility Trim Under Windowsa**    **a. Figure R703.11.1.5(2) illustrates typical installation details. See manufacturer's installation instructions for actual installation details.**    **R703.13.1 Insulated vinyl siding and accessories.**  *Insulated vinyl siding* and compatible accessories shall be installed in accordance with Sections R703.11.1, R703.11.2, and the *manufacturer’s installation instructions*.  **(S9842 AM Original )**  Modify as shown:  [**R703.11 Vinyl siding.**](https://codes.iccsafe.org/content/FLRC2020P1/chapter-7-wall-covering#FLRC2020P1_Pt03_Ch07_SecR703.11)  Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D3679 by an approved ~~quality control~~ agency.    [**R703.13 Insulated vinyl siding.**](https://codes.iccsafe.org/content/FLRC2020P1/chapter-7-wall-covering#FLRC2020P1_Pt03_Ch07_SecR703.13)  Insulated vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D7793 by an approved ~~quality control~~ agency.    [**R703.14 Polypropylene siding.**](https://codes.iccsafe.org/content/FLRC2020P1/chapter-7-wall-covering#FLRC2020P1_Pt03_Ch07_SecR703.14)  Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D7254 by an approved ~~quality control~~ agency. In addition, polypropylene siding shall conform to the fire separation distance requirements of Section R703.14.2 or R703.14.3.  **(S9947 AS)**  **Revise as follows:**  **Committee Modification:**  **TABLE R703.15.1**  **CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHTa**    b.     The thickness of wood structural panels complying with the specific gravity requirement of footnote a shall be permitted to be included in satisfying the minimum penetration into framing. For cladding connections to wood structural panels, refer to Table R703.3.3. For brick veneer tie connections to wood structural panels, refer to Table R703.8.4(2). |
|  |

**(S8888)(RB251-19 AM)**

**Revise as follows:**

**TABLE R703.16.1**

**CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHTa, b**

| **CLADDING FASTENER THROUGH FOAMSHEATHING INTO:** | **CLADDING FASTENER TYPE AND MINIMUMSIZE~~b~~c** | **CLADDING FASTENER VERTICAL SPACING(inches)** | **MAXIMUM THICKNESS OF FOAM SHEATHING~~c~~d(inches)** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **16″ o.c. Fastener Horizontal Spacing** | | | | **24″ o.c. Fastener Horizontal Spacing** | | | |
| **Cladding Weight:** | | | | **Cladding Weight:** | | | |
| **3 psf** | **11 psf** | **18 psf** | **25 psf** | **3 psf** | **11 psf** | **18 psf** | **25 psf** |
| Steel framing (minimum penetrationof steel thickness + 3threads) | No. 8 screw into 33-mil steelor thicker | 6 | 3.00 | 2.95 | 2.20 | 1.45 | 3.00 | 2.35 | 1.25 | DR |
| 8 | 3.00 | 2.55 | 1.60 | 0.60 | 3.00 | 1.80 | DR | DR |
| 12 | 3.00 | 1.80 | DR | DR | 3.00 | 0.65 | DR | DR |
| No. 10 screw into-33 mil steel | 6 | 4.00 | 3.50 | 2.70 | 1.95 | 4.00 | 2.90 | 1.70 | 0.55 |
| 8 | 4.00 | 3.10 | 2.05 | 1.00 | 4.00 | 2.25 | 0.70 | DR |
| 12 | 4.00 | 2.25 | 0.70 | DR | 3.70 | 1.05 | DR | DR |
| No. 10 screw into 43-mil steelor thicker | 6 | 4.00 | 4.00 | 4.00 | 3.60 | 4.00 | 4.00 | 3.45 | 2.70 |
| 8 | 4.00 | 4.00 | 3.70 | 3.00 | 4.00 | 3.85 | 2.80 | 1.80 |
| 12 | 4.00 | 3.85 | 2.80 | 1.80 | 4.00 | 3.05 | 1.50 | DR |

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a. Steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel, and 50 ksi steel for 54 mil steel or thicker.

b.     Where cladding is attached to wood structural panel sheathing only, fastening requirements shall be in accordance with Table R703.3.3. Where brick veneer ties are attached to wood structural panel sheathing only, fastening requirements shall be in accordance with Table R703.8.4(2).

~~b.~~c. Screws shall comply with the requirements of ASTM C1513.

~~c.~~d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

**S8892)(RB254-19 AM)**

**Revise as follows:**

**TABLE R703.15.2**

**FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHTa, b**

| **FURRING MATERIAL** | **FRAMING MEMBER** | **FASTENER TYPE ANDMINIMUMSIZE** | **MINIMUM PENETRATIONINTO WALLFRAMING(inches)c** | **FASTENER SPACING INFURRING(inches)** | **MAXIMUM THICKNESS OF FOAM SHEATHING~~d~~e(inches)** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **16 o.c. Furring**  **~~e~~f** | | | | **24 o.c. Furring**  **~~e~~f** | | | |
| **Siding Weight:** | | | | **Siding Weight:** | | | |
| **3 psf** | **11 psf** | **18 psf** | **25 psf** | **3 psf** | **11 psf** | **18 psf** | **25 psf** |
| Minimum 1 wood furring~~c~~d | Minimum 2 woodstud | 0.131 diameternail | 11/4 | 8 | 4.00 | 2.45 | 1.45 | 0.95 | 4.00 | 1.60 | 0.85 | DR |
| 12 | 4.00 | 1.60 | 0.85 | DR | 4.00 | 0.95 | DR | DR |
| 16 | 4.00 | 1.10 | DR | DR | 3.05 | 0.60 | DR | DR |
| 0.162 diameternail | 11/4 | 8 | 4.00 | 4.00 | 2.45 | 1.60 | 4.00 | 2.75 | 1.45 | 0.85 |
| 12 | 4.00 | 2.75 | 1.45 | 0.85 | 4.00 | 1.65 | 0.75 | DR |
| 16 | 4.00 | 1.90 | 0.95 | DR | 4.00 | 1.05 | DR | DR |
| No.10 woodscrew | 1 | 12 | 4.00 | 2.30 | 1.20 | 0.70 | 4.00 | 1.40 | 0.60 | DR |
| 16 | 4.00 | 1.65 | 0.75 | DR | 4.00 | 0.90 | DR | DR |
| 24 | 4.00 | 0.90 | DR | DR | 2.85 | DR | DR | DR |
| 1/4 lag screw | 11/2 | 12 | 4.00 | 2.65 | 1.50 | 0.90 | 4.00 | 1.65 | 0.80 | DR |
| 16 | 4.00 | 1.95 | 0.95 | 0.50 | 4.00 | 1.10 | DR | DR |
| 24 | 4.00 | 1.10 | DR | DR | 3.25 | 0.50 | DR | DR |

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a.  Wood framing and furring shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with AWC NDS.

b.  Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

c. The thickness of wood structural panels complying with the specific gravity requirement of footnote a shall be permitted to be included insatisfying the minimum required penetration into framing.

d.  Where the required cladding fastener penetration into wood material exceeds 3/4 inch and is not more than 11/2 inches, a minimum 2 wood furring or an approved design shall be used.

e.  Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

f.  Furring shall be spaced not more than 24 inches on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

**(S8891)(RB253-19 AS)**

**Revise as follows:**

**R703.11.2 Installation over foam plastic sheathing.** Where vinyl siding or insulated vinyl siding is installed over foam plastic sheathing, the vinyl siding shall comply with Section R703.11 and shall have a wind load design ~~wind~~ pressure ~~resistance~~ rating in accordance with Table R703.11.2.

**Exceptions:**

1.   Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other *approved* backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Sections R703.3.3 and R703.11.1.

2.   Where the vinyl siding manufacturer’s product specifications provide an approved wind load design ~~wind~~ pressure rating for installation over foam plastic sheathing, use of this wind load design ~~wind~~ pressure rating shall be permitted and the siding shall be installed in accordance with the *manufacturer’s installation instructions*.

3.   Where the foam plastic sheathing and its attachment have a design wind pressure resistance complying with Sections R316.8 and R301.2.1, the vinyl siding shall be installed in accordance with Sections R703.3.3 and R703.11.1.

**TABLE R703.11.2**

**~~ADJUSTED~~ REQUIRED MINIMUM WIND LOAD DESIGN ~~WIND~~ PRESSURE ~~REQUIREMENT~~ RATING FOR VINYL SIDING INSTALLED OVER FOAM PLASTIC SHEATHING ALONE**

| **ULTIMATE DESIGNWIND SPEED (MPH)** | **ADJUSTED MINIMUM DESIGN WIND PRESSURE (ASD) (PSF)a, b** | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Case 1: With interior gypsum wallboardc** | | | **Case 2: Without interior gypsum wallboardc** | | |
| **Exposure** | | | **Exposure** | | |
| **B** | **C** | **D** | **B** | **C** | **D** |
| <=95 | -30.0 | -33.2 | -39.4 | -33.9 | -47.4 | -56.2 |
| 100 | -30.0 | -36.8 | -43.6 | -37.2 | -52.5 | -62.2 |
| 105 | -30.0 | -40.5 | -48.1 | -41.4 | -57.9 | -68.6 |
| 110 | ~~-44.0~~  -31.8 | ~~-61.6~~  -44.5 | ~~-73.1~~  -52.8 | ~~-62.9~~  -45.4 | ~~-88.1~~  -63.5 | ~~-104.4~~  -75.3 |
| 115 | ~~-49.2~~  -35.5 | ~~-68.9~~  -49.7 | ~~-81.7~~  -59.0 | ~~-70.3~~  -50.7 | ~~-98.4~~  -71.0 | ~~-116.7~~  -84.2 |
| 120 | ~~-51.8~~  -37.4 | ~~-72.5~~  -52.4 | ~~-86.0~~  -62.1 | ~~-74.0~~  -53.4 | ~~-103.6~~  -74.8 | ~~-122.8~~  -88.6 |
| 130 | ~~-62.2~~  -44.9 | ~~-87.0~~  -62.8 | ~~-103.2~~  -74.5 | ~~-88.8~~  -64.1 | ~~-124.3~~  -89.7 | ~~-147.4~~  -106 |
| > 130 | ~~Not Allowed~~~~d~~ see footnote d | | | | | |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m2, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

a.            Linear interpolation is permitted.

b.     The table values are based on a maximum 30-foot mean roof height, and effective wind area of 10 square feet Wall Zone 5 (corner), and the ASD design component and cladding wind pressure from Table R301.2(2), adjusted for exposure in accordance with Table R301.2(3), multiplied by the following adjustment factors: ~~2.6~~ 1.87 (Case 1) and ~~3.7~~ 2.67 (Case 2) ~~for wind speeds less than 130 mph and 3.7 (Case 2) for wind speeds greater than 130 mph~~.

c.             Gypsum wallboard, gypsum panel product or equivalent.

d.     For the indicated wind speed condition~~,~~ and where foam sheathing is the only sheathing on the exterior of a frame walls with vinyl siding, ~~is not allowed unless the vinyl siding complies with an adjusted minimum design wind pressure requirement as determined in accordance with Note b and~~ the wall assembly ~~is~~ shall be capable of resisting an impact without puncture at least equivalent to that of a wood frame wall with minimum 7/16-inch OSB sheathing as tested in accordance with ASTM E1886. The vinyl siding shall comply with an adjusted design wind pressure requirement in accordance with footnote b, using an adjustment factor of 2.67.

**(S8887)(RB249-19 AS)**

|  |
| --- |
| Text of Modification |
| Revise as follows:  R703.14.1.1 Installation. Unless otherwise specified in the manufacturer’s installation instructions, polypropylene siding shall be installed over and attached to wood structural panel sheathing with a minimum thickness of 7/16 inch (11.1 mm), or other substrate another nailable substrate composed of wood or wood-based material whereby fasteners have equivalent withdrawal resistance. Accessories shall be installed in accordance with the manufacturer’s installation instructions.  R703.14.1.1.1 Starter Strip. Horizontal siding shall be installed with a starter strip at the initial course at any location.  R703.14.1.1.2 Under Windows and Top of Walls. Where nail hem is removed, such as under windows and at the top of walls, nail slot punch or pre-drilled holes shall be constructed as shown in Figure R703.14.1.1.2 (1).  cid:image002.png@01D8EEA8.52E55FB0  Figure R703.14.1.1.2 (1) Trim Under Window and Top of Walls Polypropylene Siding.  R703.14.1.2Fastener requirements. Unless otherwise specified in the approved manufacturer’s installation instructions, nails shall be corrosion resistant, with a minimum 0.120-inch (3 mm) shank and minimum 0.313-inch (8 mm) head diameter. Nails shall be a minimum of 11/4 inches (32 mm) long or as necessary to penetrate sheathing or nailable substrate not less than 3/4 inch (19.1 mm). Where the nail fully penetrates the sheathing or nailable substrate, the end of the fastener shall extend not less than 1/4 inch (6.4 mm) beyond the opposite face of the sheathing or nailable substrate. Staples are not permitted. The spacing of fasteners shall be in accordance with the manufacturer’s installation instructions. |

## **(S9849 AM) with comment pot October 2022 TAC meeting**

## **R703.15.1** **Direct attachment.** Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table R703.15.1.

**Revise as follows:**

![](data:image/png;base64;base64,)

## R703.15.2 Furred cladding attachment. Where wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table R703.15.2. Where placed horizontally, wood furring shall be preservative-treated wood in accordance with Section R317.1 or naturally durable wood and fasteners shall be corrosion resistant in accordance Section R317.3.

**Revise as follows:**

**TABLE R703.15.2**

**FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHTa, b**

| **FURRING MATERIAL** | **FRAMING MEMBER** | **FASTENER TYPE AND MINIMUM SIZE** | **MINIMUM PENETRATION INTO WALL FRAMING (inches)** | **FASTENER SPACING IN FURRING (inches)** | **MAXIMUM THICKNESS OF FOAM SHEATHINGd(inches)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **16″ o.c. Furringe** | | | | | **24″ o.c. Furringe** | | | | |
| **Siding Weight:** | | | | | **Siding Weight:** | | | | |
| **3 psf** | **11 psf** | **15 psf** | **18 psf** | **25 psf** | **3 psf** | **11 psf** | **15 psf** | **18 psf** | **25 psf** |
| Minimum 1× wood furringc | Minimum 2× woodstud | 0.131″ diameternail | 11/4 | 8 | 4.00 | 2.45 | 1.75 | 1.45 | 0.95 | 4.00 | 1.60 | 1.10 | 0.85 | DR |
| 12 | 4.00 | 1.60 | 1.10 | 0.85 | DR | 4.00 | 0.95 | 0.55 | DR | DR |
| 16 | 4.00 | 1.10 | 0.70 | DR | DR | 3.05 | 0.60 | DR | DR | DR |
| 0.162″ diameternail | 11/4 | 8 | 4.00 | 4.00 | 3.05 | 2.45 | 1.60 | 4.00 | 2.75 | 1.85 | 1.45 | 0.85 |
| 12 | 4.00 | 2.75 | 1.85 | 1.45 | 0.85 | 4.00 | 1.65 | 1.05 | 0.75 | DR |
| 16 | 4.00 | 1.90 | 1.25 | 0.95 | DR | 4.00 | 1.05 | 0.60 | DR | DR |
| No.10 woodscrew | 1 | 12 | 4.00 | 2.30 | 1.60 | 1.20 | 0.70 | 4.00 | 1.40 | 0.85 | 0.60 | DR |
| 16 | 4.00 | 1.65 | 1.05 | 0.75 | DR | 4.00 | 0.90 | DR | DR | DR |
| 24 | 4.00 | 0.90 | DR | DR | DR | 2.85 | DR | DF | DR | DR |
| 1/4″ lag screw | 11/2 | 12 | 4.00 | 2.65 | 1.90 | 1.50 | 0.90 | 4.00 | 1.65 | 1.05 | 0.80 | DR |
| 16 | 4.00 | 1.95 | 1.25 | 0.95 | 0.50 | 4.00 | 1.10 | 0.65 | DR | DR |
| 24 | 4.00 | 1.10 | 0.65 | DR | DR | 3.25 | 0.50 | DR | DR | DR |

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

## a. Wood framing and furring shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with AWC NDS.

## b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

## c. Where the required cladding fastener penetration into wood material exceeds 3/4 inch and is not more than 11/2 inches, a minimum 2× wood furring or an approved design shall be used.

## d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

## e. Furring shall be spaced not more than 24 inches on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

## R703.16.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table R703.16.1.

**Revise as follows:**

**TABLE R703.16.1**

**CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHTa**

| **CLADDING FASTENER THROUGH FOAM SHEATHING INTO:** | **CLADDING FASTENER TYPE AND MINIMUM SIZEb** | **CLADDING FASTENER VERTICAL SPACING (inches)** | **MAXIMUM THICKNESS OF FOAM SHEATHINGc(inches)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **16″ o.c. Fastener Horizontal Spacing** | | | | | **24″ o.c. Fastener Horizontal Spacing** | | | | |
| **Cladding Weight:** | | | | | **Cladding Weight:** | | | | |
| **3 psf** | **11 psf** | **15 psf** | **18 psf** | **25 psf** | **3 psf** | **11 psf** | **15 psf** | **18 psf** | **25 psf** |
| Steel framing (minimum penetrationof steel thickness + 3threads) | No. 8 screw into 33-mil steelor thicker | 6 | 3.00 | 2.95 | 2.50 | 2.20 | 1.45 | 3.00 | 2.35 | 1.75 | 1.25 | DR |
| 8 | 3.00 | 2.55 | 2.00 | 1.60 | 0.60 | 3.00 | 1.80 | 0.90 | DR | DR |
| 12 | 3.00 | 1.80 | 0.95 | DR | DR | 3.00 | 0.65 | DR | DR | DR |
| No. 10 screw into-33 mil steel | 6 | 4.00 | 3.50 | 3.05 | 2.70 | 1.95 | 4.00 | 2.90 | 2.20 | 1.70 | 0.55 |
| 8 | 4.00 | 3.10 | 2.50 | 2.05 | 1.00 | 4.00 | 2.25 | 1.35 | 0.70 | DR |
| 12 | 4.00 | 2.25 | 1.35 | 0.70 | DR | 3.70 | 1.05 | DR | DR | DR |
| No. 10 screw into 43-mil steelor thicker | 6 | 4.00 | 4.00 | 4.00 | 4.00 | 3.60 | 4.00 | 4.00 | 3.80 | 3.45 | 2.70 |
| 8 | 4.00 | 4.00 | 4.00 | 3.70 | 3.00 | 4.00 | 3.85 | 3.25 | 2.80 | 1.80 |
| 12 | 4.00 | 3.85 | 3.25 | 2.80 | 1.80 | 4.00 | 3.05 | 2.15 | 1.50 | DR |

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

## a. Steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel, and 50 ksi steel for 54 mil steel or thicker.

## b. Screws shall comply with the requirements of ASTM C1513.

## c. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

## R703.16.2 Furred cladding attachment. Where steel or wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table R703.16.2. Where placed horizontally, wood furring shall be preservative-treated wood in accordance with Section R317.1 or naturally durable wood and fasteners shall be corrosion resistant in accordance with Section R317.3. Steel furring shall have a minimum G60 galvanized coating.

**Revise as follows:**

![](data:image/png;base64;base64,)

**Committee Modification:**

**TABLE R703.16.2**

**FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHTa**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **FURRING MATERIAL** | **FRAMING MEMBER** | **FASTENER TYPE AND MINIMUM SIZEb** | **MINIMUM PENETRATION INTO WALL FRAMING (inches)** | **FASTENER SPACING IN FURRING (inches)** | **MAXIMUM THICKNESS OF FOAM SHEATHINGd(inches)** | | | | | | | | | |
| **16″ o.c. Furringe** | | | | | **24″ o.c. Furringe** | | | | |
| **Cladding Weight:** | | | | | **Cladding Weight:** | | | | |
| **3 psf** | **11 psf** | **15 psf** | **18 psf** | **25 psf** | **3 psf** | **11 psf** | **15 psf** | **18 psf** | **25 psf** |
| Minimum 33-mil steel furring or minimum 1× wood furringc | 33-milsteel stud | No. 8 screw | Steel thickness + 3threads | 12 | 3.00 | 1.80 | 0.95 | DR | DR | 3.00 | 0.65 | DR | DR | DR |
| 16 | 3.00 | 1.00 | DR | DR | DR | 2.85 | DR | DR | DR | DR |
| 24 | 2.85 | DR | DR | DR | DR | 2.20 | DR | DR | DR | DR |
| No. 10 screw | Steel thickness + 3threads | 12 | 4.00 | 2.25 | 1.35 | 0.70 | DR | 3.70 | 1.05 | DR | DR | DR |
| 16 | 3.85 | 1.45 | DR | DR | DR | 3.40 | DR | DR | DR | DR |
| 24 | 3.40 | DR | DR | DR | DR | 2.70 | DR | DR | DR | DR |
| 43-milor thickersteel stud | No. 8 Screw | Steel thickness + 3threads | 12 | 3.00 | 1.80 | ~~2.00~~  0.95 | DR | DR | 3.00 | 0.65 | DR | DR | DR |
| 16 | 3.00 | 1.00 | ~~1.30~~  DR | DR | DR | 2.85 | DR | DR | DR | DR |
| 24 | 2.85 | DR | DR | DR | DR | 2.20 | DR | DR | DR | DR |
| No. 10 screw | Steel thickness + 3threads | 12 | 4.00 | 3.85 | 3.25 | 2.80 | 1.80 | 4.00 | 3.05 | 2.15 | 1.50 | DR |
| 16 | 4.00 | 3.30 | 2.55 | 1.95 | 0.60 | 4.00 | 2.25 | 1.05 | DR | DR |
| 24 | 4.00 | 2.25 | 1.05 | DR | DR | 4.00 | 0.65 | DR | DR | DR |

*(No change to footnotes)*

**(S8890)(RB252-19 AM)**

**Modify as follows:**

**R703.1.2.1 Wind resistance of exterior soffits.**

Exterior soffits and their attachments shall comply with Section R704.

**R704.2.1 Vinyl soffit panels.**Vinyl soffit panels shall be

installed using fasteners specified by the manufacturer and

shall be fastened at both ends to a supporting component

such as a nailing strip, fascia or sub fascia component in

accordance with Figure R704.2.1. Where the unsupported

span of soffit panels is greater than 12 inches, intermediate

nailing strips shall be provided in accordance with Figure

R704.2.2 unless a larger span is permitted in accordance

with the manufacturer’s product approval specification.

Vinyl soffit panels shall be installed in accordance with

the manufacturer’s product approval specification and limitations

of use. Fascia covers shall be installed in accordance

with the manufacturer’s product approval

specification and limitations of use and Section R704.3.

**Add a new Section as follows:**

**R704.3 Aluminum Fascia.** Aluminum fascia shall have a minimum thickness of 0.019 inches and be installed per the manufacturer’s instructions and this code. Fasteners shall be aluminum or stainless steel. Aluminum fascia shall be attached in accordance with  Section R704.3.1, R704.3.2 or R704.3.3. The drip edge shall comply with R905.2.8.5, and the thickness of the drip edge shall be in accordance with Table R903.2.1.

**R704.3.1 Fascia installation where the design wind pressure is 30 psf or less.**Where the design wind pressure is 30 pounds per square foot (1.44kPA) or less, aluminum fascia shall be attached as follows:

**1.** Finish nails shall be provided in the return leg (1 ¼ x 0.057 x 0.177 head diameter) spaced a maximum of 24 inches (610 mm) on center, and

**2.** The fascia shall be inserted under the drip edge with not less than half the height of the drip edge or 1.0 inch (25 mm), whichever is greater, of the fascia material covered by the drip edge. One finish nail shall be centered in the face of the fascia from each end of the fascia material section located no more than 1 inch below the drip edge.

**R704.3.2  Fascia installation where the design wind pressure exceeds 30 psf but is 60 psf or less.**Where the design wind pressure is 60 pounds per square foot (2.88kPA) or less, aluminum fascia shall be attached in accordance with Section R704.3.2.1 or Section R704.3.2.2.

**R704.3.2.1.**Where the height of the fascia from the top of the roof sheathing to the bottom of the sub-fascia plus any thickness of soffit material below the sub-fascia is less than or equal to 6.5 inches (165 mm) or less, aluminum fascia shall be attached as follows:

**1.** Finish nails shall be provided in the return leg (1 ¼ x 0.057 x 0.177 head diameter) spaced a maximum of 24 inches (610 mm) on center.

**2.** The fascia shall be inserted under the drip edge with not less than half the height of the drip edge or 1.0 inch (25 mm), whichever is greater, of the fascia material covered by the drip edge. One finish nail shall be centered in the face of the fascia from each end of the fascia material section located no more than 1 inch below the drip edge.

**R704.3.2.2** Where the height of the fascia from the top of the roof sheathing to the bottom of the sub-fascia plus any thickness of soffit material below the sub-fascia is greater than 6.5 inches (165 mm),  the top edge of the fascia shall be secured using utility trim installed beneath the drip edge with snap locks punched into the fascia spaced no more than 6 inches on center.

**R704.3.3  Fascia installation where the design wind pressure exceeds 60 psf.**Where the design wind pressure is greater than 60 pounds per square foot (2.88kPA), aluminum fascia shall be attached as follows in accordance with Section R704.3.3.1 or Section R704.3..3.2.

**R704.3.3.1.** Where the height of the fascia  from the top of the roof sheathing to the bottom of the sub-fascia plus any thickness of soffit material below the sub-fascia is less than or equal to 4.5 inches (114 mm) or less aluminum fascia shall be attached as follows:

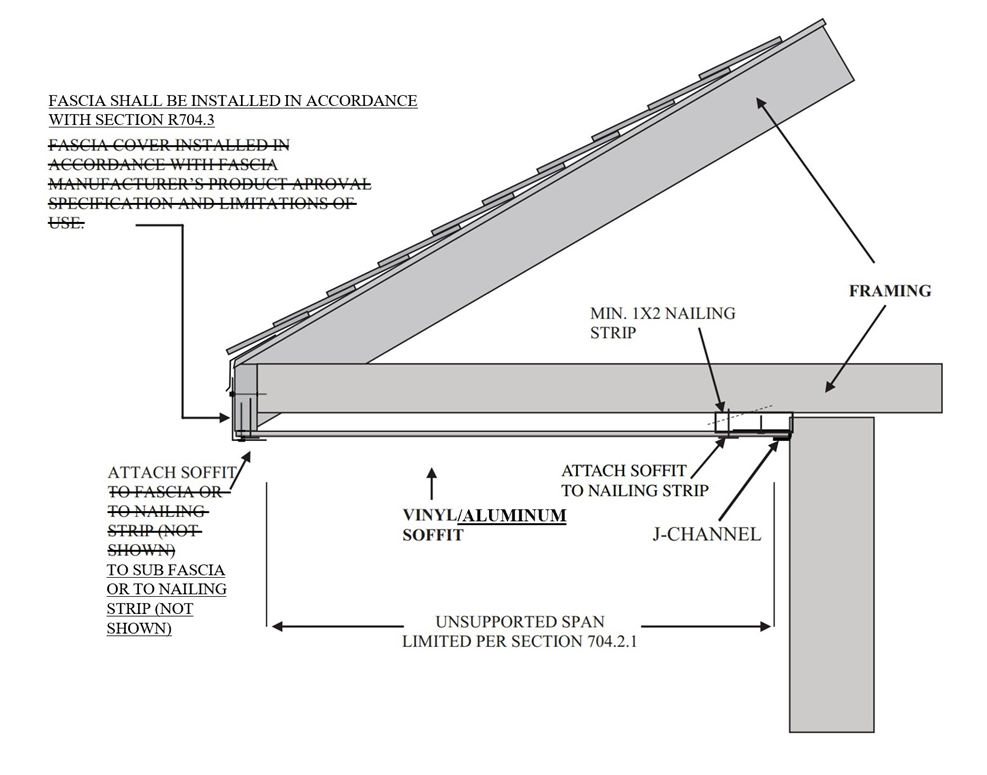
**1.** Finish nails shall be provided in the return leg (1 ¼ x 0.057 x 0.177 head diameter) spaced a maximum of  16  inches on center, and

**2.**The fascia shall be inserted under the drip edge with not less than half the height of the drip edge or 1.0 inch (25 mm), whichever is greater, of the fascia material covered by the drip edge. One finish nail shall be centered in the face of the fascia from each end of the fascia material section located no more than 1 inch below the drip edge.

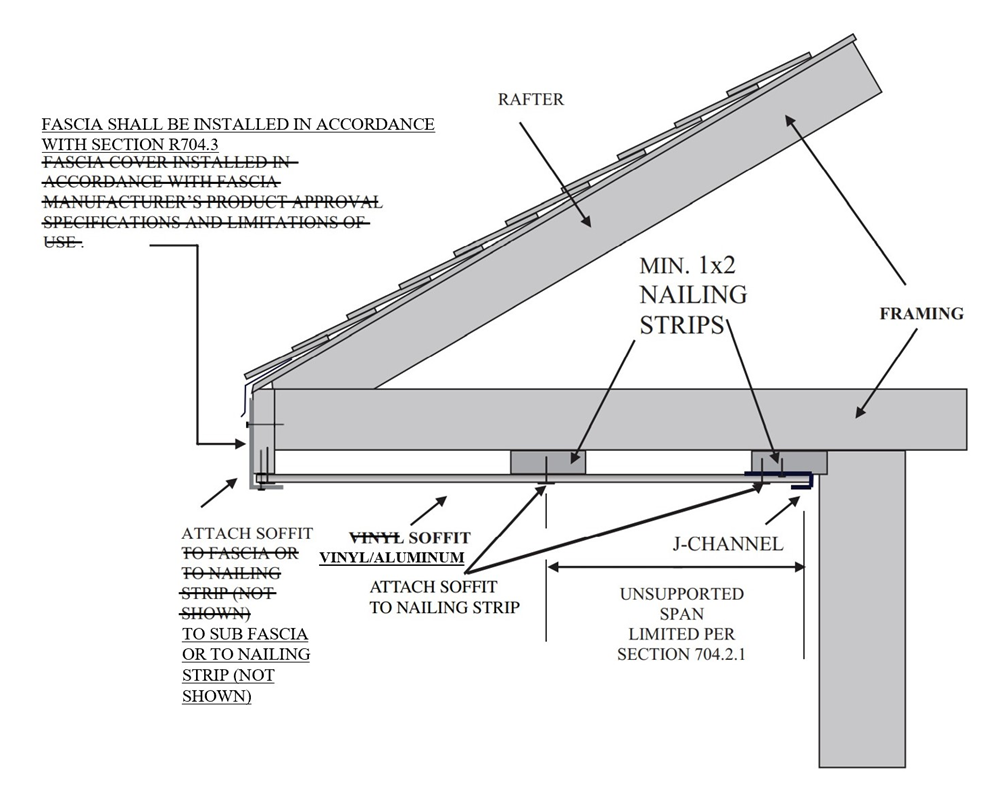
**R704.3.3.2** Where the height of the fascia from the top of the roof sheathing to the bottom of the sub-fascia plus any thickness of soffit material below the sub-fascia is greater than 4.5 inches (114 mm), the top edge of the fascia shall be secured using utility trim installed beneath the drip edge with snap locks punched into the fascia spaced no more than 6 inches on center.

**R704.4 Corners on Hip Roofs.** Fascia shall be bent around corners and extend at least 12 inches beyond the corner. The next fascia material section shall overlap the extension a minimum of 3” and be fastened through the return leg at the overlap.

**R704.5 Corners on Gable Roofs.** Fascia shall be wrapped (tabbed) around and extend at least 1 inch beyond the corner. The gable fascia material section shall overlap the tab and be fastened through the fascia cover and the tab at the end with two face nails (1 ¼ x 0.057 x 0.177 head diameter) for a 2x4-inch sub fascia and three face nails for 2x6-inch and greater sub fascia.



**FIGURE 704.2.1 TYPICAL SINGLE-SPAN VINYL OR ALUMINUM SOFFIT PANEL SUPPORT**

****

**FIGURE 704.2.2 TYPICAL DOUBLE-SPAN VINYL OR ALUMINUM SOFFIT PANEL SUPPORT**

**(S9851 AM A3)**

|  |
| --- |
| Modify text as follows:  **R704.2.1 Vinyl and aluminum soffit panels**. Vinyl and aluminum soffit panels shall be installed using aluminum, galvanized, stainless steel or rust-preventative coated nails or other *approved* corrosion-resistant fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia, or subfascia component in accordance with Figure R704.2.1. Where the unsupported span of soffit panels is greater than 12 inches, intermediate nailing strips shall be provided in accordance with Figure R704.2.2. unless a larger span is permitted in accordance with the manufacturer’s product approval specification. Vinyl and aluminum soffit panels shall be installed in accordance with the manufacturer’s installation product approval specification and limitations of use. Fascia covers shall be installed in accordance with the manufacturer’s product approval specification and limitations of use.  Modify figures CAPTIONS as follows:  FIGURE R704.2.1  TYPICAL SINGLE-SPAN VINYL OR ALUMINUM SOFFIT PANEL SUPPORT  FIGURE R704.2.2  TYPICAL MULTI-SPAN VINYL OR ALUMINUM SOFFIT PANEL SUPPORT |
|  |

**(S9878 AM A1)**

**CHAPTER 8 ROOF-CEILING CONSTRUCTION**

**Revise as follows:**

**R802.1.5.3 Testing.** For ~~wood products produced by other means during manufacture, other than a pressure process, all sides~~ fire retardant treated wood products the front and back faces of the wood product shall be tested in accordance with and produce the results required in Section R802.1.5.  ~~Testing of only the front and back faces of wood structural panels shall be permitted.~~

Add new text as follows:

R802.1.5.3.1 Fire testing of wood structural panels.Wood structural panels shall be tested with a ripped or cut longitudinal gap of 1/8 inch (3.2 mm).

**(F8895)(RB258-19 AS)**

**Revise as follows:**

**R802.1.5.2 Other means during manufacture.** For wood products ~~produced~~ impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an approved method of protection as required by this section.

**(F8894)(RB257-19 AS)**

Revise as follows:

R802.10.2 Design. Wood trusses shall be designed in accordance with accepted engineering practice. The design and manufacture of metal-plate-connected wood trusses shall comply with ANSI/TPI 1. The truss design drawings shall be prepared by a registered design professional where required by the *Florida Statutes* ~~of the jurisdiction in which the project is to be constructed in accordance with Section R106.1.~~

**(S9182)(CCC-IRC10-19 AS)**

Revise as follows

**R802.1.5 Fire-retardant-treated wood.** Fire-retardant-treated wood (FRTW) is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a listed flame spread index of 25 or less ~~and does not show evidence of significant progressive combustion where the test is~~ .In addition, the ASTM E84 or UL 723 test shall be continued for an additional 20-minutes. In addition, and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the center line of the burners at any time during the test.

**(F8893)(RB255-19 AMPC1)**

**Revise as follows:**

**R802.10.1 Truss design drawings.**Truss design drawings, prepared in conformance to Section R802.10.1, shall be provided to the *building official*and *approved*prior to installation. Truss design drawings shall be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, the following information:

*Items 1 – 3:  no changes*

4. Design loads as applicable.

4.1. Top chord live load (as determined from Section R301.6).

4.2. Top chord dead load.

4.3. Bottom chord live load.

4.4. Bottom chord dead load.

4.5. Concentrated loads and their points of application.

4.6. Controlling wind ~~and earthquake~~ loads.

*Items 5 – 12:  no changes*

**Delete section in its entirety:**

**~~R802.10.2.1 Applicability limits.~~**~~The provisions of this section shall control the design of truss roof framing when snow controls for buildings, not greater than 60 feet (18 288 mm) in length perpendicular to the joist, rafter or truss span, not greater than 36 feet (10 973 mm) in width parallel to the joist, rafter or truss span, not more than three stories above grade plane in height, and roof slopes not smaller than 3:12 (25 percent slope) or greater than 12:12 (100-percent slope). Truss roof framing constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 140 miles per hour (63 m/s), Exposure B or C, and a maximum ground snow load of 70 psf (3352 Pa). For consistent loading of all truss types, roof snow load is to be computed as: 0.7~~*~~p~~~~g~~*~~.~~

**Revise as follows:**

**R803.1 Lumber sheathing.**Allowable spans for lumber used as roof sheathing shall conform to Table R803.1. Spaced lumber sheathing for wood shingle and shake roofing shall conform to the requirements of Sections R905.7 and R905.8. ~~Spaced lumber sheathing is not allowed in Seismic Design Category D~~~~2~~.

**(S10022 AS)**

**R803.2.3.1 Sheathing fastenings.**Wood structural panel sheathing shall be fastened to roof framing in accordance with Table R803.2.3.1. Sheathing shall be fastened with ASTM F1667 RSRS-03 (2 1/2" x 0.131" x 0.281 head diameter) nails except that ~~Where the sheathing thickness is 15/32 inches and less, sheathing shall be fastened with~~ ASTM F1667 RSRS-01 (2 3/8" x 0.113") nails~~. Where the sheathing thickness is greater than 15/32 inches, sheathing shall be fastened with ASTM F1667 RSRS-03 (2 1/2" x 0.131") nails~~ or ASTM F1667 RSRS-04 (3" x 0.120" x 0.281 head diameter) nails shall be permitted where sheathing thickness is 15/32 inches and less. RSRS-01, RSRS-03 and RSRS-04 are ring shank nails meeting the specifications in ASTM F1667.

**Table R803.2.2**

**Minimum Roof Sheathing Thickness**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Rafter/Truss Spacing**  **24 in. o.c.** | **WIND SPEED** | | | | | | | |
| **115 mph** | **120 mph** | **130 mph** | **140 mph** | **150 mph** | **160 mph** | **170 mph** | **180 mph** |
| **Minimum Sheathing Thickness, inches**  **(Panel Span Rating)**  **Exposure B** | 7/16  (24/16) | 7/16  (24/16) | 7/16  (24/16) | 7/16  (24/16) | 15/32  (32/16) | 19/32  (40/20) | 19/32  (40/20) | 19/32  (40/20) |
| **Minimum Sheathing Thickness, inches**  **(Panel Span Rating)**  **Exposure C** | 7/16  (24/16) | 7/16  (24/16) | 15/32  (32/16) | 19/32  (40/20) | 19/32  (40/20) | 19/32  (40/20) | 19/32  (40/20) | 23/32  (48/24) |
| **Minimum Sheathing Thickness, inches**  **(Panel Span Rating)**  **Exposure D** | 15/32  (32/16) | 19/32  (40/20) | 19/32  (40/20) | 19/32  (40/20) | 19/32  (40/20) | 19/32  (40/20) | 23/32  (48/24) | 23/32  (48/24) |

**Table R803.2.3.1**

**Roof Sheathing Attachmenta,b**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Rafter/Truss Spacing**  **24 in. o.c.** | **Wind Speed** | | | | | | | | | | | | | | | |
| **115 mph** | | **120 mph** | | **130 mph** | | **140 mph** | | **150 mph** | | **160 mph** | | **170 mph** | | **180 mph** | |
| **E** | **F** | **E** | **F** | **E** | **F** | **E** | **F** | **E** | **F** | **E** | **F** | **E** | **F** | **E** | **F** |
| **Exposure B** | | | | | | | | | | | | | | | | |
| **Rafter/Truss SG = 0.42** | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 4 |
| **Rafter/Truss SG = 0.49** | 6 | 12 | 6 | 12 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| **Exposure C** | | | | | | | | | | | | | | | | |
| **Rafter/Truss SG = 0.42** | 6 | 6 | 6 | 6 | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 |
| **Rafter/Truss SG = 0.49** | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 4 | 4 | 4 | 4 |
| **Exposure D** | | | | | | | | | | | | | | | | |
| **Rafter/Truss SG = 0.42** | 6 | 6 | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Rafter/Truss SG = 0.49** | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

E = Nail spacing along panel edges (inches)

F = Nail spacing along intermediate supports in the panel field (inches)

a.  For sheathing located a minimum of 4 feet from the perimeter edge of the roof, including 4 feet on each side of ridges and hips, nail spacing is permitted to be 6 inches on center along panel edges and 6 inches on center along intermediate supports in the panel field.

b.  Where rafter/truss spacing is less than 24 inches on center or for specific gravities (SG) other than those shown, roof sheathing fastening is permitted to be in accordance with the AWC WFCM or the AWC NDS provided nail spacing does not exceed 6 inches on center along panel edges and 12 inches on center along intermediate supports in the panel field.

 (**S10450 AS)**

**Chapter 9 Roof Assemblies**

**Revise as shown:**

**R902.1 Roofing covering materials.**Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C *roof assemblies*~~roofing~~shall be installed in jurisdictions designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a lot line. Where Class A, B, or C *roof assemblies*are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the *roof assembly* shall be *listed*and identified as to Class by an *approved*testing agency.~~Class A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E108.~~

**Exceptions:**

1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.

2. Class A roof assemblies include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.

3. Class A roof assemblies include minimum 16 ounces per square foot copper sheets installed over combustible decks.

**(R9894 AS)**

**R905.1. Roof covering application.**

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer’s installation instructions. Unless otherwise specified in this section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2 (2), adjusted for height and exposure in accordance with Table R301.3(3).

**R905.1.1 Underlayment.**

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 ~~and~~, D6757, or ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section R905.1.1.1, R905.1.1.2 or R905.1.1.3 as applicable.

Exception: Compliance with Section R905.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

**Table R905.1.1(1)**

**Underlayment Types.**

Reserved.

**Table R905.1.1(2)**

**Underlayment Application.**

Reserved.

**Table R905.1.1(3)**

**Underlayment Attachment.**

Reserved.

**R905.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles** Underlayment for asphalt shingles, metal roof panels or ~~roof~~ shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles ~~and metal roof panels~~ shall comply with one of the following methods:

1. The entire roof deck shall be covered with an approved self-adhering polymer modified bitumen underlayment complying with ASTM D1970 installed in accordance with both the underlayment manufacturer’s and roof covering manufacturer’s installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed.

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum ~~4~~3-3/4 -inch-wide (~~102~~ 95 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer’s instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the ~~4-inch-wide (102 mm)~~ membrane strips.

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4-inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table R905.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer’s installation instructions.~~

~~3. A minimum~~~~3-3/4-inch-wide (96 mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer’s instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inchwide (102 mm) flashing strips.~~

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4-inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table R905.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer’s installation instructions.~~

~~4~~ 3. Two layers of ASTM D226 Type II or ASTM D4869 Type III ~~or~~ ,Type IV, or ASTM D8257 underlayment shall be installed as follows: ~~Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19.05 mm) into the roof sheathing.~~

~~5.Two layers of a synthetic underlayment that has a product approval as an alternative to underlayment complying with ASTM D226 Type II shall be permitted to be used. Synthetic underlayment shall have a minimum tear strength of 15 lbf in accordance with ASTM D4533, shall have a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 and shall meet the liquid water transmission test of Section 8.6 of ASTM D4869. Synthetic underlayment shall be installed as follows:~~ Apply a strip of ~~synthetic~~ underlayment for the first course that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply a full sheet~~s~~ of ~~reinforced synthetic~~ underlayment, for the second course. Apply the third course of underlayment overlapping the second course ~~successive sheets~~ half the width of a full sheet plus 2” ~~the width of the manufacturer’s single-ply overlap~~. Overlap all successive courses half the width of a full sheet plus 1 inch. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). ~~Synthetic~~ ~~u~~Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. ~~Synthetic~~ underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. ~~Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.254 mm).~~ The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19.05 mm) into the roof sheathing.

**Exception:**

          1. Use of ASTM D8257 underlayment is not permitted for wood shingles or shakes.

**TABLE R905.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS**

|  |
| --- |
|  |
| |  |  |  |  | | --- | --- | --- | --- | | **ROOF COVERING** | **UNDERLAYMENT TYPE** | **UNDERLAYMENT ATTACHMENT** | | | **Roof Slope 2:12 and Less Than 4:12** | **Roof Slope 4:12 and Greater** |  |  | | Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles | ASTM D226 Type IIASTM D4869 Type III or IVASTM D6757 ASTM D8257  M D226 Type IIASTM D4869 Type III or IVASTM D6757  ASTM D8257 | Apply in accordance with Section R905.1.1.1, Item 3 ~~4or Section R905.1.1.3, Item 3 as applicable to the type of roof covering.~~ | Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm); end laps shall be 6inches and shall be offset by 6 feet.~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c~~.. Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps  and one row at the end and side laps fastened 6 inches (152mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, *Vult*, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010inch. Minimum thickness of the outside edge of plastic caps shall be0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4inch into the roof sheathing. | | Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type ~~Shingles, Wood Shingles, Wood Shakes~~  Wood Shingles, Wood Shakes | ASTM D226 Type IIASTM D4869 Type III or IV  ASTM D8257  --------------------  ASTM D226 Type II ASTM D4869 Type III or IV | |

R905.1.1.2 Underlayment for concrete and clay tile.

Underlayment for concrete and clay tile shall comply with Section 905.3.3.

~~R905.1.1.3Underlayment for wood shakes and shingles.~~

~~Underlayment for wood shakes and shingles shall comply with one of the following methods:~~

~~1. A minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the manufacturer’s instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.~~

~~2. A minimum 33/4-inch wide (96 mm) strip of self-adhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer’s instructions for the deck material, shall be applied over all joints in the roof decking. An underlayment complying with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) flashing strips.~~

~~3. Two layers of ASTM D226 Type II or ASTM D4869 Type III or Type IV underlayment shall be installed as follows: Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.~~

**R905.2.2 Slope.** Asphalt shingles shall be used only on roof slopes of two units vertical in 12 units horizontal (2:12) or greater. ~~For roof slopes from two units vertical in 12 units horizontal (2:12) and less than four units vertical in 12 units horizontal (4:12), double underlayment application is required in accordance with Section R905.1.1.~~

**(R10073/A1 + A2 +A3 AM)/(R9884 Original + G1)**

**SECTION R905 - REQUIREMENTS FOR ROOF COVERING**

Revise Table R905.1.1.1 to read as follows:

TABLE R905.1.1.1

UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

|  |  |  |  |
| --- | --- | --- | --- |
| ROOF COVERING | UNDERLAYMENT TYPE | UNDERLAYMENT ATTACHMENT | |
| Roof Slope 2:12 and Less Than 4:12 | Roof Slope 4:12 and Greater |
| Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles | ASTM D226 Type II ASTM D4869   Type III or IV  ASTM D6757 | Apply in accordance with Section R905.1.1.1, Item 4or Section R905.1.1.3, Item 3 as applicable to the type of roof covering. | Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm); end laps shall be 6inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm)o.c., and one row at the end and side laps fastened 6 inches (152mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010inch. Minimum thickness of the outside edge of plastic caps shall be0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4inch into the roof sheathing. |
| Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shakes | ASTM D226 Type II ASTM D4869   Type III or IV |

**(R-FBC-B/R –Ch. 15/9 – Errata #1)**

**Revise as shown:**

**R905.2.4.1 ~~Wind resistance~~ Installation of asphalt shingles.**Asphalt shingles shall be installed in accordance with Sections R905.2.6 and R905.2.6.1.

**R905.2.6.1 ~~Classification~~ Wind resistance of asphalt shingles.**Asphalt shingles shall be tested and classified in accordance with ASTM D3161, TAS 107 or ASTM D7158 and shall meet the required classification in accordance with Table R905.2.6.1 to resist the basic wind speed per Figure R301.2(4).~~Shingles classified as ASTM D3161 Class D or classified as ASTM D7158 Class G are acceptable for use where~~*~~Vasd~~*~~is equal to or less than 100 mph. Shingles classified as ASTM D3161 Class F, TAS 107 or ASTM D7158 Class H are acceptable for use for all wind speeds.~~ Asphalt shingle wrappers shall be *labeled*~~labeled~~ to indicate compliance with one of the required classifications, as shown in Table R905.2.6.1.

**(R9897 AS)**

**Revise as shown:**

**R905.2.8.2 Valleys.**Valley linings shall be installed in accordance with the manufacturer’s instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be not less than 16 inches (406 mm) wide and of any of the corrosion-resistant metals in Table R903.2.1.

2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing, complying with ASTM D3909 or ASTM D6380 Class M, shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer not less than 36 inches (914 mm) wide.

3. For closed valleys (valley covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D6380 Class S and not less than 36 inches wide (914 mm) or valley lining as described in Item 1 or 2 shall be permitted. Self-adhering polymer modified bitumen underlayment complying with ASTM D1970 and not less than 36 inches (914 mm) wide shall be permitted in lieu of the lining material.

**(R9902 AS)**

**R905.2.8.4 Other flashing.**Flashing against a vertical front wall, as well as soil stack, vent pipe and chimney flashing, shall be applied in accordance with the asphalt shingle manufacturer’s ~~printed~~instructions.

**(R9887 AS)**

**R905.2.8.5 Drip edge**. Provide drip edge at eaves and gables of shingle roofs. Overlap is to be a minimum of 3 inches (76 mm). Eave drip edges shall extend 1/2 inch (13 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edge ~~at gables~~ shall be installed over the underlayment. ~~Drip edge at eaves be permitted to be installed either over or under the underlayment~~. ~~If installed over the underlayment~~, Self-adhering ASTM D1970 underlayment may be installed over a primed drip edge flange. ~~t~~There shall be a minimum 4 inches (51 mm) width of roof cement installed over the drip edge flange or the self-adhering underlayment. Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) on center. Where the Vasd, as determined in accordance with Section 1609.3.1, is 110 mph (177 km/h) or greater or the mean roof height exceeds 33 feet (10 058 mm), drip edges shall be mechanically fastened a maximum of 4 inches (102 mm) on center.

**(R9991 AM A1)**

R905.3 Clay and concrete tile.

The installation of clay and concrete tile shall be in accordance with the manufacturer’s installation instructions, or recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.2 Deck slope.

Clay and concrete roof tile shall be installed on roof slopes in accordance with the recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.3 Underlayment.

Required underlayment shall comply with the underlayment manufacturer’s installation instructions in accordance with the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.3.1 Slope and underlayment requirements.

Refer to manufacturer’s installation instructions, FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or RAS 118, 119 or 120~~ for underlayment and slope requirements for specific roof tile systems.

R905.3.6Fasteners.

Nails shall be corrosion resistant and not less than 11 gage, 5/16-inch (11 mm) head, and of sufficient length to penetrate the deck not less than 3/4 inch (19 mm) or through the thickness of the deck, whichever is less or in accordance with the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or in accordance with the recommendations of RAS 118, 119 or 120~~. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 mm).

R905.3.7 Application.

Tile shall be applied in accordance with this chapter and the manufacturer’s installation instructions, recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.7.1 Hip and ridge tiles.

Hip and ridge tiles shall be installed in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.8 Flashing.

At the juncture of roof vertical surfaces, flashing and counterflashing shall be provided in accordance with this chapter and the manufacturer’s installation instructions, recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3~~or the recommendations of RAS 111, 118, 119 or 120~~.

**(R10066 AS)**

**R905.3 Clay and concrete tile.**

The installation of clay and concrete tile shall be in accordance with the manufacturer’s installation instructions, or recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, ~~Sixth~~ Seventh Edition where the Vasd is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

**R905.3.1Deck requirements.**

Concrete and clay tile shall be installed only over solid sheathing, except where the roof covering is specifically designed and tested in accordance with Chapter 16, Florida Building Code, Building to be applied over spaced structural sheathing boards.

**R905.3.2 Deck slope.**

Clay and concrete roof tile shall be installed on roof slopes in accordance with the recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, ~~Sixth~~ Seventh Edition where the Vasd is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

**R905.3.3 Underlayment.**

Required underlayment shall comply with the underlayment manufacturer’s installation instructions in accordance with the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, ~~Sixth~~ Seventh Edition where the Vasd is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

**R905.3.3.1 Slope and underlayment requirements.**

Refer to manufacturer’s installation instructions, FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, ~~Sixth~~ Seventh Edition where the Vasd is determined in accordance with Section R301.2.1.3 or RAS 118, 119 or 120 for underlayment and slope requirements for specific roof tile systems.

**R905.3.4 Clay tile.**

Clay roof tile shall comply with ASTM C1167.

**R905.3.5 Concrete tile.**

Concrete roof tile shall comply with ASTM C1492.

**R905.3.6 Fasteners.**

Nails shall be corrosion resistant and not less than 11 gage, 5/16-inch (11 mm) head, and of sufficient length to penetrate the deck not less than 3/4 inch (19 mm) or through the thickness of the deck, whichever is less or in accordance with the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, ~~Sixth~~ Seventh Edition where the Vasd is determined in accordance with Section R301.2.1.3 or in accordance with the recommendations of RAS 118, 119 or 120. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 mm).

**R905.3.7 Application.**

Tile shall be applied in accordance with this chapter and the manufacturer’s installation instructions, recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, ~~Sixth~~ Seventh Edition or the recommendations of RAS 118, 119 or 120.

**Table R905.3.7 Clay and Concrete Tile Attachment. Reserved.**

**R905.3.7.1Hip and ridge tiles.**

Hip and ridge tiles shall be installed in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, ~~Sixth~~ Seventh Edition where the Vasd is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120**.**

**R905.3.8 Flashing.**

At the juncture of roof vertical surfaces, flashing and counterflashing shall be provided in accordance with this chapter and the manufacturer’s installation instructions, recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, ~~Sixth~~ Seventh Edition where the Vasd is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 111, 118, 119 or 120.

**(R9890 AS)**

**905.3.3 Underlayment.**Unless otherwise noted, required underlayment shall comply with the underlayment manufacturer's installation instructions in accordance with the recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd, is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

Exception: Where an existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing of the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with a two-ply system as described in the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

**(R9989 AS)**

**Revise as follows:**

**R906.1 General.~~The use of~~ Where above-deck thermal insulation is installed, such insulation shall be ~~permitted provided that such insulation is~~ covered with an *approved* roof covering and ~~complies with FM 4450~~ shall comply with NFPA 276 or UL 1256.**

**(R8950)(RB283-19 AS)**

**906.2 Material standards.**

Above-deck thermal insulation board shall comply with the standards in Table 906.2/

**TABLE 906.2**

**MATERIAL STANDARDS FOR ROOF INSULATION**

|  |  |
| --- | --- |
| Cellular glass board | ASTM C552 or ASTM C1902 |
| Composite boards | ASTM C1289, Type III, IV, V or VII |
| Expanded polystyrene | ASTM C578 |
| Extruded polystyrene | ASTM C578 |
| Fiber-reinforced gypsum board | ASTM C1278 |
| Glass-faced gypsum board | ASTM C1177 |
| High-density polyisocyanurate board | ASTM C1289, Type II, Class 4 |
| Mineral fiber insulation board | ASTM C726 |
| Perlite board | ASTM C728 |
| Polyisocyanurate board | ASTM C1289, Type I or II |
| Wood fiberboard | ASTM C208, Type II |

**(R10475 AS)**

Revise section 908.1.1 to read as follows:

**706.1.1**

|  |
| --- |
| Not more than 25 percent of the total roof area or roof section of any existing building or structure shall be repaired, replaced or recovered in any 12-month period unless the roof covering on the entire existing roof~~ing~~ system or roof section is replaced or recovered to conform to the requirements of this code. |

**Exception:** If an existing roofing system or roof section was built, repaired, or replaced in compliance with the requirements of the 2007 Florida Building Code, or any subsequent editions of the Florida Building Code, and 25 percent or more of such roofing system or roof section is being repaired, replaced, or recovered, only the repaired, replaced, or recovered portion is required to be constructed in accordance with the Florida Building Code in effect, as applicable. Pursuant to s. 553.844(5), Florida Statutes, a local government may not adopt by ordinance an administrative or technical amendment to this exception.

**(Code language for consistency with SB 4-D)/(R9870 AM A1)/comment post October 2022 TAC meeting**

**Chapter 10 Chimneys and Fireplaces**

|  |  |  |  |
| --- | --- | --- | --- |
| **Revise as follows:**    **R1001.3 Seismic reinforcing.** Reserved. ~~Masonry or concrete chimneys in Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~shall be reinforced. Reinforcing shall conform to the requirements set forth in Table R1001.1 and Section R606.~~    **~~R1001.3.1 Vertical reinforcing.~~**~~For chimneys up to 40 inches (1016 mm) wide, four No. 4 continuous vertical bars shall be placed between wythes of~~*~~solid masonry~~*~~or within the cells of hollow unit masonry and grouted in accordance with Section R606. Grout shall be prevented from bonding with the flue liner so that the flue liner is free to move with thermal expansion. For chimneys more than 40 inches (1016 mm) wide, two additional No. 4 vertical bars shall be provided for each additional flue incorporated into the chimney or for each additional 40 inches~~  ~~(1016 mm) in width or fraction thereof.~~    **~~R1001.3.2 Horizontal reinforcing.~~**~~Vertical reinforcement shall be placed within 1/4-inch (6.4 mm) ties, or other reinforcing of equivalent net cross-sectional area, placed in the bed joints in accordance with Section R606 at not less than every 18 inches (457 mm) of vertical height. Two such ties shall be installed at each bend in the vertical bars.~~    **Revise as follows:**    **R1001.4 Seismic anchorage.**Reserved.~~Masonry or concrete chimneys in Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above~~*~~grade~~*~~, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements of Section R1001.4.1.~~    **~~R1001.4.1 Anchorage.~~**~~Two 3/16-inch by 1-inch (5 mm by 25 mm) straps shall be embedded not less than 12 inches (305 mm) into the chimney. Straps shall be hooked around the outer bars and extend 6 inches (152 mm) beyond the bend. Each strap shall be fastened to not less than four floor ceiling or floor joists or rafters with two 1/2-inch (12.7 mm) bolts.~~    **~~R1001.4.1.1 Cold-formed steel framing.~~**~~Where cold-formed steel framing is used, the location where the 1/2- inch (12.7 mm) bolts are used to attach the straps to the framing shall be reinforced with not less than a 3-inch x 3-inch x 0.229-inch (76 mm x 76 mm x 5.8 mm) steel plate on top of the strap that is screwed to the framing with not fewer than seven No. 6 screws for each bolt.~~    **Revise as follows:**    **TABLE R1001.1**  **SUMMARY OF REQUIREMENTS FOR MASONRY FIREPLACES AND CHIMNEYS**     |  |  |  | | --- | --- | --- | | ~~Chimney~~  ~~Vertical reinforcing~~~~b~~ | ~~H~~ | ~~Four No. 4 full-length bars for chimney up to 40” wide.~~  ~~Add two No. 4 bars for each additional 40” or fraction of width or each additional flue.~~ |     (*no change to remainder of table*)    ~~b. Not required in Seismic Design Category A, B or C.~~  (*no change to remaining notes*)    **Delete section in its entirety and show as Reserved:**    **R1002.4 Seismic reinforcing.** Reserved.~~In Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~, masonry heaters shall be anchored to the masonry foundation in accordance with Section R1003.3. Seismic reinforcing shall not be required within the body of a masonry heater whose height is equal to or less than 3.5 times its body width and where the masonry chimney serving the heater is not supported by the body of the heater. Where the masonry chimney shares a common wall with the facing of the masonry heater, the chimney portion of the structure shall be reinforced in accordance with Section R1003.~~    **Revise as follows:**    **R1003.3 Seismic reinforcing.** Reserved.~~Masonry or concrete chimneys shall be constructed, anchored, supported and reinforced as required in this chapter. In Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~masonry and concrete chimneys shall be reinforced and anchored as detailed in Sections R1003.3.1, R1003.3.2 and R1003.4. In Seismic Design Category A, B or C, reinforcement and seismic anchorage are not required.~~    **~~R1003.3.1 Vertical reinforcing.~~**~~For chimneys up to 40 inches (1016 mm) wide, four No. 4 continuous vertical bars, anchored in the foundation, shall be placed in the concrete, or between wythes of~~*~~solid masonry~~*~~, or within the cells of hollow unit masonry, and grouted in accordance with Section R608.1.1. Grout shall be prevented from bonding with the flue liner so that the flue liner is free to move with thermal expansion. For chimneys more than 40 inches (1016 mm) wide, two additional No. 4 vertical bars shall be installed for each additional 40 inches (1016 mm) in width or fraction thereof.~~    **~~R1003.3.2 Horizontal reinforcing.~~**~~Vertical reinforcement shall be placed enclosed within 1/4-inch (6.4 mm) ties, or other reinforcing of equivalent net cross-sectional area, spaced not to exceed 18 inches (457 mm) on center in concrete, or placed in the bed joints of unit masonry, at not less than every 18 inches (457 mm) of vertical height. Two such ties shall be installed at each bend in the vertical bars.~~    **Revise as follows:**    **R1003.4 Seismic anchorage.** Reserved.~~Masonry and concrete chimneys and foundations in Seismic Design Category D~~~~0~~~~, D~~~~1~~~~or D~~~~2~~~~shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above~~*~~grade~~*~~, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements in Section R1003.4.1.~~    **~~R1003.4.1 Anchorage.~~**~~Two 3/16-inch by 1-inch (5 mm by 25 mm) straps shall be embedded not less than 12 inches (305 mm) into the chimney. Straps shall be hooked around the outer bars and extend 6 inches (152 mm) beyond the bend. Each strap shall be fastened to not less than four floor joists with two 1/2-inch (12.7 mm) bolts.~~    **~~R1003.4.1.1 Cold-formed steel framing.~~**~~Where cold-formed steel framing is used, the location where the 1/2-inch (12.7 mm) bolts are used to attach the straps to the framing shall be reinforced with not less than a 3-inch x 3-inch x 0.229-inch (76 mm x 76 mm x 5.8 mm) steel plate on top of a strap that is screwed to the framing with not fewer than seven No. 6 screws for each bolt.~~ |
|  |

**(S10023 AS)**

**Add new text as follows:**

**R1001.13 Fireplace accessories. *Listed* and *labeled* fireplace accessories shall be installed in accordance with the conditions of the listing and the manufacturer’s instructions. Fireplace accessories shall comply with UL 907.**

**(M8951)(RB284-19 AS)**

**CHAPTER 11 [RE] ENERGY EFFICIENCY**

**No change**

**CHAPTER 12 MECHANICAL ADMINISTRATION**

**No change**

**Chapter 13 General Mechanical System Requirements**

**Revise as follows:**

**M1307.2 Anchorage of appliances.***Appliances*designed to be fixed in position shall be fastened or anchored in an *approved*manner. ~~In Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~, and in townhouses in Seismic Design Category C, water heaters and thermal storage units shall be anchored or strapped to resist horizontal displacement caused by earthquake motion in accordance with one of the following:~~

~~1. Anchorage and strapping shall be designed to resist a horizontal force equal to one-third of the operating weight of the water heater storage tank, acting in any horizontal direction. Strapping shall be at points within the upper one-third and lover one-third of the~~*~~appliance’s~~*~~vertical dimensions. At the lower point, the strapping shall maintain a minimum distance of 4 inches (102 mm) above the controls.~~

~~2. The anchorage strapping shall be in accordance with the appliance manufacturer’s recommendations.~~

**(M10024 AS)**

**Add new text as follows:**

**M1307.7 Prohibited support.**Gypsum board shall not be used as a support base under an appliance**.**

**(M9292)(RM3-18 AS)**

**Chapter 14 Heating and Cooling Equipment**

**Add new text as follows:**

**M1411.3.1.2 Appliance, equipment and insulation in pans**. Where appliances, equipment or insulation are subject to water damage when auxiliary drain pans fill, that portion of the appliance, equipment and insulation shall be installed above the rim of the pan. Supports located inside of the pan to support the appliance or equipment shall be water resistant and approved.

**(M9293)(RM9-18 AS)**

**Revise as follows:**

**M1411.6 Insulation of refrigerant piping.**Piping and fittings for refrigerant vapor (suction) lines shall be insulated with insulation having a thermal resistivity of not less than R-~~4~~ 3 and having external surface permeance not exceeding 0.05 perm [2.87 ng/(s • m2 • Pa)] when tested in accordance with ASTM E96.

**(Already in the code)**

**(M9296)(RM10-18 AS)**

Add new text as follows:

**M1411.9 Support of refrigerant piping.** Refrigerant piping and tubing shall be securely fastened to a permanent support within 6 feet (1829 mm) of the condensing unit.

**(M9314)(RM11-18 AM)**

**Chapter 15 Exhaust Systems**

Revise as follows:

**M1502.3 Duct termination**. Exhaust ducts shall terminate on the outside of the building. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into buildings including openings in ventilated soffits. Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination.

**(M9331)(RM13-18 AS)**

Add new text as follows:

M1502.4.~~5~~ 8 Booster fans prohibited. Domestic booster fans shall not be installed in dryer exhaust systems.

**(8487)(M53-18 Part II AS)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE M1507.4**  **MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS**   |  |  | | --- | --- | | **AREA TO BE EXHAUSTED** | **EXHAUST RATESa** | | Kitchens | 100 cfm intermittent or 25 cfm continuous | | Bathrooms-Toilet Rooms | Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous |   For SI:  1 cubic foot per minute = 0.0004719 m3/s.  a.     The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch wc in accordance with Section M1505.3. |
|  |

**(M9333)(RM23-18 AS)**

**Chapter 16 Duct Systems**

**Revise as follows:**

**M1601.1.1 Above-ground duct systems. Above-ground duct systems shall conform to the following:**

1.   Equipment connected to duct systems shall be designed to limit discharge air temperature to not greater than 250°F (121°C).

2.   Factory-made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions.

3.   Fibrous glass duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.

4.   Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC Duct Construction Standards~~-~~—Metal and Flexible except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.

5.   The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.

6.   Duct systems shall be constructed of materials having a flame spread index of not greater than 200.

7.   Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:

7.1.       These cavities or spaces shall not be used as a plenum for supply air.

7.2.       These cavities or spaces shall not be part of a required fire-resistance-rated assembly.

7.3.       Stud wall cavities shall not convey air from more than one floor level.

7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section ~~R602.8.~~R302.11. Fireblocking materials used for isolation shall comply with Section R302.11.1.

7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

**M1601.4.5  Fireblocking.**Duct installations shall be fireblocked in accordance with Section ~~R602.8~~R302.11.

**(M9337)(RM32-18 AS)**

**CHAPTER 17 COMBUSTION AIR**

**No change**

**Chapter 18 Chimneys and Vents**

Add new text as follows:

**M1802.4 Blocked vent switch.** Oil-fired *appliances* shall be equipped with a device that will stop burner operation in the event that the venting system is obstructed. Such device shall have a manual reset and shall be installed in accordance with the manufacturer’s instructions.

**(M9339)(RM34-18 AM)**

**CHAPTER 19 SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS**

**~~SECTION M1903~~**

**~~STATIONARY FUEL CELL POWER PLANTS~~**

**~~M1903.1~~**~~General. Stationary fuel cell power plants having a power output not exceeding 1,000 kW shall comply with ANSI/CSA America FC 1 and shall be installed in accordance with the manufacturer's instructions and NFPA 853.~~

**(F8723)(RB160-19 AM)**

**Add as a new section as follows:**

SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS

SECTION M1905 RESIDENTIAL PERMANENTLY INSTALLED  STAND-BY GENERATORS.

M1905.1 Listed and labeled.

Permanently installed stand-by generators regulated by this code shall be listed and labeled for the application in which they are installed and used.

M1905.2 Installation.

Installation of permanently installed  stand-by generators shall comply with manufacturer's installation instructions and listing conditions.

M1905.2.1 Electrical installation.

Electrical installation of permanently installed  stand-by generators shall comply with the applicable provisions of NFPA 70, National Electrical Code, manufacturer's installation instructions, and conditions of the listing.

M1905.2.2 Flood hazard.

In flood hazard areas as established by Table R301.2(1), permanently installed  stand-by generators shall be located or installed in accordance with Section R322.1.6.

M1905.2.3 Fuel installation.

M1905.2.3.1 Fuel gas.

Fuel gas installation for permanently installed  stand-by generators shall comply with the applicable provisions of Chapter 24 of this code.

M1905.2.3.2 Liquid fuel.

Liquid fuel installation for permanently installed  stand-by generators shall comply with the applicable provisions of NFPA-30.

M1905.2.4 (301.10) Wind resistance.

Permanently installed  stand-by generators that are exposed to wind shall be designed and installed to resist the wind pressures determined in accordance with this code.

M1905.2.5 Exhaust Location.

Permanently installed residential standby generator’s exhaust shall be located to not create a nuisance. Exhaust termination shall be a minimum of 10 feet from any openings that could allow fumes into the building (doors, operable windows, eave vents, etc.) or air intakes.

Exception: The generator exhaust can be located a minimum of 5 feet from any such openings (doors, operable windows, eave vents, etc.) or in compliance with generator manufacturer installation requirements and listing, whichever is more restrictive, if all of the following is complied with:

1.    A carbon monoxide (CO) alarm(s) is installed in the residency within 10 feet of each room

used for sleeping purposes, or per the alarm’s manufacturer installation requirements and listing,

whichever is more restrictive.

2.    An additional carbon monoxide (CO) alarm is installed in the residency as close as possible

to the building’s exterior opening nearest to the generator exhaust.

3.    The carbon monoxide (CO) alarms mentioned above shall be of the types required by sections R315.1.1 or R315.1.2 of this code.

**(M10069 AM with A1)**

**CHAPTER 20 BOILERS AND WATER HEATERS**

**No change**

**Chapter 21 Hydronic Piping**

**Add new text as follows:**

M2101.11 Used materials. Used pipe, fittings, valves, and other materials shall not be reused in hydronic systems.

M2101.12 Material rating. Pipe and tubing shall be rated for the operating temperature and pressure of the system. Fittings shall be suitable for the pressure applications and recommended by the manufacturer for installation with the pipe and tubing material installed. Where used underground, materials shall be suitable for burial.

M2101.13 Joints and connections. Joints and connections shall be of an approved type. Joints and connections shall be tight for the pressure of the system. Joints used underground shall be approved for such applications.

M2101.13.1 Joints between different piping materials. Joints between different piping materials shall be made with approved transition fittings.

M2101.14 Preparation of pipe ends. Pipe shall be cut square and shall be free of burrs and obstructions. Pipe ends

shall have full-bore openings and shall be prepared in accordance with the pipe manufacturer’s instructions.

M2101.15 Joint preparation and installation. Where required by Sections M2101.16 through M2101.18, the preparation and installation of mechanical and thermoplastic-welded joints shall comply with Sections M2101.15.1 and M2101.15.2.

M2101.15.1 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

M2101.15.2 Thermoplastic-welded joints. Joint surfaces for thermoplastic-welded joints shall be cleaned by an approved procedure. Joints shall be welded in accordance with the manufacturer's instructions.

M2101.16 CPVC plastic pipe. Joints between CPVC plastic pipe or fittings shall be solvent-cemented in accordance with Section P2906.9.1.2. Threaded joints between fittings and CPVC plastic pipe shall be in accordance with Section M2101.16.1.

M2101.16.1 Threaded joints. Threads shall conform to ASME B1.20.1 The pipe shall be Schedule 80 40 or heavier plastic pipe and shall be threaded with dies specifically designed for plastic pipe. Thread lubricant, pipe-joint compound or tape shall be applied on the male threads only and shall be approved for application on the piping material.

M2101.17 Cross-linked polyethylene (PEX) plastic tubing. Joints between cross-linked polyethylene plastic tubing and fittings shall comply with Sections M2101.17.1 and M2101.17.2. Mechanical joints shall comply with Section M2101.15.1.

M2101.17.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

M2101.17.2 Plastic-to-metal. Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition from such metal pipe to plastic pipe or tubing.

M2101.18 Polyethylene plastic pipe and tubing. Joints between polyethylene plastic pipe and tubing or fittings for systems shall be heat-fusion joints complying with Section M2101.18.1, electrofusion joints complying with Section M2101.18.2, or stab-type insertion joints complying with Section M2101.18.3.

M2101.18.1 Heat-fusion joints. Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, and joined in accordance with ASTM D2657. Joint surfaces shall be clean and free from moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall remain undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D2683 or ASTM D3261.

M2101.18.2 Electrofusion joints. Joints shall be of the electrofusion type. Joint surfaces shall be clean and free from moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall remain undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F1055.

M2101.18.3 Stab-type insert fittings. Joint surfaces shall be clean and free from moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F1924.

M2101.19 Polyproplyene (PP) plastic. Joints between PP plastic pipe and fittings shall comply with Sections M2101.19.1 and M2101.19.2.

M2101.19.1 Heat-fusion joints. Heat-fusion joints for polypropylene (PP) pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings, electrofusion polypropylene fittings or by butt fusion. Joint surfaces shall be clean and free from moisture. The joint shall remain undisturbed until cool. Joints shall be made in accordance with ASTM F2389.

M2101.19.2 Mechanical and compression sleeve joints.Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's instructions.

M2101.20 Raised temperature polyethylene (PE-RT) plastic tubing. Joints between raised temperature polyethylene tubing and fittings shall comply with Sections M2101.20.1 through M2101.20.4. Mechanical joints shall comply with Section M2101.15.1.

M2101.20.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

M2101.20.2 PE-RT-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition from such metal pipe to PE-RT pipe or tubing.

M2101.20.3 Heat-fusion joints. Heat-fusion joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, and shall be joined in accordance with ASTM D2657. Joint surfaces shall be clean and free from moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall remain undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D2683 or ASTM D3261.

M2101.20.4 Electrofusion joints. Joints shall be of the electrofusion type. Joint surfaces shall be clean and free from moisture and scoured to exp0ose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer and joined. The joint shall remain undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F105.

M2101.21 PVC plastic pipe. Joints between PVC plastic pipe or fittings shall be solvent-cemented in accordance with Section P2906.9.1.4. Threaded joints between fittings and PVC plastic pipe shall be in accordance with Section M2101.16.1.

M2101.21 Shutoff valves. Shutoff valves shall be installed in ground-source loop piping systems in the locations indicated in Sections M2101.21.1 through M2101.21.6.

M2101.21.1 Heat exchangers. Shut off valves shall be installed on the supply and return side of a heat exchanger.

Exception: Shutoff valves shall not be required where heat exchangers are integral with a boiler or are a component of a manufacturer's boiler and heat exchanger packaged unit and are capable of being isolated from the hydronic system by the supply and return valves required by Section M2001.3.

M2101.21.2 Central systems. Shutoff valves shall be installed on the building supply and return of a central utility system.

M2101.21.3 Pressure vessels. Shutoff valves shall be installed on the connection to any pressure vessel.

M2101.21.4 Pressure-reducing valves. Shutoff valves shall be installed on both sides of a pressure-reducing valve. M2101.21.5 Equipment and appliances. `Shutoff valves shall be installed on connections to mechanical equipment and appliances. This requirement does not apply to components of ground- source loop systems such as pumps, air separators, metering devices, and similar equipment.

M2101.21.6 Expansion tanks. Shutoff valves shall be installed at connections to nondiaphragm-type expansion tanks.

M2101.22 Reduced pressure. A pressure relief valve shall be installed on the low-pressure side of a hydronic piping system that has been reduced in pressure. The relief valve shall be set at the maximum pressure of the system design. The valve shall be installed in accordance with Section M2002.

M2101.23 Installation. Piping, valves, fittings, and connections shall be installed in accordance with the manufacturer's instructions.

M2101.24 Protection of potable water. Where hydronic systems have a connection to a potable water supply, the potable water system shall be protected from backflow in accordance with Section P2902.

M2101.25 Pipe penetrations. Openings for pipe penetrations in walls, floors and ceilings shall be larger than the penetrating pipe. Openings through concrete or masonry building elements shall be sleeved. The annular space surrounding pipe penetrations shall be protected in accordance with Section P2606.1.

M2101.26 Clearance from combustibles. A pipe in a piping system having an exterior surface temperature exceeding 250ºF (121ºC) shall have a clearance of not less than 1 inch (25 mm) from combustible materials.

M2101.27 Contact with building material. A piping system shall not be in direct contact with building materials that cause the piping or fitting material to degrade or corrode, or that interfere with the operation of the system.

M2101.28 Strains and stresses. Piping shall be installed so as to prevent detrimental strains and stresses in the pipe. Provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement. Piping shall be installed so as to avoid structural stresses or strains within building components.

M2101.28.1 Flood hazard. Piping located in a flood hazard area shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation.

M2101.29 Chemical compatibility. Antifreeze and other materials used in the system shall be chemically compatible with the pipe, tubing, fittings and mechanical systems.

M2101.30 Makeup water. The transfer fluid shall be compatible with the makeup water supplied to the system.

**(M9340)(RM35-18 AM)**

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**M2103.1 Piping materials.**Piping for embedment in concrete or gypsum materials shall be standard-weight steel pipe, copper and copper-alloy pipe and tubing, cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe, chlorinated polyvinyl chloride (CPVC), ~~polybutylene,~~ cross-linked polyethylene (PEX) tubing, polyethylene of raised temperature (PE-RT) or polypropylene (PP) with a rating of not less than ~~100~~ 80 psi at 180°F (~~690~~ 552 kPa at 82°C).

**(M8545)(M119-18 Part II AS)**

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| **Revise as follows:**    **TABLE M2105.4**  **GROUND-SOURCE LOOP PIPE**   |  |  | | --- | --- | | **MATERIAL** | **STANDARD** | | Chlorinated polyvinyl chloride (CPVC) | ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F441; ASTM F442; CSA B137.6 | | Cross-linked polyethylene (PEX) | ASTM F876; CSA B137.5; CSA C448 | | High-density polyethylene (HDPE) | ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1 | | Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe | ASTM F1282; AWWA C 903; CSA B137.9 | | Polypropylene (PP-R) | ASTM F2389; CSA B137.11, NSF 358-2 | | Polyvinyl chloride (PVC) | ASTM D1785; ASTM D2241; CSA 137.3 | | Raised temperature polyethylene (PE-RT) | ASTM F2623; ASTM F2769, CSA B137.18; CSA C448 | |
| **(M9341)(RM36-18 AS)** |

**TABLE M2105.4**

**GROUND-SOURCE LOOP PIPE**

|  |  |
| --- | --- |
| **MATERIAL** | **STANDARD** |
| Chlorinated polyvinyl chloride (CPVC) | ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F441; ASTM F442; CSA B137.6 |
| Cross-linked polyethylene (PEX) | ASTM F876; CSA B137.5 |
| High-density polyethylene (HDPE) | ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1 |
| Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe | ASTM F1282; AWWA C 903; CSA B137.9 |
| Polypropylene (PP-R) | ASTM F2389; CSA B137.11, NSF 358-2 |
| Polyvinyl chloride (PVC) | ASTM D1785; ASTM D2241; CSA 137.3 |
| Raised temperature polyethylene (PE-RT) | ASTM F2623; ASTM F2769, CSA B137.18, NSF358-4 |

**TABLE M2105.5**

**GROUND-SOURCE LOOP PIPE FITTINGS**

|  |  |
| --- | --- |
| **PIPE MATERIAL** | **STANDARD** |
| Chlorinated polyvinyl chloride (CPVC) | ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F1970; CSA B137.6 |
| Cross-linked polyethylene (PEX) | ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; CSA B137.5 |
| High-density polyethylene (HDPE) | ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1 |
| Polyethylene/aluminum/polyethylene (PE-AL-PE) | ASTM F1282; ASTM F2434; CSA B137.9 |
| Polypropylene (PP-R) | ASTM F2389; CSA B137.11; NSF 358-2 |
| Polyvinyl chloride (PVC) | ASTM D2464; ASTM D2466; ASTM D2467; ASTM F1970, CSA B137.2; CSA B137.3 |
| Raised temperature polyethylene (PE-RT) | ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.1; CSA B137.18, NSF 358-4 |

**(M9353)(RM39-18 AS)**

**TABLE M2105.4**

**GROUND-SOURCE LOOP PIPE**

|  |  |
| --- | --- |
| **MATERIAL** | **STANDARD** |
| Chlorinated polyvinyl chloride (CPVC) | ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F441; ASTM F442; CSA B137.6 |
| Cross-linked polyethylene (PEX) | ASTM F876; CSA B137.5, NSF 358-3 |
| High-density polyethylene (HDPE) | ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1 |
| Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe | ASTM F1282; AWWA C 903; CSA B137.9 |
| Polypropylene (PP-R) | ASTM F2389; CSA B137.11, NSF 358-2 |
| Polyvinyl chloride (PVC) | ASTM D1785; ASTM D2241; CSA 137.3 |
| Raised temperature polyethylene (PE-RT) | ASTM F2623; ASTM F2769, CSA B137.18 |

**TABLE M2105.5**

**GROUND-SOURCE LOOP PIPE FITTINGS**

|  |  |
| --- | --- |
| **PIPE MATERIAL** | **STANDARD** |
| Chlorinated polyvinyl chloride (CPVC) | ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F1970; CSA B137.6 |
| Cross-linked polyethylene (PEX) | ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; CSA B137.5, NSF 358-3 |
| High-density polyethylene (HDPE) | ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1 |
| Polyethylene/aluminum/polyethylene (PE-AL-PE) | ASTM F1282; ASTM F2434; CSA B137.9 |
| Polypropylene (PP-R) | ASTM F2389; CSA B137.11; NSF 358-2 |
| Polyvinyl chloride (PVC) | ASTM D2464; ASTM D2466; ASTM D2467; ASTM F1970, CSA B137.2; CSA B137.3 |
| Raised temperature polyethylene (PE-RT) | ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.1; CSA B137.18 |

**(M9356)(RM40-18 AS)**

**TABLE M2105.5**

**GROUND-SOURCE LOOP PIPE FITTINGS**

|  |  |
| --- | --- |
| **PIPE MATERIAL** | **STANDARD** |
| Chlorinated polyvinyl chloride (CPVC) | ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F1970; CSA B137.6 |
| Cross-linked polyethylene (PEX) | ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; CSA B137.5; CSA C448 |
| High-density polyethylene (HDPE) | ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1 |
| Polyethylene/aluminum/polyethylene (PE-AL-PE) | ASTM F1282; ASTM F2434; CSA B137.9 |
| Polypropylene (PP-R) | ASTM F2389; CSA B137.11; NSF 358-2 |
| Polyvinyl chloride (PVC) | ASTM D2464; ASTM D2466; ASTM D2467; ASTM F1970, CSA B137.2; CSA B137.3 |
| Raised temperature polyethylene (PE-RT) | ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.1; CSA B137.18; CSA C448 |

**(M9346)(RM38-18 AS)**

**M2105.7 Preparation of pipe ends.**Pipe shall be cut square ~~, reamed,~~and shall be free of burrs and obstructions. ~~CPVC, PE and PVC pipe shall be chamfered.~~Pipe ends shall have full-bore openings and shall ~~not be undercut.~~be prepared in accordance with the pipe manufacturer's instructions.

**(M9370)(RM42-18 AS)**

**Chapter 22 Special Piping and Storage Systems**

Approved as submitted (AS)

M2202.1 Materials. Piping shall consist of steel pipe, copper and copper-alloy pipe and tubing, steel tubing conforming to ASTM A539 or stainless steel tubing conforming to ASTM A254 or ASTM ~~A539.~~ A269. Aluminum tubing shall not be used between the fuel-oil tank and the burner units.

**(M9371)(RM43-18)**

**Revise as follows:**

**M2202.2 Joints and fittings.**Piping shall be connected with ~~standard~~fittings compatible with the piping material. Cast-iron fittings shall not be used for oil piping. Unions requiring gaskets or packings, right or left couplings, and sweat fittings employing solder having a melting point less than 1,000°F (538°C) shall not be used for oil piping. Threaded joints and connections shall be made tight with a lubricant or pipe thread compound.

**(M9372)(RM45-18)**

**M2203.5 Vent termination.**Vent piping shall terminate outside of buildings at a point not less than 2 feet (610 mm), measured vertically or horizontally, from any building opening. Outer ends of vent piping shall terminate in a weatherproof cap or fitting having an unobstructed area at least equal to the cross-sectional area of the vent pipe, and shall be located sufficiently above the ground to avoid being obstructed ~~by snow and ice~~.

**(M10025 AS)**

**Chapter 23 – Solar Thermal Energy Systems**

**Delete section in its entirety:**

**~~M2301.2.13 Thermal storage unit seismic bracing.~~**~~In Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~and in townhouses in Seismic Design Category C, thermal storage units shall be anchored in accordance with Section M1307.2.~~

**(M10026 AS)**

**CHAPTER 24 FUEL GAS**

**Note: Revise for consistency with Chapter 24 of the 2021 IRC.**

**Delete section in its entirety and show as Reserved:**

**G2404.8 (301.12) Seismic resistance.** Reserved.~~When earthquake loads are applicable in accordance with this code, the supports shall be designed and installed for the seismic forces in accordance with this code.~~

**(P10027 AS)**

**Chapter 25 Water Plumbing Administration**

**P2503.4 Building sewer testing.**

The building sewer shall be tested by insertion of a test plug at the point of connection with the public sewer, ~~filling the building sewer with water and pressurizing the sewer to not less than a 5-foot (3048 mm) head of water.~~ completely filling the building sewer with water from the lowest to the highest point thereof. The test pressure shall not decrease during a period of not less than 15 minutes. The building sewer shall be water tight at all points.

A forced sewer test shall consist of pressurizing the piping to a pressure of 5 psi (34.5 kPa) greater than the pump rating and maintaining such pressure for not less than 15 minutes. The forced sewer shall be water tight at all points.

**(P9877 AS)**

**Revise as follows:**

**P2503.5.1 Rough plumbing.**DWV systems shall be tested on completion of the rough piping installation by water or, air for piping systems other than plastic or, by a vacuum of air for plastic piping systems, without evidence of leakage. ~~Either~~ The test shall be applied to the drainage system in its entirety or in sections after rough-in piping has been installed, as follows:

1.   Water test. Each section shall be filled with water to a point not less than 5 feet (1524 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.

2.   Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes.

3.   Vacuum Test. The portion under test shall be evacuated of air by a vacuum type pump to achieve a uniform gauge pressure of -5 pounds per square inch or a negative 10-inches of mercury column (-34 kPa). This pressure shall be held without the removal of additional air for a period of 15 minutes.

**(P8490)(P11-18 Part II AS)**

**CHAPTER 27 PLUMBING FIXTURES**

Add new text as follows:

**P2708.2.1 Waste Fittings.**Waste fittings shall conform to ASME A112.18.2/CSA B125.2.

**(P8682)(P63-18 Part II AS)**

Revise to read as follows:

P2708.4 Shower control valves. Individual shower and tub/shower combination valves shall be balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valves that conform to the requirements of ASSE 1016/ASME 112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1. Shower control valves shall be rated for the flow rate of the installed shower head. Such valves shall be installed at the point of use. Shower and tub/shower combination valves required by this section shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer’s instructions to provide water at a temperature not to exceed 120ºF (49°C). In-line thermostatic valves shall not be utilized for compliance with this section.

**(P8667)(P46-18 Part II AS)/ (P8660)(P44-18 Part II AS)**

**Revise to read as follows:**

P2713.3 Bathtub and whirlpool bathtub valves. Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70, except where such valves are combination tub/shower valves in accordance with Section P2708.4. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 120ºF (49ºC), and, where adjustable, shall be field adjusted in accordance with the manufacturer’s instructions to provide hot water at a temperature not to exceed 120ºF (49ºC). Access shall be provided to water-temperature-limiting devices that conform to ASSE 10705/ASME A112.1070/CSA B125.70.

Exception: Access is not required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

**(P8660)(P44-18 Part II AS)/ (P8672)(P47-18 Part II AS)**

**Add new text as follows:**

**P2709.4.1 Waste Fittings.**Flanged drains shall conform to ASME A112.18.2/CSA B125.2.

**(P9386)(RP4-18 AS)**

Revise as follows:

P2721.2 Bidet water temperature. The discharge water temperature from a bidet fitting shall be limited to not greater than 110°F (43°C) by a water-temperature-limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70 ~~or CSA B125.3~~.

**(P8625)(P33-18 Part II AS)**

**Chapter 28 Water Heaters**

|  |
| --- |
|  |
| **Delete section in its entirety:**  **~~P2801.8 Water heater seismic bracing.~~**~~In Seismic Design Categories D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~and townhouses in Seismic Design Category C, water heaters shall be anchored or strapped in the upper one-third and in the lower one-third of the appliance to resist a horizontal force equal to one-third of the operating weight of the water heater, acting in any horizontal direction, or in accordance with the appliance manufacturer’s recommendations.~~  **(P10028 AS)**  **P2802.1 Water temperature control.**Where heated water is discharged from a solar thermal system to a hot water distribution system, a ~~thermostatic~~ temperature-actuated mixing valve complying with ASSE 1017 shall be installed to temper the water to a temperature of not greater than 140°F (60°C). Solar thermal systems supplying hot water for both space heating and domestic uses shall comply with Section P2803.2. A temperature-indicating device shall be installed to indicate the temperature of the water discharged from the outlet of the mixing valve. The ~~thermostatic~~ temperature-actuated mixing valve required by this section shall not be a substitute for water-temperature limiting devices required by Chapter 27 for specific fixtures.    **P2803.2 Temperature control.**Where a combination water heater-space heating system requires water for space heating at temperatures exceeding 140°F (60°C), a ~~master thermostatic~~ temperature-actuated mixing valve complying with ASSE 1017 shall be installed to temper the water to a temperature of not greater than 140°F (60°C) for domestic uses. |

**(P8730)(P71-18 Part II AS)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Chapter 29 Water Supply and Distribution**  **Revise as follows:**    **P2902.3.3 Backflow preventer with intermediate atmospheric vent.**Backflow preventers with intermediate atmospheric vents shall conform to ASSE 1012, ASSE 1081, or CSA B64.3. These devices shall be permitted to be installed where subject to continuous pressure conditions. These devices shall be prohibited as a means of protection where any hazardous chemical additives are introduced downstream of the device. The relief opening shall discharge by air gap and shall be prevented from being submerged.    **P2902.5.1 Connections to boilers.**Where chemicals will not be introduced into a boiler, the potable water supply to the boiler shall be protected from the boiler by a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012, ASSE 1081, or CSA B64.3. Where chemicals will be introduced into a boiler, the potable water supply to the boiler shall be protected from the boiler by an air gap or a reduced pressure principle backflow prevention assembly complying with ASSE 1013, CSA B64.4 or AWWA C511.    **TABLE P2902.3**  **APPLICATION FOR BACKFLOW PREVENTERS**   |  |  |  |  | | --- | --- | --- | --- | | **DEVICE** | **DEGREE OF HAZARDa** | **APPLICATIONb** | **APPLICABLE STANDARDS** | | Backflow Prevention Assemblies |  |  |  | | Double-check backflow prevention assembly and double-check fire protection backflow prevention assembly | Low hazard | Backpressure or backsiphonage Sizes 3/8? – 16? | ASSE 1015, AWWA C510, CSA B64.5, CSA B64.5.1 | | Double-check detector fire protection backflow prevention assemblies | Low hazard | Backpressure or backsiphonage Sizes 2? – 16? | ASSE 1048 | | Pressure vacuum breaker assembly | High or low hazard | Backsiphonage only Sizes 1 / 2 ? – 2? | ASSE 1020, CSA B64.1.2 | | Reduced pressure principle backflow prevention assembly and reduced pressure principle fire pro tection backflow prevention assembly | High or low hazard | Backpressure or backsiphonage Sizes 3/8? – 16? | ASSE 1013, AWWA C511, CSA B64.4, CSA B64.4.1 | | Reduced pressure detector fire protection back flow prevention assemblies | High or low hazard | Backsiphonage or backpressure (Fire sprinkler systems) | ASSE 1047 | | Spill-resistant vacuum breaker | High or low hazard | Backsiphonage only Sizes 1 / 4 ? – 2? | ASSE 1056, CSA B64.1.3 | | Backflow Preventer Plumbing Devices |  |  |  | | Antisiphon-type fill valves for gravity water closet flush tanks | High hazard | Backsiphonage only | ASSE 1002/ASME A112.1002/CSA B125.12, CSA B125.3 | | Backflow preventer with intermediate atmo spheric vents | Low hazard | Backpressure or backsiphonage Sizes 1/4” – 3/8? | ASSE 1012, CSA B64.3 | | Backflow preventer with intermediate atmospheric vents and pressure reducing valve | Low hazard | Backpressure or backsiphonage Sizes 1/4” – 3/4? | ASSE 1081 | | Dual-check-valve-type backflow preventers | Low hazard | Backpressure or backsiphonage Sizes 1/4? – 1? | ASSE 1024, CSA B64.6 | | Hose-connection backflow preventer | High or low hazard | Low head backpressure, rated working pressure backpressure or backsiphonage Sizes 1 / 2 ? – 1? | ASSE 1052, CSA B64.2.1.1 | | Hose-connection vacuum breaker | High or low hazard | Low head backpressure or backsi phonage Sizes 1/2?, 3/4?, 1? | ASSE 1011, CSA B64.2, CSA B64.2.1 | | Laboratory faucet backflow preventer | High or low hazard | Low head backpressure and back siphonage | ASSE 1035, CSA B64.7 | | Pipe-applied atmospheric-type vacuum breaker | High or low hazard | Backsiphonage only Sizes 1 / 4 ? – 4? | ASSE 1001, CSA B64.1.1 | | Vacuum breaker wall hydrants, frost-resistant, automatic-draining type | High or low hazard | Low head backpressure or backsi- phonage Sizes 3/4? – 1? | ASSE 1019, CSA B64.2.2 | | Other Means Or Methods |  |  |  | | Air gap | High or low hazard | Backsiphonage only | ASME A112.1.2 | | Air gap fittings for use with plumbing fixtures, appliances and appurtenances | High or low hazard | Backsiphonage or backpressure | ASME A112.1.3 |   For SI: 1 inch = 25.4 mm.  a.         Low hazard-See Pollution (Section R202). High hazard-See Contamination (Section R202).  b.   See Backpressure (Section R202). See Backpressure, Low Head (Section R202). See Backsiphonage (Section R202). |
| **(P8796)(P97-18 Part II AS)**  **Revise as follows:**    **P2902.6.3 Relief port piping.**The termination of the piping from the relief port or air gap fitting of the backflow preventer shall discharge to an approved indirect waste receptor or to the outdoors where it will not cause damage or create a nuisance. The indirect waste receptor and drainage piping shall be sized to drain the maximum discharge flow rate from the relief port as published by the backflow preventer manufacturer. |

**(P8798)(P98-18 Part II AS)**

**Revise as follows:**

**P2903.1 Water supply system design criteria.**The water service and water distribution systems shall be designed and ~~pipe sizes shall be selected such that under conditions of~~ sized for peak demand, ~~the capacities at the point of outlet discharge shall be not less than~~ using values shown in Table P2903.1.

**TABLE P2903.1**

**~~REQUIRED CAPACITIES AT POINT OF OUTLET DISCHARGE~~**

**FLOW RATE AND PRESSURES FOR DESIGNING PIPING SYSTEMS**

|  |  |  |
| --- | --- | --- |
| **FIXTURE SUPPLY OUTLET SERVING** | **FLOW RATE (gpm)** | **FLOW PRESSURE (psi)** |
| Bathtub, balanced-pressure, thermostatic or combination balanced- pressure/thermostatic mixing valve | 4 | 20 |
| Bidet, thermostatic mixing valve | 2 | 20 |
| Dishwasher | 2.75 | 8 |
| Laundry tray | 4 | 8 |
| Lavatory | 0.8 | 8 |
| Shower, balanced-pressure, thermostatic or combination balanced- pressure/thermostatic mixing valve | 2.5 a | 20 |
| Sillcock, hose bibb | 5 | 8 |
| Sink | 1.75 | 8 |
| Water closet, flushometer tank | 1.6 | 20 |
| Water closet, tank, close coupled | 3 | 20 |
| Water closet, tank, one-piece | 6 | 20 |

For SI: 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 3.785 L/m.

1. Where the shower mixing valve manufacturer indicates a lower flow rating for the mixing valve, the lower value shall be applied.

**(P8738)(P79-18 Part II AS)**

Add new text as follows:

P2903.3.2 Pumps handling drinking water.Pumps intended to supply drinking water shall conform to NSF 61.

**(P8735)(P77-18 Part II AS)**

**Revise as follows:**

**P2904.2.1 Temperature rating and separation from heat sources.**Except as provided for in Section P2904.2.2, sprinklers shall have a temperature rating of not less than 135°F (57°C) and not more than ~~170°F (77°C)~~225°F (107°C). Sprinklers shall be separated from heat sources as required by the sprinkler manufacturer's installation instructions.

**(P9389)(RP5-18 AS)**

**Revise as follows:**

**P2904.2.3 Freezing areas.**Piping shall be protected from freezing as required by Section P2603.5 or by using one of the following:

1.     A~~a~~ dry pipe automatic sprinkler system that is listed for residential occupancy applications.

2.     ~~Where sprinklers are required in areas that are subject to freezing, d~~Dry-side-wall or dry-pendent sprinklers extending from a nonfreezing area into a freezing area ~~shall be installed~~

**(P9392)(RP6-18 AM)**

**Revise as follows:**

**P2904.3.2 Shutoff valves prohibited.**With the exception of shutoff valves for the entire water distribution system or a single master control valve for the automatic sprinkler system that is locked in the open position, valves shall not be installed in any location where the valve would isolate piping serving one or more sprinklers.

**(P9394)(RP7-18 AS)**

**Revise as follows:**

**P2904.4 Determining system design flow.** The flow for sizing the sprinkler piping system shall be based on ~~the flow rating of each sprinkler in accordance with~~ ~~Section P2904.4.1~~ ~~and the calculation in accordance with~~ ~~Section P2904.4.2.~~ Sections P2904.4.1 through P2904.4.2.

P2904.4.1 Determining required flow rate for each sprinkler.The minimum required flow for each sprinkler shall be determined using the sprinkler manufacturer's published data for the specific sprinkler model based on all of the following:

1.   The area of coverage.

2.   The ceiling configuration, in accordance with Section P2904.4.1.1 through P2904.4.1.3.

3.   The temperature rating.

4.   Any additional conditions specified by the sprinkler manufacturer.

Add new text as follows:

P2904.4.1.1 Ceiling configurations.Manufacturer's published flow rates for sprinklers tested under an 8 ft (2.4 m) high ceiling, in accordance with the sprinkler listing, shall be used for the following ceiling configurations, provided that the ceiling surface does not have significant irregularities, lumps or indentations and is continuous in a single plane. ??

1.   Ceilings that are horizontal or that have a slope not exceeding 8 units vertical in 12 units horizontal (67%), without beams, provided that the ceiling height, measured to the highest point, does not exceed 24 ft (7.3 m) above the floor. Where the slope exceeds 2 units vertical in 12 units horizontal (17%), the highest sprinkler installed along the sloped portion of a ceiling shall be positioned above all communicating openings connecting the sloped ceiling compartment with an adjacent space.

2.   Ceilings that are horizontal or that have a slope not exceeding 8 units vertical in 12 units horizontal (67%), with beams, provided that the ceiling height, measured to the highest point, does not exceed 24 ft (7.3 m) above the floor. Beams shall not exceed 14 in. (350 mm) in depth, and pendent sprinklers shall be installed under the beams as described at the end fo this section. The compartment containing the beamed ceiling shall not exceed 600 ft2(56 m2) in area. Where the slope does not exceed 2 units vertical in 12 units horizontal (17%), the highest sprinkler in the compartment shall be above all communicating openings connecting the compartment with an adjacent space. Where the slope exceeds 2 units vertical in 12 units horizontal (17%) the highest sprinkler installed along the sloped portion of a ceiling shall be positioned above all communicating openings connecting the sloped ceiling compartment with an adjacent space.

3.   Ceilings that have a slope exceeding 2 units vertical in 12 units horizontal (17%) but not exceeding 8 units vertical in 12 units horizontal (67%), with beams of any depth, provided that the ceiling height, measured to the highest point, does not exceed 24 ft (7.3 m) above the floor. Sidewall or pendent sprinklers shall be installed in each pocket formed by beams. The compartment containing the sloped, beamed ceiling shall not exceed 600 ft2(56 m2) in area.

Pendent, recessed pendent, and flush-type pendent sprinklers installed directly under a beam having a maximum depth of 14 inches shall have the sprinkler deflector located not less than 1 inch or more than 2 inches below the bottom of the beam. Pendent sprinklers installed adjacent to the bottom of a beam having a maximum depth of 14 inches shall be positioned such that the vertical centerline of the sprinkler is no more than 2 inches from the edge of the beam, with the sprinkler deflector located not less than 1 inch or more than 2 inches below the bottom of the beam. Pendent sprinklers shall also be permitted to be installed less than 1 inch below the bottom of a beam where in accordance with manufacturer's instructions for installation of flush sprinklers.

P2904.4.1.2 Ceiling configurations with special sprinkler listings.For ceiling configurations not specified in Section 2904.4.1.1, the manufacturer's published flow rate for sprinklers that have been listed for protection of such configurations shall be used.

**P2904.4.1.3 Other Ceiling Configurations.** For ceiling configurations not addressed by Sections P2904.4.1.1 or P2904.4.1.2, the flow rate shall be subject to approval by the ~~fire~~ code official.

Revise as follows:

**P2904.4.2 System design flow rate.** The design flow rate for the system shall be based on the following:

1.   The design flow rate for a room having only one sprinkler shall be the flow rate required for that sprinkler, as determined by Section P2904.4.1.

2.   The design flow rate for a room having two or more sprinklers and a ceiling configuration specified in Section P2904.4.1.1 shall be determined by identifying the sprinkler in that room with the highest required flow rate, based on Section P2904.4.1, and multiplying that flow rate by 2.

3.   ~~Where the sprinkler manufacturer specifies different criteria for ceiling configurations that are not smooth, flat and horizontal, the required~~ The design flow rate for ~~that room shall comply with the sprinkler~~ a room having two or more sprinklers and a ceiling configuration covered by Section P2904.4.1.2 shall be in accordance with the manufacturer's instructions.

4.   The design flow rate for a room having two or more sprinklers and a ceiling configuration covered by Section P2904.4.1.3 shall be subject to approval by the fire code official.

5.   The design flow rate for the sprinkler system shall be the flow required by the room with the largest flow rate, based on Items 1 ~~, 2 and 3~~through 4.

6.         For the purpose of this section, it shall be permissible to reduce the design flow rate for a room by subdividing the space into two or more rooms, where each room is evaluated separately with respect to the required design flow rate. Each room shall be bounded by walls and a ceiling. Openings in walls shall have a lintel not less than 8 inches (203 mm) in depth and each lintel shall form a solid barrier between the ceiling and the top of the opening.

**(P9398)(RP8-18 AM)**

**Revise as follows:**

**P2906.21 Push-fit fitting joints.** Push-fit fittings shall be used only on copper-tube-size outside diameter dimensioned CPVC, PEX, PE-RT and copper tubing. Push-fit fittings shall conform to ASSE 1061 and shall be installed in accordance with the manufacturer’s instructions.

**(P8773)(P89-18 Part II AM)**

Revise as follows:

TABLE P2904.6.2(2)

MINIMUM WATER METER PRESSURE LOSS (PLm)a

|  |  |  |  |
| --- | --- | --- | --- |
| FLOW RATE(gallons per minute, gpm)b | 5/8-INCH METER PRESSURE LOSS (pounds per square inch, psi) | 3/4-INCH METER PRESSURE LESS(pounds per square inch, psi) | 1-INCH METER PRESSURE LOSS (pounds per square inch, psi) |
| 8 | ~~2~~3 | ~~1~~3 | 1 |
| 10 | 3 | ~~1~~3 | 1 |
| 12 | 4 | ~~1~~3 | 1 |
| 14 | ~~5~~6 | ~~2~~5 | 1 |
| 16 | 7 | ~~3~~6 | 1 |
| 18 | 9 | ~~4~~7 | ~~1~~2 |
| 20 | 11 | ~~4~~9 | 2 |
| ~~22~~23 | ~~NP~~14 | ~~5~~11 | ~~2~~3 |
| ~~24~~ | ~~NP~~ | ~~5~~ | ~~2~~ |
| 26 | ~~NP~~18 | ~~6~~14 | ~~2~~3 |
| ~~28~~ | ~~NP~~ | ~~6~~ | ~~2~~ |
| ~~30~~31 | ~~NP~~26 | ~~7~~22 | ~~2~~4 |
| ~~32~~39 | ~~NP~~38 | ~~7~~35 | ~~3~~6 |
| ~~34~~ | ~~NP~~ | ~~8~~ | ~~3~~ |
| ~~36~~52 | NP | ~~8~~NP | ~~3~~10 |

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.063 L/s.

NP = Not permitted unless the actual water meter pressure loss is known.

a.     Table P2904.6.2(2) establishes conservative values for water meter pressure loss or installations where the water meter loss is unknown. Where the actual water meter pressure loss is ~~known~~published and available from the meter manufacturer, Pm shall be the ~~actual loss.~~published pressure loss for the selected meter.

b.     Flow rate from Section P2904.4.2. Add 5 gpm to the flow rate required by Section P2904.4.2 where the water service pipe supplies more than one dwelling.

**(P9406)(RP9-18 AS)**

**Revise as follows:**

**P2906.15 Soldered and brazed joints.**Soldered joints in copper and copper alloy tubing shall be made with fittings approved for water piping and shall conform to ASTM B828. Surfaces to be soldered shall be cleaned bright. Fluxes for soldering shall be in accordance with ASTM B813. Brazing fluxes shall be in accordance with AWS A5.31M/A5.31. Solders and fluxes used in potable water-supply systems shall have a lead content of not greater than 0.2 percent. Solder and flux joining pipe or fittings intended to supply drinking water shall conform to NSF 61.

**(P8766)(P88-18 Part II AS)**

**Revise as follows:**

**P2906.21 Push-fit fitting joints.** Push-fit fittings shall be used only on copper-tube-size outside diameter dimensioned CPVC, PEX, PE-RT and copper tubing. Push-fit fittings shall conform to ASSE 1061 and shall be installed in accordance with the manufacturer’s instructions.

**(P9410)(RP11-18 AS)**

**Revise as follows:**

**TABLE P2906.6**

**PIPE FITTINGS**

|  |  |
| --- | --- |
| **MATERIAL** | **STANDARD** |
| Acrylonitrile butadiene styrene (ABS) plastic | ASTM D2468 |
| Cast-iron | ASME B16.4 |
| Chlorinated polyvinyl chloride (CPVC) plastic | ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6 |
| Copper or copper alloy | ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F3226 |
| Cross-linked polyethylene/aluminum/high-density polyethylene (PEX- AL-HDPE) | ASTM F1986 |
| Fittings for cross-linked polyethylene (PEX) plastic tubing | ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; CSA B137.5 |
| Gray iron and ductile iron | AWWA C110/A21.10; AWWA C153/A21.53 |
| Malleable iron | ASME B16.3 |
| Insert fittings for Polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) | ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10 |
| Polyethylene (PE) plastic | ASTM D 2609; CSA B137.1 |
| Fittings for polyethylene of raised temperature (PE-RT) plastic tubing | ASSE 1061; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F 2159; ASTM F2735; ASTM F2769; CSA B137.18 |
| Polypropylene (PP) plastic pipe or tubing | ASTM F2389; CSA B137.11 |
| Polyvinyl chloride (PVC) plastic | ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3 |
| Stainless steel (Type 30 4 / 30 4L) pipe | ASTM A312; ASTM A778 |
| Stainless steel (Type 31 6 / 31 6L) pipe | ASTM A312; ASTM A778 |
| Steel | ASME B16.9; ASME B16.11; ASME B16.28 |

**(P8761)(P87-18 Part II AS)**

**Revise as follows:**

**P2909.1 Design.**Drinking water treatment units shall meet the requirements of NSF42, NSF 44, NSF 53, NSF ~~60~~ 62 or CSA B483.1.

**(P9411)(12-18 AS)**

**Revise as follows:**

**Replace as follows:**

**P2912.1 General.**The provisions of this section shall govern the construction, installation, alteration, and repair of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications,~~as permitted by~~ .For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water.The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

**P2912.1.1 Alternate compliance path.**Systems for nonpotable uses that comply with CSA B805/ICC 805 are deemed to comply with Section P2912.

**(P8843)(P131-18 Part II AMPC1)**

**Chapter 30 Sanitary Drainage**

**Revise as follows:**

**TABLE P3002.2**

**BUILDING SEWER PIPE**

|  |  |
| --- | --- |
| **MATERIAL** | **STANDARD** |
| Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall | ASTM D2661; ASTM D2680; ASTM F628; ASTM F1488 |
| Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS35, SDR 35 (PS 45), PS50, PS100, PS140, SDR 23.5 (PS 150) and PS200; with a solid, cellular core or composite wall | ASTM D2751; ASTM F1488 |
| Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS140 and PS 200; with a solid, cellular core or composite wall | ASTM D3034; ASTM F891; ASTM F1488; CSA B182.2; CSA B182.4 |
| Cast-iron pipe | ASTM A74; ASTM A888; CISPI 301 |
| Concrete pipe | ASTM C14; ASTM C76; CSA A257.1; CSA A257.2 |
| Copper or copper-alloy tubing (Type K or L) | ASTM B75/B75M; ASTM B88; ASTM B251 |
| Polyethylene (PE) plastic pipe (SDR-PR) | ASTM F714 |
| Polyolefin pipe | ASTM F1412; CSA B181.3 |
| Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with solid, cellular core or composite wall | ASTM D2665; ASTM D2949; ASTM D3034; ASTM F1412; CSA B182.2; CSA B182.4 |
| Polyvinyl chloride (PVC) plastic pipe with a 3.25 inch O.D. and a solid, cellular core or composite wall | ASTM D2949; ASTM F1488 |
| Stainless steel drainage systems, Types 304 and 316L | ASME A112.3.1 |
| Vitrified clay pipe | ASTM C425; ASTM C700 |

For SI: 1 inch = 25.4 mm.

**(P8802)(P103-18 Part II AS)**

**Add new text as follows:**

**P3003.3.4 Push-fit fitting joints.**Push-fit DWV fittings shall ~~conform~~ be listed and labeled to ASME A112.4.4 and shall be installed in accordance with the manufacturer's instructions

**Revise as follows:**

**TABLE P3002.3**

**PIPE FITTINGS**

|  |  |
| --- | --- |
| **PIPE MATERIAL** | **FITTING STANDARD** |
| Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters | ASTM D2661; ASTM D3311; ASTM F628; CSA B181.1; ASME A112.4.4 |
| Acrylonotrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters | ASTM D2751 |
| Cast-iron | ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301 |
| Copper or copper alloy | ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29 |
| Gray iron and ductile iron | AWWA C110/A21.10 |
| Polyethylene | ASTM D2683 |
| Polyolefin | ASTM F1412; CSA B181.3 |
| Polyvinyl chloride (PVC) plastic in IPS diameters | ASTM D2665; ASTM D3311; ASTM F1866 |
| Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters | ASTM D3034 |
| Polyvinyl chloride (PVC) plastic pipe with a 3.25 inch O.D. | ASTM D2949 |
| PVC fabricated fittings | ASTM F1866 |
| Stainless steel drainage systems, Types 304 and 316L | ASME A112.3.1 |
| Vitrified clay | ASTM C700 |

For SI: 1 inch = 25.4 mm.

**(P8805)(P106-18 Part II AM)**

**Add new text as follows:**

**P3003.9.4 Push-fit joints.**Push-fit joints shall conform to ASME A112.4.4 and shall be installed in accordance with the manufacturer's instructions.

**Revise as follows:**

**TABLE P3002.3**

**PIPE FITTINGS**

|  |  |
| --- | --- |
| **PIPE MATERIAL** | **FITTING STANDARD** |
| Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters | ASTM D2661; ASTM D3311; ASTM F628; CSA B181.1 |
| Acrylonotrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters | ASTM D2751 |
| Cast-iron | ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301 |
| Copper or copper alloy | ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29 |
| Gray iron and ductile iron | AWWA C110/A21.10 |
| Polyethylene | ASTM D2683 |
| Polyolefin | ASTM F1412; CSA B181.3 |
| Polyvinyl chloride (PVC) plastic in IPS diameters | ASTM D2665; ASTM D3311; ASTM F1866; ASME A112.4.4 |
| Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters | ASTM D3034 |
| Polyvinyl chloride (PVC) plastic pipe with a 3.25 inch O.D. | ASTM D2949 |
| PVC fabricated fittings | ASTM F1866 |
| Stainless steel drainage systems, Types 304 and 316L | ASME A112.3.1 |
| Vitrified clay | ASTM C700 |

For SI: 1 inch = 25.4 mm.

**(P8809)(P109-18 Part II AS)**

**Add new text as follows:**

**P3005.2.10.1 Cleanout Equivalent.**A fixture trap or a fixture with integral trap, removable without altering the concealed piping shall be acceptable as a cleanout equivalent.

**Revise as follows:**

**P3005.2 Cleanouts required.**Cleanouts shall be provided for drainage piping in accordance with Sections P3005.2.1 through ~~P3005.2.11~~P3005.2.12.

**(P8815)(P113-18 Part II AS)**

**SECTION P3009**

**SUBSURFACE ~~LANDSCAPE IRRIGATION~~ GRAYWATER SOIL ABSORPTION SYSTEMS**

**RESERVED**

**(P9875 AS)**

**Revise as follows:**

**~~SECTION~~ P3011  
~~REPLACEMENT~~ RELINING OF ~~UNDERGROUND~~ BUILDING SEWERS ~~BYPVC FOLD~~ AND ~~FORM METHODS~~BUILDING DRAINS**

**P3011.1 General.**This section shall govern the ~~replacement~~ relining of existing building sewer ~~piping by PVC Fold and Form methods.~~ and building drainage piping.

**P3011.2 Applicability.**The ~~replacement~~ relining of existing building sewer ~~piping by PVC fold and form methods~~ and building drainage piping shall be limited to gravity drainage piping 4 inches (102 mm) ~~to 18 inches (457 mm). The replacement~~ in diameter and larger. The relined piping shall be of the same nominal size as the existing piping.

**P3011.3 ~~Preinstallation inspection~~Pre-installation Requirements.**~~The~~ Prior to commencement of the relining installation, the existing piping sections to be ~~replaced~~ relined shall be descaled and cleaned. After the cleaning process has occurred and water has been flushed through the system, the piping shall be inspected internally by a recorded video camera survey. ~~The survey shall include notations of the position of cleanouts and the depth of connections to the existing piping.~~

**Add new text as follows:**

**P3011.3.1 Pre-installation recorded video camera survey.**The video survey shall include verification of the project address location. The video shall include notations of the cleanout and fitting locations, and the approximate depth of the existing piping. The video shall also include notations of the length of piping at intervals no greater than 25 feet.

**P3011.4 Permitting.**Prior to issuing a permit for relining, the building official shall review and evaluate the pre-installation recorded video camera survey to determine whether the piping system is capable to be relined in accordance with the proposed lining system manufacturer's installation requirements and applicable referenced standards.

**Delete and substitute as follows:**

**~~3011.4~~ ~~Pipe.~~**~~The replacement piping shall be manufactured in compliance with ASTM F1504 or ASTM F1871.~~

**P3011.5 Prohibited applications.**Where review of the pre-installation recorded video camera survey reveals that piping systems are not installed correctly, or defects exist, relining shall not be permitted. The defective portions of piping shall be exposed and repaired with pipe and fittings in accordance with this code. Defects shall include, but are not limited to, backslope or insufficient slope, complete pipe wall deterioration or complete separations such as from tree root invasion or improper support.

**~~3011.5 Installation.~~**~~The piping sections to be replaced shall be cleaned and flushed. Remediation shall be performed where there is groundwater infiltration, roots, collapsed pipe, dropped joints, offsets more than 12 percent of the inside pipe diameter or other obstructions.~~

**P3011.6 Relining materials.**The relining materials shall be manufactured  in compliance with applicable standards and certified as required in Section P2609. Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

**Add new text as follows:**

**P3011.7.1 Material data report.**The installer shall record the data as required by the relining material manufacture and applicable standards. The recorded data shall include but is not limited to the location of the project, relining material type, amount of product installed and conditions of the installation. A copy of the data report shall be provided to the building official prior to final approval.

**Delete and substitute as follows:**

**~~3011.6 Cleanouts.~~**~~Where the existing building sewer did not have cleanouts meeting the requirements of this code, cleanout fittings shall be installed as required by this code.~~

**P3011.7 Installation.**The installation of relining materials shall be performed in accordance with the manufacturer's installation instructions, applicable referenced standards and this code.

**~~3011.7 Post-installation inspection.~~**~~The completed replacement piping shall be inspected internally by a recorded video camera survey. The video survey shall be reviewed and approved by the building official prior to pressure testing of the replacement piping system.~~

**P3011.8 Post-installation recorded video camera survey.**The completed relined piping system shall be inspected internally by a recorded video camera survey after the system has been flushed and flow tested with water. The video survey shall be submitted to the the code official prior to finalization of the permit. The video survey shall be reviewed and evaluated to provide verification that no defects exist. Any defects identified shall be repaired and replaced in accordance with this code.

**Delete without substitution:**

**~~3011.8~~ ~~Pressure testing.~~**~~The replacement piping system as well as the connections to the replacement piping shall be tested in accordance with Section P2503.4.~~

**Add new text as follows:**

**P3011.9 Certification.**A certification shall be provided in writing to the building official, from the permit holder, that the relining materials have been installed in accordance with the manufacturer's installation instructions, the applicable standards and this code.

**P3011.10 Approval.**Upon verification of compliance with the requirements of Sections P3011.1 through P3011.9, the building official shall approve the installation.

**(P8818)(P115-18 Part II AS)**

**Chapter 31 - Vents**

**Revise as follows:**

**P3103.1.1 Roof extension.**Open vent pipes that extend through a roof and that do not meet the conditions of Section P3103.1.2 or Section P3103.1.3 shall terminate not less than 6 inches (150 mm) above the roof ~~or 6 inches (150 mm) above the anticipated snow accumulation, whichever is greater~~.

**Revise as follows:**

**P3103.1.3 Roof extension covered.**Where an open vent pipe terminates above a sloped roof and is covered by either a roof-mounted panel such as a solar collector or photovoltaic panel mounted over the vent opening, or by a roof element such as an architectural feature or a decorative shroud, the vent pipe shall terminate not less than 2 inches (51 mm) above the roof surface. Such roof elements shall be designed to prevent the adverse effects of ~~snow accumulation and~~ wind on the function of the vent. The placement of a panel over a vent pipe and the design of a roof element covering the vent pipe shall provide for an open area for the vent pipe to the outdoors that is not less than the area of the pipe, as calculated from the inside diameter of the pipe. Such vent terminals shall be protected by a method that prevents birds and rodents from entering or blocking the vent pipe opening.

**(P10029 AS)**

**CHAPTERS 33 – No change**

**CHAPTER 34 GENERAL REQUIREMENTS**

**ECTION E3408**

**GFCI PROTECTION**

**E3408.1** NFPA 70-20: *National Electric Code*, Article 210 (Branch Circuits), Section 210.8, Ground-Fault Circuit-Interrupter Protection for Personnel, is amended to read as follows:

**210.8 Ground-Fault Circuit-Interrupter Protection for Personnel.** Ground-fault circuit-interrupter protection for personnel shall be provided as required in 210.8(A) through (F). The ground-fault circuit-interrupter shall be installed in a readily accessible location.

… remaining text unchanged

**(F) Outdoor Outlets.** All outdoor outlets for dwellings, other than those covered in 210.8(A)(3), Exception to (3) that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, shall have ground-fault circuit-interrupter protection for personnel.

*Exception No. 1: Ground-fault circuit-interrupter protection shall not be required on lighting outlets other than those covered in 210.8(C).*

*Exception No. 2: GFCI protection shall not be required for listed and labeled HVAC equipment.*

*Informational Note: See UL 60335-2-40, Household And Similar Electrical Appliances – Safety – Part 2-40:Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers or UL 1995, Heating and Cooling Equipment for product safety standards.(1)*

**(E10149 AS) with comment post October 2022 TAC meeting**

**35– 44 – No change**

**Chapter 45 - Private Swimming Pool**

**R4501.17.1.15**

A mesh safety barrier meeting the requirements of Section R4501.17, installed in accordance with the manufacturer’s instructions and complying with ASTM F2286, ~~and the following minimum requirements~~ shall be considered a barrier as defined in this section. Where a hinged gate is used with a mesh fence, the gate shall comply with Section R4501.17.1.8. Mesh fences shall not be installed on top of above-ground/on-ground private swimming pools.~~:~~

~~1.      Individual component vertical support posts shall be capable of resisting a minimum of 52 pounds (24 kg) of horizontal force prior to breakage when measured at a 36 inch (914 mm) height above grade. Vertical posts of the child safety barrier shall extend a minimum of 3 inches (76 mm) below deck level and shall be spaced no greater than 36 inches (914 mm) apart.~~

~~2.      The mesh utilized in the barrier shall have a minimum tensile strength according to ASTM D 5034 of 100 lbf, and a minimum ball burst strength according to ASTM D 3787 of 150 lbf. The mesh shall not be capable of deformation such that a 1/4-inch (6.4 mm) round object could not pass through the mesh. The mesh shall receive a descriptive performance rating of no less than "trace discoloration" or "slight discoloration" when tested according to ASTM G 53, Weatherability, 1,200 hours.~~

~~3.      When using a molding strip to attach the mesh to the vertical posts, this strip shall contain, at a minimum, #8 by ½ inch (12.7 mm) screws with a minimum of two screws at the top and two at the bottom with the remaining screws spaced a maximum of 6 inches (152 mm) apart on center.~~

4.      ~~Patio deck sleeves (vertical post receptacles) placed inside the patio surface shall be of a nonconductive material.~~

~~5.      A latching device shall attach each barrier section at a height no lower than~~

~~45 inches (1143 mm) above grade. Common latching devices that include, but are not limited to, devices that provide the security equal to or greater than that of a hook-and-eye-type latch incorporating a spring actuated retaining lever (commonly referred to as a safety gate hook).~~

~~6.      The bottom of the mesh safety barrier shall not be more than 1 inch (25~~

~~mm) above the deck or installed surface (grade).~~

***Add new standard under the ASTM Standards listed in Chapter 46 as follows:***

**ASTM F2286-16 Standard Design and Performance Specification for Removable Mesh Fencing for Swimming Pools, Hot Tubs, and Spas                                      R4501.17.1.15**

**(SW10439 AS)**

**Chapter 46 Reference Standards**

**See attached**

**Appendix D, Section D.6, Item (3)d –**

d. Reserved. ~~OFF. Where required by the local building code in earthquake prone locations, inspect that the water heater is secured to the wall studs in two locations (high and low) using appropriate metal~~ ~~strapping and bolts.~~

***(P10030 AS)***

***Appendix H - Patio Covers***

**Revise as follows:**

**AH105.1 Design loads.**Patio covers shall be designed and constructed to sustain, within the stress limits of this code, all dead loads plus a vertical live load of not less than 10 pounds per square foot (0.48 kN/m2)~~, except that snow loads shall be used where such snow loads exceed this minimum~~. Such covers shall be designed to resist the minimum wind loads set forth in Section R301.2.1.

**(S10031 AS)**

**Appendix J - Existing Buildings and Structures**

**AJ102.4 Replacement windows.**

Regardless of the category of work, where an existing window, including the sash and glazed portion, or safety glazing is replaced, the replacement window or safety glazing shall comply with the requirements of Sections AJ102.4.1 through AJ102.4.~~3~~4, as applicable.

**AJ102.4.1 Energy efficiency.**

Replacement windows shall comply with the requirements of Chapter 11.

**AJ102.4.2 Safety glazing.**

Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

**AJ102.4.3 Replacement windows for e~~E~~mergency escape and rescue openings.**

Where windows are required to provide emergency escape and rescue openings, replacement windows shall be exempt from ~~the maximum sill height requirements of Section R310.1 and the requirements of~~ Sections ~~R310.1.1, R310.1.2, R310.1.3 and~~ R310.2.1 and R310.2.2 provided that the replacement window meets the following conditions:

1.The replacement window is the manufacturer’s largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

2.Where t~~T~~he replacement window is not part of a change of occupancy.

**~~3.~~**Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as required ~~to provide~~ emergency escape and rescue openings.

**AJ102.4.3.1 Control devices**

Emergency escape and rescue openings with window opening control devices or fall prevention devices complying with ASTM F2090, after operation to release the control device allowing the window to fully open, shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.

**AJ102.4.4 Window control devices.**

~~Where window fall prevention devices complying with ASTM F2090 are not provided,~~W~~w~~indow opening control devices or fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1.The window is operable.

2.One of the following applies:

2.1.The window replacement includes replacement of the sash and the frame.

            2.2.The window replacement includes the sash only when the existing frame remains.

3.The bottom ~~top~~ of the clear opening ~~sill~~ of the window opening is at a height less than 24 inches (610 mm) above the finished floor.

4.The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere where the window is in its largest opened position.

5.The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

~~The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit.~~

**(S10428 AS)**

**~~AJ401.4 Structural.~~**~~Unreinforced masonry buildings located in Seismic Design Category D~~~~2~~~~or E shall have parapet bracing and wall anchors installed at the roofline whenever a reroofing~~*~~permit~~*~~is issued. Such parapet bracing and wall anchors shall be of an~~*~~approved~~*~~design.~~

**(S10032 AS)**

**Add new text as follows:**

## APPENDIX A BOARD OF APPEALS

## SECTION A101 GENERAL

## A101.1 Scope. A board of appeals shall be established within the jurisdiction for the purpose of hearing applications for modification of the requirements of this code pursuant to the provisions of Section R112 (Means of Appeals). The board shall be established and operated in accordance with this section, and shall be authorized to hear evidence from appellants and the code official pertaining to the application and intent of this code for the purpose of issuing orders pursuant to these provisions.

## A101.2 Application for appeal. Any person shall have the right to appeal a decision of the building official to the board. An application for appeal shall be based on a claim that the intent of this code or the rules legally adopted hereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equally good or better form of construction is proposed. The application shall be filed on a form obtained from the building official within 20 days after the notice was served.

## A101.2.1 Limitation of authority. The board shall not have authority to waive requirements of this code or interpret the administration of this code.

## A101.2.2 Stays of enforcement. Appeals of notice and orders, other than Imminent Danger notices, shall stay the enforcement of the notice and order until the appeal is heard by the board.

## A101.3 Membership of board. The board shall consist of five voting members appointed by the chief appointing authority of the jurisdiction. Each member shall serve for [INSERT NUMBER OF YEARS] years or until a successor has been appointed. The board member’s terms shall be staggered at intervals, so as to provide continuity. The building official shall be an ex officio member of said board but shall not vote on any matter before the board.

## A101.3.1 Qualifications. The board shall consist of five individuals, who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the jurisdiction.

## A101.3.2 Alternate members. The chief appointing authority is authorized to appoint two alternate members who shall be called by the board chairperson to hear appeals during the absence or disqualification of a member. Alternate members shall possess the qualifications required for board membership, and shall be appointed for the same term or until a successor has been appointed.

## A101.3.3 Vacancies. Vacancies shall be filled for an unexpired term in the same manner in which original appointments are required to be made.

## A101.3.4 Chairperson. The board shall annually select one of its members to serve as chairperson.

## A101.3.5 Secretary. The chief appointing authority shall designate a qualified clerk to serve as secretary to the board. The secretary shall file a detailed record of all proceedings which shall set forth the reasons for the board’s decision, the vote of each member, the absence of a member and any failure of a member to vote.

## A101.3.6 Conflict of interest. A member with any personal, professional or financial interest in a matter before the board shall declare such interest and refrain from participating in discussions, deliberations and voting on such matters.

## A101.3.7 Compensation of members. Compensation of members shall be determined by law.

## A101.3.8 Removal from the board. A member shall be removed from the board prior to the end of their terms only for cause. Any member with continued absence from regular meeting of the board may be removed at the discretion of the chief appointing authority.

## A101.4 Rules and procedures. The board shall establish policies and procedures necessary to carry out its duties consistent with the provisions of this code and applicable state law. The procedures shall not require compliance with strict rules of evidence, but shall mandate that only relevant information be presented.

## A101.5 Notice of meeting. The board shall meet upon notice from the chairperson, within 10 days of the filing of an appeal or at stated periodic intervals.

## A101.5.1 Open hearing. All hearings before the board shall be open to the public. The appellant, the appellant’s representative, the code official and any person whose interests are affected shall be given an opportunity to be heard.

## A101.5.2 Quorum. Three members of the board shall constitute a quorum.

## A101.5.3 Postponed hearing. When five members are not present to hear an appeal, either the appellant or the appellant’s representative shall have the right to request a postponement of the hearing.

## A101.6 Legal counsel. The jurisdiction shall furnish legal counsel to the board to provide members with general legal advice concerning matters before them for consideration. Members shall be represented by legal counsel at the jurisdiction’s expense in all matters arising from service within the scope of their duties.

## A101.7 Board decision. The board shall only modify or reverse the decision of the building official by a concurring vote of three or more members.

## A101.7.1 Resolution. The decision of the board shall be by resolution. Every decision shall be promptly filed in writing in the office of the building official within three days and shall be open to the public for inspection. A certified copy shall be furnished to the appellant or the appellant’s representative and to the building official.

## A101.7.2 Administration. The building official shall take immediate action in accordance with the decision of the board.

## A101.8 Court review. Any person, whether or not a previous party of the appeal, shall have the right to apply to the appropriate court for a writ of certiorari to correct errors of law. Application for review shall be made in the manner and time required by law following the filing of the decision in the office of the chief administrative officer.

**(CA9113) (ADM43-19 Part II AS)**

**APPENDIX J EXISTING BUILDINGS AND STRUCTURES**

AJ 401.5Exterior Wall Coverings. Exterior wall coverings shall comply with the requirements of Chapter 7. ~~Exterior wall coverings~~ Insulated Vinyl Siding, Polypropylene Siding, and Vinyl Siding shall be attached to a nail-able substrate.

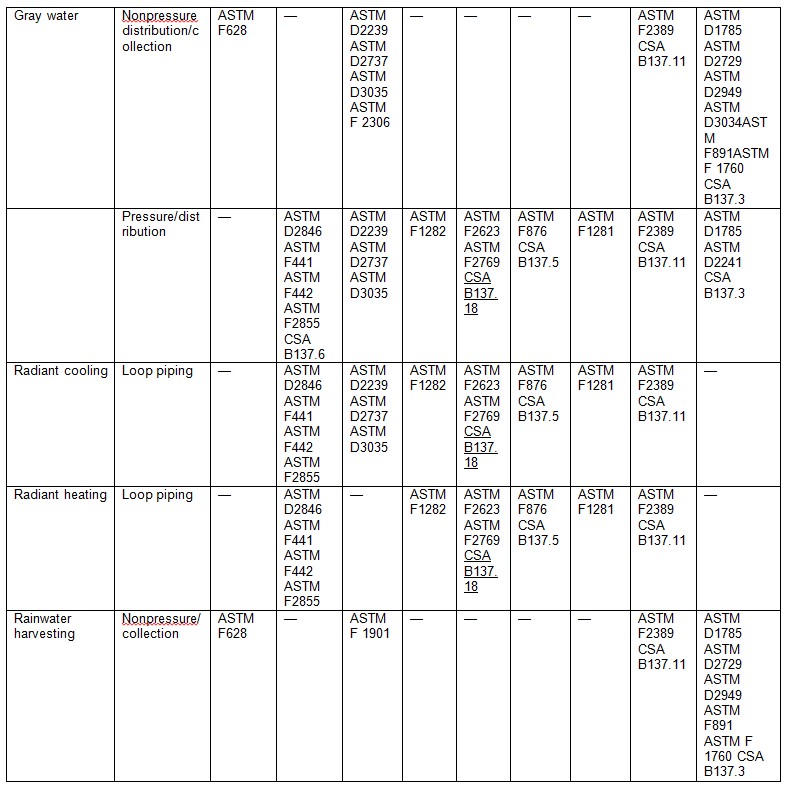
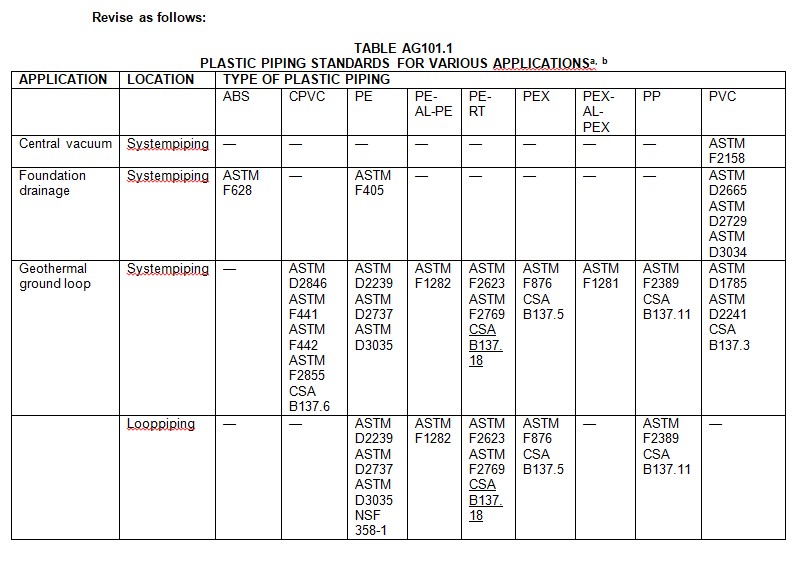
**(S9879 AM A3)**

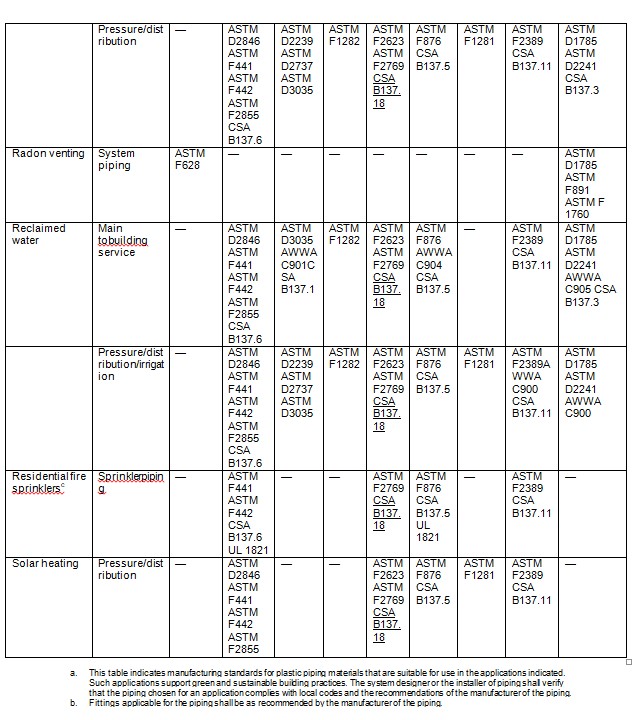
**Appendix R - Light Straw-Clay Construction**

|  |
| --- |
| **Revise as follows:**    **AR101.1 Scope.**This appendix shall govern the use of light straw-clay as a nonbearing building material and wall infill system ~~in Seismic Design Categories A and B~~. |
| **(S10033 AS)**  **Appendix S - Strawbale Construction**  **Revise as follows:**  **Section AS102 –**    **SHEAR WALL.**A strawbale wall designed and constructed to resist lateral ~~seismic and~~ wind forces parallel to the plane of the wall in accordance with Section AS106.13.    **Revise as follows:**    **AS105.2 Building requirements for use of strawbale nonstructural walls.**Buildings using strawbale nonstructural walls shall be subject to the following limitations and requirements:    1. Number of stories: not more than one, except that two stories shall be allowed with an *approved*engineered design.  2. Building height: not more than 25 feet (7620 mm).  3. Wall height: in accordance with Table AS105.4.  ~~4. Braced wall panel length, and increase in Seismic Design Categories C, D~~~~0~~~~, D~~~~1~~~~and D~~~~2~~~~: the required length of bracing for buildings using strawbale nonstructural walls shall comply with Section R602.10.3 of this code, with the additional requirements that Table R602.10.3(3) shall be applicable to buildings in Seismic Design Category C, and that the minimum total length of braced wall panels in Table R602.10.3(3) shall be increased by 60 percent.~~    **Revise as follows:**    **AS105.4.1 Determination of out-of-plane loading.**Out-of-plane loading for the use of Table AS105.4 shall be in terms of the design wind speed ~~and seismic design category~~ as determined in accordance with Section~~s~~ R301.2.1 ~~and R301.2.2~~ of this code.    **Revise as follows:**    **TABLE AS105.4**  **OUT-OF-PLANE RESISTANCE AND UNRESTRAINED WALL DIMENSIONS**     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **OUT-OF-PLANE RESISTANCEa** | **FOR WIND**  **DESIGN**  **SPEEDS**  **(mph)** | **~~FOR SEISMIC~~**  **~~DESIGN~~**  **~~CATEGORIES~~** | **UNRESTRAINED WALL DIMENSIONS,**  **Hb** | | **MESH STAPLE SPACING**  **AT BOUNDARY**  **RESTRAINTS** | | **Absolute limit in feet** | **Limit based on bale**  **thickness Tc**  **in feet (mm)** | | Nonplaster finish or unreinforced plaster | = 100 | ~~A, B, C, D~~~~0~~ | H = 8 | H = 5T | None required | | Pins per Section AS105.4.2 | = 100 | ~~A, B, C, D~~~~0~~~~, D~~~~1~~~~, D~~~~2~~ | H = 12 | H = 8T | None required | | Pins per Section AS105.4.2 | = 110 | ~~A, B, C, D~~~~0~~~~, D~~~~1~~~~, D~~~~2~~ | H = 10 | H = 7T | None required | | Reinforcedc clay plaster | = 110 | ~~A, B, C, D~~~~0~~~~, D~~~~1~~~~, D~~~~2~~ | H = 10 | H = 8T0.5  (H = 140T0.5) | = 6 inches | | Reinforcedc clay plaster | = 110 | ~~A, B, C, D~~~~0~~~~, D~~~~1~~~~, D~~~~2~~ | 10 < H = 12 | H = 8T0.5  (H = 140T0.5) | = 4 inchese | | Reinforcedc cement, cement-lime, lime  or soil-cement plaster | = 110 | ~~A, B, C, D~~~~0~~~~, D~~~~1~~~~, D~~~~2~~ | H = 10 | H = 9T0.5  (H = 157T0.5) | = 6 inches | | Reinforcedc cement, cement-lime, lime  or soil-cement plaster | = 120 | ~~A, B, C, D~~~~0~~~~, D~~~~1~~~~, D~~~~2~~ | H = 12 | H = 9T0.5  (H = 157T0.5) | = 4 inchese |     (*no change to table notes*)    **Revise as follows:**    **AS106.13 Braced panels.**Plastered strawbale walls shall be permitted to be used as braced wall panels for one-story buildings in accordance with Section R602.10 of the *Florida Building Code, Residential*and with Tables AS106.13(1), AS106.13(2) and AS106.13(3). Wind design criteria shall be in accordance with Section R301.2.1. ~~Seismic design criteria shall be in accordance with Section R301.2.2.~~    **Delete table in its entirety:**    **~~TABLE AS106.13(3)~~**  **~~BRACING REQUIREMENTS FOR STRAWBALE BRACED WALL PANELS BASED ON SEISMIC DESIGN CATEGORY~~**  **(S10034 AS)** |

**Appendix G Piping Standards for**

**Various Applications**





**c. Piping systems for fire sprinkler applications shall be listed for the application.**

**(P9412)(RP15-18 AS)**

**Appendix J - Existing Buildings and Structures**

Revise as follows:

**AJ102.4.4 Window control devices.**Where window fall prevention devices complying with ASTM F2090 are not provided, window opening control devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1.     The window is operable.

2.     One of the following applies:

2.1   The window replacement includes replacement of the sash and frame.

2.2  The window replacement includes the sash only when the existing frame remains.

~~2~~3.   The top of the sill of the window opening is at a height less than 24 inches (610 mm) above the finished floor.

~~3~~4.   The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere where the window is in its largest opened position.

~~4~~5.   The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm)

**(F8953)(RB290-19 AM)**

**Appendix K - Sound Transmission**

Revise as follows:

AK102.1 General.Airborne sound insulation for wall and floor-ceiling assemblies shall meet a sound transmission class (STC) rating of 45 where tested in accordance with ASTM E90 or a Normalized Noise Isolation Class (NNIC) rating  of 42 when tested in accordance with ASTM ~~E90~~ E336. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. *Dwelling unit* entrance doors, which share a common space, shall be tight fitting to the frame and sill.

AK103.1 General.Floor/ceiling assemblies between *dwelling units*, or between a *dwelling unit* and a public or service area within a structure, shall have an impact insulation class (IIC) rating of not less than 45 when tested in accordance with ASTM E492 or a Normalized Impact Sound Rating (NISR) of 42 where tested in accordance with ASTM E1007.

Add new standard(s) as follows:

E336-17a:   Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings

E1007-16:   Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures

**(S8954)(RB291-19 AM)**

**Appendix Q**

**Revise as follows:**

**AQ104.2.2.1 Size and capacity.** Ladders accessing *lofts* shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 200 300-pound (~~75~~ 136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

**(M8957)(RB294-19 AS)**

**Add new text as follows:**

**SECTION AQ106**

**ENERGY CONSERVATION**

**AQ106.1 Air leakage testing.** The air leakage rate for *tiny houses* shall not exceed 0.30 cubic feet per minute at 50

Pascals of pressure per square foot of the *dwelling unit* enclosure area. The air leakage testing shall be in accordance with the testing methods required in Section N1102.4.1.2. The *dwelling unit* enclosure area shall be the sum of the areas of ceilings, floors and walls that separate the conditioned space of a *dwelling unit* from the exterior, its adjacent unconditioned spaces and adjacent *dwelling units*.

**AQ106.1.1 Whole-house mechanical ventilation.**

Where the air leakage rate is in accordance with Section AQ106.1, the *tiny house* shall be provided with wholehouse

mechanical ventilation in accordance with Section M1505.4.

**AQ106.2 Alternative compliance.** *Tiny houses* shall be deemed to be in compliance with Chapter 11 of this code and Chapter R4 of the *International Energy Conservation Code*, provided that the following conditions are met:

1. The insulation and fenestration meet the requirements of Table N1102.1.2.

2. The thermal envelope meets the requirements of Section N1102.4.1.1 and Table N1102.4.1.1.

3. Solar, wind or other renewable energy source supplies not less than 90 percent of the energy use for

the structure.

4. Solar, wind or other renewable energy source supplies not less than 90 percent of the energy for

service water heating.

5. Permanently installed lighting is in accordance with Section N1104.

6. Mechanical ventilation is provided in accordance with Section M1505 and operable fenestration is not

used to meet ventilation requirements

**(EN8955)(RB292-19 AMPC2)**

**Appendix R Light Straw-Clay Construction**

**Revise as follows:**

**CLAY SLIP.** A suspension of clay or clay subsoil particles in water.

**CLAY SUBSOIL.** Subsoil sourced directly from the earth or refined, containing clay and ~~free from~~ not more than trace amounts of organic matter.

![](data:image/png;base64;base64,)

**(S8958)(RB295-19 AS)**

**Appendix U - Solar-Ready Provisions-Detached-One and Two-family Dwellings(Townhouses)**

**Add new text as follows:**

**APPENDIX U  
Cob Construction (Monolithic Adobe)**

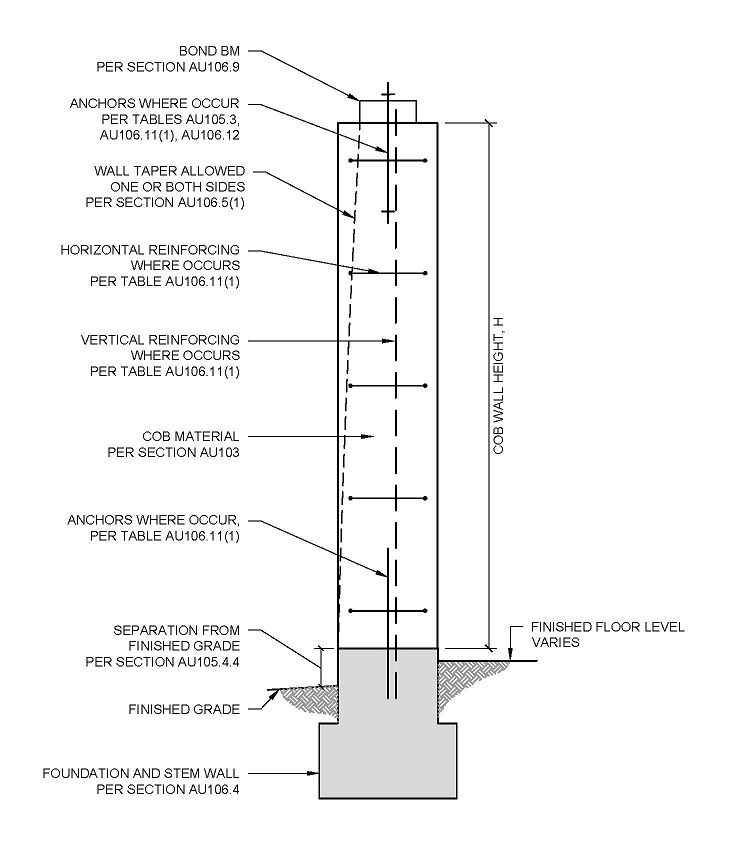
**SECTION AU101  
GENERAL**

**AU101.1 Scope.** This appendix provides prescriptive and performance-based requirements for the use of *natural cob* as a building material. *Buildings* using *cob* walls shall comply with this code except as otherwise stated in this appendix.

**AU101.2 Intent.** In addition to the intent described in Section R101.3, the purpose of this appendix is to establish minimum requirements for cob structures that provide flexibility in the application of certain provisions of the code, to permit the use of site-sourced and local materials, and innovative combinations of proven historical and modern techniques that are safe, reduce life-cycle impacts, and increase affordability.

**AU101.3 Tests and empirical evidence.** Tests for an alternative material, design or method of construction shall be in accordance with Section R104.11.1, and the *building official* shall have the authority to consider evidence of a history of successful use in lieu of testing.

**AU101.4 Cob wall systems.** *Cob* wall systems include those shown in Figure AU101.4 and *approved* variations.

****

**FIGUREAU101.4**

**TYPICAL COB WALL**

**SECTION AU102  
DEFINITIONS**

**AU102.1 Definitions.** The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the *International Residential Code* for general definitions.

**BRACED WALL PANEL.**A *cob* wall designed and constructed to resist in-plane shear loads through the interaction of the cob material, its reinforcing and its connections to its bond beam and foundation. The panel’s length meets the requirements for the particular wall type and contributes toward the total amount of bracing required along its braced wall line in accordance with Sections AU106.11 and R602.10.1.

**BUTTRESS.**A mass set at an angle to, or bonded to a wall that it strengthens or supports.

**CLAY.** Inorganic soil with particle sizes less than 0.00008 inch (0.002 mm) having the characteristics of high to very high dry strength and medium to high plasticity, used as the binder of other component materials in a mix of *cob* or of *clay* plaster.

**CLAY SUBSOIL.** Subsoil sourced directly from the earth, containing *clay,* sand, and silt, and not more than trace amounts of organic matter.

**COB.**A composite building material consisting of refined clay or clay subsoil wet-mixed with loose straw and sometimes sand. Also known as *monolithic adobe*.

**COB CONSTRUCTION.**A wall system of layers or *lifts* of moist *cob* placed to create monolithic walls, typically without formwork.

**DRY JOINT.** The boundary between a layer of moist cob and a previously laid and significantly drier, non-malleable layer of cob that requires wetting to achieve bonding between the layers.

**FINISH.** Completed combination of materials on the face of a *cob* wall.

**LIFT.**A layer of installed *cob*.

**LOAD-BEARING WALL.**A *cob* wall that supports more than 100 pounds per linear foot (1459 N/m) of vertical load in addition to its own weight.

**MONOLITHIC ADOBE.** Synonymous with *cob*.

**NATURAL COB.** Cob not containing admixtures such as Portland cement, lime, asphalt emulsion, or oil. Synonymous with *unstabilized* cob.

**NONSTRUCTURAL WALL.** Walls other than *load-bearing* walls or *shear walls*.

**PLASTER.** C*lay*, soil-cement, gypsum, lime, clay-lime, cement-lime, or cement plaster as described in Section AU104.

**SHEAR WALL.**A *cob* wall designed and constructed to resist in-plane lateral seismic and wind forces in accordance with Section AU106.11. Synonymous with *braced wall panel*.

**STABILIZED.** *Cob* or other earthen material containing admixtures such as Portland cement, lime, asphalt emulsion, or oil, that are intended to help limit water absorption, stabilize volume, increase strength, and increase durability.

**STRUCTURAL WALL.**A wall that meets the definition for a *load-bearing* wall or *shear wall*.

**STRAW.** The dry stems of cereal grains after the seed heads have been removed.

**UNSTABILIZED.**A *Cob* or other earthen material that does not contain admixtures such as Portland cement, lime, asphalt emulsion, or oil.

**SECTION AU103  
MATERIALS, MIXING, AND INSTALLATION**

**AU103.1 Clay subsoil.** *Clay subsoil* for a *cob* mix shall be acceptable if the mix it produces meets the requirements of Section AU103.4.

**AU103.2 Sand.** Sand or other aggregates such as, but not limited to, gravel, pumice and lava rock, when added to *cob* mixes, shall yield a mix that meets the requirements of Section AU103.4.

**AU103.3 Straw.** *Straw* for *cob* mixes shall be from wheat, rice, rye, barley or oat, or similar reinforcing fibers with similar performance. Before mixing, the straw or other reinforcing fibers shall be dry to the touch and free of visible decay.

**AU103.4 Mix proportions.** *Cob* mixes shall be of any proportion of refined *clay* or *clay subsoil*, added sand (if any) and straw that produces a dried mix that passes the shrinkage test in accordance with Section AU103.4.1, complies with the compressive strength requirements of Section AU106.6 and complies with the modulus of rupture requirements of Section AU106.7.

**AU103.4.1 Shrinkage test for cob mixes.** Each proposed *cob* mix of different mix proportions shall be placed moist to completely fill a 24-inch by 3 1/2-inch by 3 1/2-inch (610 mm by 89 mm by 89 mm) wooden form on a plastic or paper slip sheet and dried to ambient moisture conditions, or oven dried. The total shrinkage of the length shall not exceed 1 inch (25 mm), as measured from the dried edges of the material to the insides of the form. Cracks in the sample > 1/16 inch (1.5 mm) shall first be closed manually. The shrinkage test shall be shown to the building official for approval before placement of the cob mix onto walls.

**AU103.5 Mixing.** The clay subsoil, sand and straw for *cob* shall be thoroughly mixed by manual or mechanical means with water sufficient to produce a mix of a plastic consistency capable of bonding of successively placed layers or *lifts*.

**AU103.6 Installation.** *Cob* shall be installed on the wall in *lifts* of a height that supports itself with minimal slumping.

**AU103.7 Dry joints.** Each layer of cob shall be prevented from drying until the next layer is installed, to ensure bonding of successive layers. The top of each layer shall be kept moist and malleable with one or more of the following methods:

1. Covering with a material that prevents loss of or holds moisture,

2. Covering with a material that shades it from direct sun, or

3. Wetting.

When dry joints are unavoidable, the previous layer shall be wetted prior to application of the next layer.

**AU103.8 Drying holes.** Where holes to facilitate drying are used, such holes shall be of any depth and not exceeding 3/4-inch (19 mm) in diameter on the face of *cob* walls. Drying holes shall not be spaced closer than ten hole-diameters. Drying holes shall not be placed in *braced wall panels*. The design load on load-bearing walls with drying holes shall not exceed 90% of the allowable bearing capacity as determined in accordance with Section AU106.8. Drying holes shall be filled with cob before final inspection.

**AU103.9 Adding roof loads to walls.** Roof and ceiling loads shall not be added until walls are sufficiently dry to support them without compressing.

**SECTION AU104  
FINISHES**

**AU104.1 General.** *Cob* walls shall not require a *finish*, except as required by Section AU104.2. Finishes applied to *cob* walls shall be plasters in accordance with Section AU104.4, non-plaster exterior wall coverings in accordance with Section R703 or other finish systems in accordance with the following:

1. Specifications and details of the finish system’s means of attachment to the wall or its independent support and means of draining or evaporating water that penetrates the exterior finish shall be provided.

2. The vapor permeance of the combination of finish materials shall be 5 perms or greater to allow the transpiration of water vapor from the wall.

3. Finish systems with weights >10 and ≤ 20 pounds per square foot (> 48.9 and ≤ 97.8 kg/m2) of wall shall require that the minimum total length of braced wall panels in Table AU106.11(3) be multiplied by a factor of 1.2.

4. Finish systems with weights > 20 pounds per square foot (> 97.8 kg/m2) of wall area shall require an engineered design.

**AU104.2 Where required.** Cob walls exposed to rain due to local climate, building design and wall orientation shall be finished or clad to provide protection from excessive erosion.

**AU104.3 Vapor retarders.** Class I and II vapor retarders shall not be used on *cob* walls, except at cob walls surrounding showers or as required or addressed elsewhere in this appendix.

**AU104.4 Plaster.** *Plaster* applied to *cob* walls shall be any type described in this section. *Plaster* thickness shall not exceed 3 inches (76 mm) on each face except where an approved engineered design is provided.

**AU104.4.1 Plaster and membranes.** *Plaster* shall be applied directly to *cob* walls to facilitate transpiration of moisture from the walls and to secure a mechanical bond between the *plaster* and the *cob*. A membrane shall not be located between the cob wall and the plaster.

**AU104.4.2 Plaster lath.** The surface of *cob* walls shall be permitted to function as lath for plaster, with no other lath required. Metal, plastic, and natural fiber lath shall be permitted to be used to limit plaster cracking or increase the plaster bond to the wall, or to bridge dissimilar materials.

**AU104.4.3 Clay plaster.** *Clay* plaster shall comply with Sections AU104.4.3.1 and AU104.4.3.2.

**AU104.4.3.1 General.** *Clay* plaster shall be any plaster having a *clay* or *clay subsoil* binder. Such plaster shall contain sufficient clay to fully bind the sand or other aggregate and any reinforcing fibers. Reinforcing fibers shall be chopped straw, sisal, hemp, animal hair or other similar *approved* fibers.

**AU104.4.3.2 Clay subsoil requirements.** The suitability of *clay subsoil* shall be determined in accordance with the Figure 2 Ribbon Test and the Figure 3 Ball Test in the appendix of ASTM E2392/E2392M.

**AU104.4.4 Soil-cement plaster.** Soil-cement plaster shall be composed of *clay subsoil*, sand, not more than 7 percent Portland cement by volume and, where provided, reinforcing fibers.

**AU104.4.5 Gypsum plaster.** Gypsum plaster shall comply with Section R702.2.1 and shall be limited to interior use.

**AU104.4.6 Lime plaster.** Lime plaster is any plaster with a binder composed of calcium hydroxide including Type N or S hydrated lime, hydraulic lime, natural hydraulic lime or slaked quicklime. Hydrated lime shall comply with ASTM C206. Hydraulic lime shall comply with ASTM C1707. Natural hydraulic lime shall comply with ASTM C141 and EN 459. Quicklime shall comply with ASTM C5.

**AU104.4.7 Clay-lime plaster.** Clay-lime plaster shall be composed of refined *clay* or *clay subsoil*, sand, lime and, where provided, reinforcing fibers.

**AU104.4.8 Cement-lime plaster.** Cement-lime plaster shall be plaster mix types CL, F or FL, as described in ASTM C926.

**AU104.4.9 Cement plaster.** Cement plaster shall have not less than 1 part lime to 4 parts cement and be not thicker than 1-1/2 inches (38 mm), to ensure minimum acceptable vapor permeability

**SECTION AU105  
COB WALLS—GENERAL**

**AU105.1 General.** *Cob walls* shall be designed and constructed in accordance with this section and Figure AU101.4 or an *approved* alternative design. In addition to the general requirements for c*ob*walls in this section, c*ob structural walls* shall comply with Section AU106.

**AU105.2 Building limitations and requirements for cob wall construction.** *Cob* walls shall be subject to the following limitations and requirements:

1. Number of stories: not more than one.

2. *Building* height: not more than 25 feet (7620 mm).

3. Seismic design categories: limited to use in Seismic Design Categories A, B and C, except where an *approved* engineered design is provided.

4. Wall height: in accordance with Table AU105.4, and with Table AU106.11(1) for *braced wall panels*.

5. Wall thickness, excluding finish, shall be not less than 10 inches, not greater than 24 inches at the top two-thirds, not limited at the bottom third and, for structural walls, shall comply with Section AU106.2(2). Wall taper is permitted in accordance with Section AU106.5(1).

6. Interior *cob* walls shall require an *approved* engineered design that accounts for the seismic load of the interior *cob* walls, except in Seismic Design Category A for walls with a height to thickness ratio ≤ to 6.

**AU105.3 Out-of-plane resistance methods and unrestrained wall height limits.** *Cob* walls shall employ a method of out-of-plane load resistance in accordance with Table AU105.3, and comply with its associated height limits and requirements.

**AU105.3.1 Determination of out-of-plane loading.** Out-of-plane loading for the use of Table AU105.3 shall be in accordance with the ultimate design wind speed and seismic design category requirements of Sections R301.2.1 and R301.2.2 respectively. An *approved* engineered design shall be required where the building is located in a Special Wind Region or a Wind Design Required location in accordance with Figure R301.2(5)B.

**TABLE AU105.3**

**OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL HEIGHT LIMITS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **WALL TYPEa, g, h**  **and**  **METHOD OF**  **OUT-OF-PLANE LOAD RESISTANCE** | **FOR ULTIMATE DESIGN WIND SPEEDS**  **(mph)** | **FOR SEISMIC DESIGN CATEGORIES** | **UNRESTRAINED COB WALL HEIGHT Hb, c** | | **TOP ANCHORe SPACING**  **(inches)** | **TENSION TIEf SPACING**  **(inches)** |
| **Absolute limit in feet** | **Limit based on wall thickness Td**  **in feet** |
| Wall 1i: no anchors, no steel wall reinforcing | ≤ 110 | A | *H*≤ 8 | *H*≤ 6*T* | none | 48 |
| Wall 2: top anchorsj, continuous vertical 6”x6”x6 gage steel mesh in center of wall embedded in foundation 12” | ≤ 140 | A, B, C | *H*≤ 8 | *H*≤ 8*T* | 12 | 24 |
| Wall Ai: top anchors, no vertical steel reinforcing | ≤ 120 | A, B | *H*≤ 8 | *H*≤ 6*T* | 12 | 48 |
| Wall Bi: top & bottom anchors, no vertical steel reinforcing | ≤ 130 | A, B | *H*≤ 8 | *H*≤ 6*T* | 12 | 48 |
| Wall C: top and bottom anchors, continuous vertical threaded rod at 4’ oc embedded in foundation and connected to bond beam | ≤ 140 | A, B, C | *H*≤ 8 | *H*≤ 8*T* | 12 | 24 |
| Wall D: continuous vertical threaded rod at 1’ oc embedded in foundation and connected to bond beam | ≤ 140 | A, B, C | *H*≤ 8 | *H*≤ 8*T* | NA | 24 |
| Wall E: top anchors, continuous vertical 6”x6”x6 gage steel mesh 2” from each face of wall embedded in foundation | ≤ 140 | A, B, C | *H*≤ 8 | *H*≤ 8*T* | 12 | 24 |

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

N/A = Not Applicable

a. See Table AU106.11(1) for reinforcing and anchorage specifications for wall types A, B, C, D and E.

b.  *H*= height of the cob portion of the wall only. See Figure AU101.4. The maximum H is the absolute limit or the limit based on wall thickness, whichever is more restrictive.

c. Bond beams or other horizontal restraints are capable of separating a wall into more than one unrestrained wall height with an *approved* engineered design.

d.  *T*= Cob wall thickness (in feet) at its minimum, without plaster.

e. 5/8-inch threaded rod anchors at prescribed spacing with 12” embedment in cob, full embedment in concrete bond beams or full penetration in wood bond beam with a nut and washer.

f. Attach rafters to bond beam with 4-inch by 3-inch by 3-inch by 18 gage tension tie angles at prescribed spacing. See Figure R608.9(9). Where rafters are attached to tension ties shall, roof sheathing shall be edge nailed.

g. All walls shall be tested for compressive strength in accordance with Section AU106.6.

h. For curved walls with an arc length: radius ratio of 1.5:1 or greater, the H/T factor shall be increased by 1, and the absolute height limit by 1 foot.

i. Wall type requires a modulus of rupture test in accordance with Section AU106.7.

j. See wall type A in Table AU106.11(1) for top anchor requirements.

**AU105.3.2 Bond beams for nonstructural walls.** Nonstructural *cob* walls shall be provided with a bond beam at the top of the wall that complies with Section AU106.9, except for requirements relating to roof and/or ceiling loads or *braced wall panels*.

**AU105.3.3 Lintels in nonstructural walls.** Door, window, and other openings in nonstructural *cob* walls shall require a lintel in accordance with Section AU106.10, except for requirements relating to roof and/or ceiling loads or *braced wall panels*.

**AU105.3.4 Reinforcing at wall openings.** Reinforcing shall be installed at window, door, and similar wall openings and penetrations greater than 2 feet (610 mm) in width in accordance with this section. Surface voids deeper than 25 percent of the wall thickness shall be considered an opening.

**AU105.3.4.1 Opening size limit.** Openings shall not exceed 6 feet (1829 mm) in width, and the height of the cob wall below openings shall not exceed 6 feet (1829 mm) above the top of the foundation.

**AU105.3.4.2 Horizontal reinforcing.** 2-inch by 2-inch (51 mm by 51 mm) 14 gage galvanized steel mesh shall be embedded 4 inches (102 mm) in the cob above the rough opening and below the rough opening for windows, and shall extend 12 inches (305 mm) beyond the sides of the opening. Walls below rough window openings greater than 4 foot 6 inches (1372 mm) in height shall be provided with additional horizontal reinforcing at mid-height.

**AU105.3.4.3 Vertical reinforcing.** Full-height 5/8-inch (16 mm) threaded rod shall be installed 4 inches (102 mm) from each side of the opening, centered in the thickness of the cob wall. The threaded rods shall be embedded 7 inches (178 mm) in the foundation, and 4 inches (102 mm) in concrete bond beams or shall penetrate through wood bond beams and be secured with a nut and washer. The threaded rods shall be embedded in concrete lintels, or pass through a drilled hole in wood lintels.

**AU105.3.5 Minimum length of cob walls.** Sections of *cob* walls between openings shall be not less than 2 foot 6 inches (762 mm) in length. Wall sections less than 4 feet (1219 mm) and not less than 2 foot 6 inches (762 mm) in length shall contain vertical reinforcing in accordance with Section AU105.3.4.3

**AU105.4 Moisture control.** *Cob* walls shall be protected from moisture intrusion and damage in accordance with Sections AU105.4.1 through AU105.4.5.

**AU105.4.1 Water-resistant barriers and vapor permeance.** *Cob* walls shall be constructed without a membrane barrier between the *cob* wall and *plaster* to facilitate transpiration of water vapor from the wall, and to secure a mechanical bond between the cob and plaster, except as otherwise required elsewhere in this appendix. Where a water-resistant barrier is placed behind an exterior finish, it shall be considered part of the finish system and shall comply with Section AU104.1(2) for the combined vapor permeance rating.

**AU105.4.2 Horizontal surfaces.** *Cob* walls and other *cob* elements shall be provided with a water-resistant barrier at weather-exposed horizontal surfaces. The water-resistant barrier shall be of a material and installation that will prevent erosion and prevent water from entering the wall system. Horizontal surfaces, including exterior window sills, sills at exterior niches, and exterior buttresses, shall be sloped not less than 1 unit vertical in 12 units horizontal to drain away from *cob* walls or other cob elements.

**AU105.4.3 Separation of cob and foundation.** A liquid-applied or bituminous Class II *vapor retarder* shall be installed between *cob* and supporting concrete or masonry

**Exception:** Where local climate, site conditions and foundation design limit ground moisture migration into the base of the *cob* wall, including but not limited to the use of a moisture barrier or capillary break between the supporting concrete or masonry and the earth.

**AU105.4.4 Separation of cob and finished grade.** *Cob* shall be not less than 8 inches (203 mm) above finished grade.

**Exception:** The minimum separation shall be 4 inches (102 mm) in Dry climate zones as defined in Table N1101.7.2(1) [R302.3(1)], and shall be 2 inches (51mm) on walls that are not weather-exposed.

**AU105.4.5 Installation of windows and doors.** Windows and doors shall be installed in accordance with the manufacturer’s instructions to a wooden frame of not less than nominal 2x4 (51 mm by 102 mm) wood members anchored into the cob wall with 16d galvanized nails half-driven at a maximum 6-inch (152 mm) spacing, with the protruding half embedded in the cob. The wood frame shall be embedded not less than 1-1/2 inches (38 mm) in the cob and shall be set in from each face of the wall not less than 3 inches (76 mm). Alternative window and door installation methods shall be capable of resisting the wind loads in Table R301.2(2). Windows and doors in cob walls shall be installed so as to mitigate the passage of air or moisture into or through the wall system. Window sills shall comply with Section AU105.4.2.

**AU105.5 Inspections.** The *building official* shall inspect the following aspects of *cob construction* in addition to the required tests of, and accordance with Section R109.1:

1. Anchors and vertical and horizontal reinforcing in *cob* walls, where required in accordance with Tables AU105.2 and AU106.11(1) and Sections AU105.3.4 and AU105.3.5.

2. Reinforcing in any concrete bond beams or lintels, in accordance with Sections AU106.9.2 and Table AU106.10.

**SECTION AU106  
COB WALLS—STRUCTURAL**

**AU106.1 General.** *Cob structural walls* hall be in accordance with the prescriptive provisions of this section. Designs or portions of designs not complying with this section shall require an *approved* engineered design.

**AU106.2 Requirements for cob structural walls.** In addition to the requirements of Section AU105.2, *cob structural walls* shall be subject to the following:

1. Wall height: shall be in accordance with Table AU105.3 for load-bearing cob walls or AU106.11(1) for cob braced wall panels, as applicable and most restrictive.

2. Wall thickness: shall be in accordance with Section AU105.2(5) and Section AU106.8.1 for load-bearing cob walls or AU106.11(1) for cob braced wall panels, as applicable and most restrictive.

*3. Braced wall panel* lengths: for *buildings* using *cob braced wall panels*, the greater of the values determined in accordance with Tables AU106.11(2) for wind loads and AU106.11(3) for seismic loads shall be used.

**AU106.3 Loads and other limitations.** Live and dead loads and other limitations shall be in accordance with Section R301, except that the dead load for *cob* walls shall be determined with the following equation:

*CWDL*= (*H x Tavgx D*)  **(Equation AU-1)**

where:

*CWDL*= Cob wall dead load (in pounds per lineal foot of wall)

*H*= Height of cob portion of wall (in feet)

*Tavg*= Average thickness of wall (in feet)

*D*= Density of cob = 110 (in pcf), unless a lesser value at equilibrium moisture content is demonstrated to the *building official*

**AU106.4 Foundations.** Foundations for *cob* walls shall be in accordance with Chapter 4. The width of foundations for cob walls shall be not less than the width of the cob at its base, excluding *finish.*

**AU106.5 Wall taper, straightness and surface voids for cob walls.** *Cob* walls shall be in accordance with the following:

1. *Cob structural* and *nonstructural walls* shall be vertical, or shall taper from bottom to top with the wall thickness in accordance with Section AU105.2(5) and the wall height in accordance with AU105.2(4).

2. *Cob structural* and *nonstructural walls* shall be straight or curved. Curved *braced wall panels* shall be in accordance with Sections AU106.11.2 and AU106.11.3.

3. Niches and other surface voids in *load-bearing walls* are limited to 12 inches (305 mm) in width and height and 25 percent of the wall thickness, and shall be located in the top two-thirds of the wall. Surface voids that exceed these limits shall be considered wall openings, and shall receive a lintel in accordance with Section AU106.10 and be reinforced in accordance with Section AU105.3.4. Surface voids are prohibited in *braced wall panels*.

**AU106.6 Compressive strength of cob structural and nonstructural walls.**

All *cob* walls shall have a minimum compressive strength of 60 psi (414 kPa). *Cob* in walls used as *braced wall panels* shall have a minimum compressive strength of 85 psi (586 kPa).

**AU106.6.1 Demonstration of compressive strength.** The compressive strength of the *cob* mix to be used in *structural walls* and *nonstructural walls* as required in Section AU106.6 shall be demonstrated to the *building official* before the placement of cob onto walls, with compressive strength tests and an associated report by an *approved* laboratory or with an *approved* on-site test as follows:

1. Five samples of the proposed *cob* mix shall be placed moist to completely fill a 4-inch by 4-inch by 4-inch (102 mm by 102 mm by 102 mm) form and dried to ambient moisture conditions. Samples shall not be oven dried. Any opposite faces shall be faced with plaster of Paris if needed to achieve smooth, parallel faces, after which the sample shall reach ambient moisture conditions before testing. The horizontal cross-section of the dried sample as tested, and the maximum applied load at failure shall be used to calculate the sample’s compressive strength. The fourth lowest value shall be used to determine the mix’s compressive strength.

**AU106.7 Modulus of rupture of cob structural walls.** *Cob* in walls used as *braced wall panels* shall have a minimum modulus of rupture of 50 psi (345 kPa).

**AU106.7.1 Demonstration of modulus of rupture.** The modulus of rupture of *cob* used in structural walls as required in Section AU106.7 shall be demonstrated to the *building official* before the placement of cob onto walls, with modulus of rupture tests and an associated report by an *approved* laboratory or with an *approved* on-site test as follows:

1. Five samples of the proposed *cob* mix shall be placed moist to completely fill a 6-inch by 6-inch by 12-inch (152 mm by 152 mm by 305 mm) form and dried to indoor ambient moisture conditions. Samples shall not be oven dried. Each sample shall be tested with the 12-inch (305 mm) dimension horizontal. The fourth lowest value shall be used to determine if the mix’s meets the minimum required modulus of rupture.

**AU106.8 Bearing capacity.** The allowable bearing capacity for *cob load-bearing walls* supporting vertical roof and/or ceiling loads imposed in accordance with Section R301 shall be determined with the following equation:

*BC*= (*C xTmin)/3*- (*H x Tavgx D*)  **(Equation AU-2)**

where:

*BC*= Allowable bearing capacity of wall (in pounds per lineal foot of wall)

*C*= Compressive strength (in psi) as determined in accordance with Section AU106.6

*Tmin*= Thickness of wall (in feet) at its minimum

*H*= Height of cob portion of wall (in feet)

*Tavg*= Average thickness of wall (in feet)

*D*= Density of cob = 110 (in pcf), unless a lesser value at equilibrium moisture content is demonstrated

**AU106.8.1 Support of uniform loads.** Uniform roof and/or ceiling loads shall be supported by *cob load-bearing walls* not exceeding their allowable bearing capacity, as demonstrated in accordance with the following equation:

*BL ≤ BC* **(Equation AU-3)**

where:

*BL*= Design load on the wall (in pounds per lineal foot) determined in accordance with Sections R301.4 and R301.6

*BC*= Allowable bearing capacity of wall (in pounds per lineal foot of wall) determined in accordance with Section AU106.8

**AU106.8.2 Support of concentrated loads.** Concentrated roof and/or ceiling loads shall be distributed by structural elements capable of distributing the loads to the *cob load-bearing wall* and within its allowable bearing capacity as determined in accordance with Section AU106.8. Concentrated loads over lintels or over bond beams spanning openings shall require an *approved* engineered design.

**AU106.9 Bond beams.**  *Cob structural wall s*hall require a bond beam at the top of the wall in accordance with Sections AU106.9.1, AU106.9.2 or AU106.9.3, and shall be anchored to the *cob* below in accordance with Tables AU105.3, AU106.11(1) and AU106.12 as applicable and most restrictive. Bond beams spanning openings shall be in accordance with Section AU106.9.4.

**AU106.9.1 Wood bond beams.** Wood bond beams shall be not less than nominal 4 inches high by 8 inches wide and shall comply with Sections AU106.9.1.1 through AU106.9.1.3.

**AU106.9.1.1 Wood species and grade.** Wood bond beams shall be of a species with an extreme fiber in bending (*Fb*) of not less than 850 psi (5.9 MPa), a modulus of elasticity (*E*) of not less than 1,300,000 psi (8964 MPa), and of No. 2 grade or better. Composite lumber bond beams shall have an extreme fiber in bending (*Fb*) of not less than 850 psi (5.9 MPa), and a modulus of elasticity (*E*) of not less than 1,300,000 psi (8964 MPa).

**AU106.9.1.2 Discontinuity.** Discontinuous wood bond beams shall be spliced on top with a metal strap with not less than the allowable wind or seismic load tension capacity in accordance with the following, whichever is more restrictive:

1. For seismic design categories: A: 2500 pounds (11 kN). B: 4500 pounds (20 kN). C: 6000 pounds (26.7 kN).

2. For braced wall line lengths, when wind governs: 10 feet: 2500 pounds (11 kN). 20 feet: 3400 pounds (15.1 kN). 30 feet: 5000 pounds (22.2 kN).

**AU106.9.1.3 Corners and curved walls.** Wood bond beams at corners and discontinuities atop curved walls shall be connected across their exterior faces with a metal strap with a capacity of not less than that determined in in accordance Section AU106.9.2.

**AU106.9.2 Concrete bond beams.** Concrete bond beams shall be not less than 6 inches (152 mm) high by 8 inches (305 mm) wide. Concrete bond beams shall be reinforced with two # 4 bars, 2 inches (51 mm) clear from the bottom and 2 inches (51 mm) clear from the sides. Lap splices shall comply with Table R608.5.4(1). Reinforcing at corners shall be in accordance with the horizontal reinforcing requirements in Section R608.6.4. The concrete shall have a compressive strength of not less than 2500 psi (17.2 MPa) at 28 days.

**AU106.9.3 Other bond beams.** Bond beams of other materials, including earthen materials, require an *approved* engineered design.

**AU106.9.4 Bond beams spanning openings.** Bond beams that support uniform roof and/or ceiling loads and span openings in *cob* walls shall be in accordance with Table AU106.10. Bond beams shall be continuous across the opening and not less than 1 foot (305 mm) beyond each side of the opening.

**AU106.9.5 Connection of roof framing to bond beams.** Roof and ceiling framing shall be attached to bond beams in accordance with Table R602.3(1), Items 2, 6, 30, 31, and 32. Tension ties shall be provided in accordance with Figure R608.9(9) and Footnote f of Table AU105.3. 10d toe nails at 6 inches (152 mm) on center shall be provided from the rim blocking to top plate for the entirety of braced wall lines, instead of the 43 mil strap shown in Figure R608.9(9). A nominal 2-inch by 6-inch (51 mm by 152 mm) wood plate shall be installed on concrete bond beams with 5/8-inch (16 mm) diameter anchor bolts with 5-inch (127 mm) embedment at 2 feet (610 mm) on center to allow the required fastening of roof and ceiling framing, including tension ties and toe nailing of rim blocking.

**AU106.9.6 Bond beams at gable and shed roof end walls.** Bond beams at end walls of buildings with gable or shed roofs shall comply with the following:

1. End walls shall not exceed 20 feet (6096 mm) in length.

2. Shall be continuous and straight for the entire wall line.

3. Wood bond beams when used shall comply with the following:

3.1. Not less than nominal 4x8 (102 mm by 203 mm) when wind design governs in accordance with Tables AU106.11(2) and AU106.11(3), and for wall lengths ≤ 20 feet (6096 mm) in Seismic Design Category A, and for wall lengths ≤ 10 feet (3048 mm) in Seismic Design Categories B and C.

3.2. Not less than nominal 4x10 (102 mm by 254 mm) for wall lengths ≤ 20 feet (6096 mm) in Seismic Design Category B.

3.3. Not less than nominal 6x12 (152 mm by 305 mm) or 4x16 (102 mm by 406 mm) for wall lengths ≤ 20 feet (6096 mm) in Seismic Design Category C.

4. Concrete bond beams when used shall be in accordance with Section AU106.9.2 in Seismic Design Categories A, B, and C and for ultimate design wind speeds ≤ 140 mph (63.6 m/s).

5. Walls between the bond beam and roof shall be of wood-framed construction in accordance with Section R602.

**AU106.10 Lintels.** Door, window, and other openings in *load-bearing cob* walls shall be provided with a lintel of wood or concrete in accordance with Table AU106.10.

**TABLEAU106.10**

**LINTELS AND BOND BEAMS SPANNING OPENINGS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **GROUND SNOW LOAD≤30 PSF** | | | **WOOD:**  **Fb≥850 PSI**  **E≥1,300,000 PSI**  **NO. 2 GRADE OR BETTER**  **ORIENTED FLAT**  **1 PIECE OR 2 EQUAL-WIDTH PIECES**  **EXTEND 1 FT BEYOND OPENING SIDES** | | **CONCRETE:**  **2500 PSI COMPRESSIVE STRENGTH**  **HEIGHT = 6”**  **EXTEND 1 FT BEYOND OPENING SIDES**  **REINFORCEMENT: 2 - #4 BARSa**  **2”CLEAR FROM BOTTOM**  **2”CLEAR FROM SIDESa** | |
| **Building width (feet)** | **Cob above lintel (feet)** | **Total cob wall and plaster thickness**  **(inches)** | **SIZE OF WOOD LINTEL**  **OR BOND BEAM**  **H x W (nominal inches)** | | **WIDTH OF CONCRETE LINTEL**  **OR BOND BEAM**  **(inches)** | |
| **For Span≤4’** | **For Span≤6’** | **For Span≤6’** | **For Span≤8’** |
| 10 | 0 | ≤ 27 | 4x8 | 4x8 | 8 | 8 |
| 10 | 1 | 15 | 4x12 | 4x12 | 12 | 12 |
| 10 | 1 | 19 | 4x16 | 4x16 | 16 | 16 |
| 10 | 1 | 27 | 4x24 | 4x24 | 24 | 24 |
| 10 | 2 | 15 | 4x12 | 6x12 | 12 | 12 |
| 10 | 2 | 19 | 4x16 | 6x16 | 16 | 16 |
| 10 | 2 | 27 | 4x24 | 4x24 | 24 | 24 |
| 20 | 0 | ≤ 27 | 4x8 | 6x8 | 8 | 8 |
| 20 | 1 | 15 | 4x12 | 6x12 | 12 | 12 |
| 20 | 1 | 19 | 4x16 | 6x16 | 16 | 16 |
| 20 | 1 | 27 | 4x24 | 4x24 | 24 | 24 |
| 20 | 2 | 15 | 4x12 | 6x12 | 12 | NP |
| 20 | 2 | 19 | 4x16 | 6x16 | 16 | NP |
| 20 | 2 | 27 | 4x24 | 6x24 | 24 | NP |
| 30 | 0 | ≤ 27 | 4x8 | 6x8 | 8 | NP |
| 30 | 1 | 15 | 4x12 | 6x12 | 12 | NP |
| 30 | 1 | 19 | 4x16 | 6x16 | 16 | NP |
| 30 | 1 | 27 | 4x24 | 6x24 | 24 | NP |
| 30 | 2 | 15 | 4x12 | 6x12 | 12 | NP |
| 30 | 2 | 19 | 4x16 | 6x16 | 16 | NP |
| 30 | 2 | 27 | 4x24 | 6x24 | 24 | NP |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm

NP = Not Permitted

a. Concrete bond beams spanning openings, and lintels greater than 16 inches in width, shall have an additional #4 bar in the center of their width.

**AU106.11 Cob braced wall panels.** *Cob braced wall panels* shall be in accordance with Section R602.10 and Tables AU106.11(1), AU106.11(2) and AU106.11(3A), AU106.11(3B) and AU106.11(3C). Wind design criteria shall be in accordance with Section R301.2.1. Seismic design criteria shall be in accordance with Section R301.2.2. An *approved* engineered design shall be required in accordance with Section R301.2.1 where the building is located in a Special Wind Region or a Wind Design Required location in accordance with Figure R301.2(5)B.

**AU106.11.1 Non-orthogonal braced wall panels.** *Braced wall panels* at an angle to the orthogonal braced wall lines shall be considered to contribute to the minimum total braced wall lengths in Tables AU106.11(2) and AU106.11(3) as follows:

1. A braced wall panel not more than 45 degrees and greater than 30 degrees to an adjacent orthogonal braced wall line shall contribute 50% of its length to that line.

2. A braced wall panel not more than 30 degrees to an orthogonal braced wall line shall contribute 65 percent of its length to that line.

3. A braced wall panel greater than 45 degrees and not more than 60 degrees to an orthogonal braced wall line shall contribute 35 percent of its length to that line.

4. The angle of a curved braced wall panel to a braced wall line shall be determined with the chord of that section of wall, connecting the end points of the arc at the center of the wall.

**AU106.11.2 Braced wall lines for buildings with curved walls.** Buildings with curved *cob* walls shall contain two braced wall lines in two orthogonal directions. The spacing of the braced wall lines for wind design in Table AU106.11(2) and the spacing and length of the braced wall lines for seismic design in Table AU106.11(3), shall be the maximum widths of the building in the two orthogonal directions.

**AU106.11.3 Radius, thickness and length of curved braced wall panels.** *Cob* curved *braced wall panels* shall have an inside radius of not less than 5 feet (1524 mm), shall be of the thickness required in Table AU106.11(1) and of the length determined in accordance with Section AU106.11. The curved wall’s length shall be considered to be the length of the arc at the center of the wall, in accordance with Figure AU106.11.3 and determined with the following equation:

*ARCC*= .0175 *RC*x *A* **(Equation AU-4)**

where:

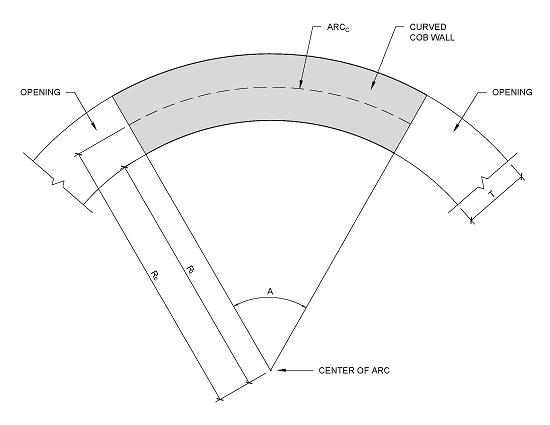
*ARCC*= Length of arc at center of wall (in feet)

*RC*= Radius at center of wall = *RI*+ .5*T*(in feet)

*RI*= Inside radius of wall (in feet)

*T*= Thickness of wall without finish (in feet)

*A*= Angle of extent of braced wall panel from the center of the arc (in degrees)

****

**FIGUREAU106.11.3**

**CURVED BRACED WALL PANEL**

**TABLE AU106.11(1)**

**COB BRACED WALL PANEL TYPES**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **WALL TYPEa DESIGNATION** | **ANCHORS TO FOUNDATIONb** | **ANCHORS TO**  **BOND BEAMc** | **VERTICAL STEEL REINFORCINGb, c** | **HORIZONTAL STEEL REINFORCING** | **MAXIMUM HEIGHT Hd**  **(in feet)** | **MAXIMUM ASPECT RATIO**  **(H:L)** |
| A | none | 5/8” threaded rod @12”  4” from wall ends  12” embedment in cob | none | none | 7e | 1:1 |
| B | #5 bar @ 12”  16” embedment  in cob | 5/8” threaded rod @12”  4” from wall ends  16” embedment in cob 2”x2”x1/4” washer and nut at cob end | none | 2”x2”x14 gage welded wire meshf@ 18”, 6” from foundation and bond beam | 7e | 1:1 |
| C | #5 bar @ 12”  16” embedment  in cob | 5/8” threaded rod @12”  16” embedment in cob | 5/8” threaded rod  4” from each end of braced wall panel  continuous from foundation to bond beam | 2”x2”x14 gage welded wire meshf@ 18”, 6” from foundation and bond beam | 7e | 2:1 |
| D | (see vertical steel reinforcing) | (see vertical steel reinforcing) | 5/8” threaded rod  4” from each end of braced wall panel and @12”, continuous from foundation to bond beam | 2”x2”x14 gage welded wire meshf@ 18”, 6” from foundation and bond beam | 7e | 2:1 |
| E | 6”x6”x6 gage welded wire mesh  12”embedment in foundation | 5/8” threaded rod @12”  4” from wall ends  12” embedment in cob | 6”x6”x6 gage welded wire mesh  2” from each wall face | none | 7.5 | 1:1 |

SI: 1 inch = 25.4 mm.

a.  *Braced wall panel*types A, B, C, and D shall be not less than 16 inches thick. *Brace wall panel*type E shall be not less than 12 inches thick. All *braced wall panels*shall be not greater than 24 inches thick.

b. Not less than 8” embedment into foundation, unless otherwise stated.

c. Not less than 4” embedment into concrete bond beams. Full penetration through wood bond beam, secured with nut and washer.

d.  *H*= height of the cob portion of the wall only. See Figure AU101.4.

e. Maximum height shall be 8 feet when wall thickness is increased to 18”.

f. Galvanized mesh.

**TABLE AU106.11(2)**

**BRACING REQUIREMENTS FOR COB BRACED WALL PANELS BASED ON WIND SPEED**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **EXPOSURE CATEGORY Bd**  • **25-FOOT MEAN ROOF HEIGHT**  • **10-FOOT EAVE-TO-RIDGE HEIGHTd**  • **10-FOOT WALL HEIGHTd**  • **2 BRACED WALL LINESd** | | | **MINIMUM TOTAL LENGTH (FEET) OF COB BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINEa, b, c, d** | | | |
| **Ultimate Design Wind Speed**  **(mph)** | **Story Location** | **Braced Wall Line Spacing (feet)** | **Cob braced wall panele A**  **(aspect ratio**  **H:L ≤ 1:1)** | **Cob braced wall panele B**  **(aspect ratio**  **H:L ≤ 1:1)** | **Cob braced wall panele C, D**  **(aspect ratio**  **H:L ≤ 2:1)** | **Cob braced wall panele E**  **(aspect ratio**  **H:L ≤ 1:1)** |
| 10 | 6.0 | 6.0 | 3.7 | NP |  |  |
| ≤ 110 | One-story building | 20 | 7.9 | 7.4 | 7.4 | NP |
| 30 | 11.8 | 11.0 | 11.0 | NP |  |  |
| 10 | 6.0 | 6.0 | 4.1 | NP |  |  |
| ≤ 115 | One-story building | 20 | 8.7 | 8.1 | 8.1 | NP |
| 30 | 13.0 | 12.1 | 12.1 | NP |  |  |
| 10 | 6.0 | 6.0 | 4.4 | NP |  |  |
| ≤ 120 | One-story building | 20 | 9.4 | 8.8 | 8.8 | NP |
| 30 | 14.1 | 13.1 | 13.1 |  |  |  |
| 10 | 6.0 | 6.0 | 5.1 | NP |  |  |
| ≤ 130 | One-story building | 20 | 11.0 | 10.3 | 10.3 | NP |
| 30 | 16.5 | 15.4 | 15.4 | NP |  |  |
| 10 | 6.0 | 6.0 | 5.9 | NP |  |  |
| ≤ 140 | One-story building | 20 | 12.7 | 11.9 | 11.9 | NP |
| 30 | 19.1 | 17.8 | 17.8 | NP |  |  |

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

a. Linear interpolation shall be permitted.

b. Braced wall panels shall be without openings.

c. Braced wall panel types A, B and E shall have an aspect ratio (H:L) ≤ 1:1. Braced wall panel types C and D shall have an aspect ratio (H:L) ≤ 2:1.

d. Subject to applicable wind adjustment factors associated with Items 1 and 2 of Table R602.10.3(2)

e.  *Cob* braced panel types indicated shall comply with Sections AU106.11.1, AU106.11.2 and Table AU106.11(1).

**TABLE AU106.11(3A)**

**BRACING REQUIREMENTS FOR COB-BRACED WALL PANELS BASED ON SEISMIC DESIGN CATEGORY A**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **SOIL CLASS De**  • **TOTAL WALL HEIGHT = 10 FEET (INCLUDING STEM WALL AND BOND BEAM)**  • **COB WALL HEIGHT PER TABLE AS106.11(1)**  • **15 PSF ROOF-CEILING DEAD LOADd**  • **STORY LOCATION: ONE-STORY BUILDING**  • **SEISMIC DESIGN CATEGORY A**  • **1.5”PLASTER THICKNESS EACH SIDEh** | | | | **MINIMUM TOTAL LENGTH (FEET) OF COB- BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINEa, b, c, d** | | |
| **Braced wall line spacing (feet)** | **Braced wall line length (feet)** | **Braced wall line % openings** | **Perpendicular braced wall line % openings** | **Cob-braced wall paneleA, B** | **Cob-braced wall paneleC, D** | **Cob-braced wall paneleE** |
| 10 | 30 | Any %g | Any %g | Windi | Windi | NP |
| 20 | 20 | Any %g | Any %g | Windi | Windi | NP |
| 20 | 30 | Any %g | Any %g | Windi | 4.5 | NP |
| 30 | 30 | Any %g | Any %g | Windi | Windi | NP |

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

a. Interpolation is not permitted.

b. Braced wall panels shall be without openings.

c. Braced wall panel types A, B and E shall have an aspect ratio (H:L) ≤ 1:1. Braced wall panel types C and D shall have an aspect ratio (H:L) ≤ 2:1.

d. Subject to applicable seismic adjustment factors associated with item 5 in Table R602.10.3(4).

e. Cob braced panel types indicated shall comply with Sections AU106.11.1 and AU106.11.2 and Table AU106.11(1).

f. Wall bracing lengths are based on a soil site class “D.” Interpolation of bracing lengths between *Sds* values associated with the seismic design categories is allowable where a site-specific *Sds* value is determined in accordance with Section 1613.3 of the *International Building Code*.

g. Openings in the braced wall line shall not be limited, except that the minimum total braced wall panel length shall be as determined by Tables AU106.11(3A) and AU106.11(2).

h. For total plaster thickness between 3-inches and 6-inches, the minimum total length of braced wall panels shall be mulitplied by 1.2.

i. The minimum total braced wall panel length shall be governed by Table AU106.11(2).

**AU106.11(3B)**

**BRACING REQUIREMENTS FOR COB-BRACED WALL PANELS BASED ON SEISMIC DESIGN CATEGORY B**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **SOIL CLASS De**  • **TOTAL WALL HEIGHT = 10 FEET (INCLUDING STEM WALL AND BOND BEAM)**  • **COB WALL HEIGHT PER TABLE AS106.11(1)**  • **15 PSF ROOF-CEILING DEAD LOADd**  • **STORY LOCATION: ONE-STORY BUILDING**  • **SESIMIC DESIGN CATEGORY B**  • **1.5”PLASTER THICKNESS EACH SIDEh** | | | | **MINIMUM TOTAL LENGTH (FEET) OF COB- BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINEa, b, c, d** | | |
| **Braced wall line spacing (feet)** | **Braced wall line length (feet)** | **Braced wall line % openings** | **Perpendicular braced wall lines % openings** | **Cob-braced wall paneleA, B** | **Cob-braced wall paneleC, D** | **Cob-braced wall paneleE** |
| 10 | 10 | Any %g | Any %g | Windi | Windi | NP |
| 10 | 20 | 0 | Any %g | 6.0 | 4.9 | NP |
| 10 | 20 | 50 | Any %g | 6.0 | Windi | NP |
| 10 | 30 | 0 | Any %g | 7.1 | 6.6 | NP |
| 10 | 30 | 50 | Any %g | 6.0 | 4.5 | NP |
| 20 | 10 | 0 | 0 | 6.0j | 4.9j | NP |
| 20 | 10 | 0 | 50 | 6.0 | Windi | NP |
| 20 | 10 | 50 | Any %g | 6.0 | 4.2 | NP |
| 20 | 10 | 50 | 50 | 6.0 | 4.2 | NP |
| 20 | 20 | 0 | 0 | 7.4 | 6.9 | NP |
| 20 | 20 | 0 | 50 | 6.0 | 5.5 | NP |
| 20 | 20 | 50 | 0 | 6.0 | 5.5 | NP |
| 20 | 20 | 50 | 50 | 6.0 | 4.1 | NP |
| 20 | 30 | 0 | 0 | 9.4 | 8.8 | NP |
| 20 | 30 | 0 | 50 | 7.9 | 7.4 | NP |
| 20 | 30 | 50 | 0 | 7.2 | 6.7 | NP |
| 20 | 30 | 50 | 50 | 6.0 | 5.3 | NP |
| 30 | 10 | Any %g | Any %g | Windi | Windi | NP |
| 30 | 20 | 0 | 0 | 9.4 | 8.8 | NP |
| 30 | 20 | 0 | 50 | Windi | Windi | NP |
| 30 | 20 | 50 | Any %g | 7.9 | Wind | NP |
| 30 | 30 | 0 | 0 | 11.8 | 11.0 | NP |
| 30 | 30 | 0 | 50 | 9.5 | 8.9 | NP |
| 30 | 30 | 50 | 0 | 9.5 | 8.9 | NP |
| 30 | 30 | 50 | 50 | Windi | Windi | NP |

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

NP = Not Permitted

a. Interpolation is not permitted.

b. Braced wall panels shall be without openings.

c. Braced wall panel types A, B and E shall have an aspect ratio (H:L) ≤ 1:1. Braced wall panel types C and D shall have an aspect ratio (H:L) ≤ 2:1.

d. Subject to applicable seismic adjustment factors associated with Item 5 in Table R602.10.3(4)

e. Cob braced panel types indicated shall comply with Sections AU106.11.1, AU106.11.2 and Table AU106.11(1).

f. Wall bracing lengths are based on a soil site class “D.” Interpolation of bracing lengths between *Sds* values associated with the seismic design categories is allowable where a site-specific *Sds* value is determined in accordance with Section 1613.3 of the *International Building Code*.

g. Openings in the braced wall line shall not be limited, except that the minimum total braced wall panel length shall be as determined by Tables AU106.11(3A) and AU106.11(2).

h. For total plaster thicknesses 3-inches to 6-inches, the minimum total length of braced wall panels shall be multiplied by 1.2.

i. The minimum total braced wall panel length shall be governed by Table AU106.11(2).

j. Total plaster thicknesses shall be not greater than 3-inches. Substitute 15/32” roof sheathing and 10d at 6” edge nailing for requirements in Table R602.3(1).

**AU106.11(3C)**

**BRACING REQUIREMENTS FOR COB-BRACED WALL PANELS BASED ON SEISMIC DESIGN CATEGORY C**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **SOIL CLASS De**  • **TOTAL WALL HEIGHT = 10 FEET (INCLUDING STEM WALL AND BOND BEAM)**  • **COB WALL HEIGHT PER TABLE AS106.11(1)**  • **15 PSF ROOF-CEILING DEAD LOADd**  • **STORY LOCATION: ONE-STORY BUILDING**  • **SESIMIC DESIGN CATEGORY C**  • **1.5”PLASTER THICKNESS EACH SIDEh** | | | | **MINIMUM TOTAL LENGTH (FEET) OF COB- BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINEa, b, c, d** | | |
| **Braced wall line spacing (feet)** | **Braced wall line length (feet)** | **Braced wall line % openings** | **Perpendicular braced wall lines % openings** | **Cob-braced wall paneleA, B** | **Cob-braced wall paneleC, D** | **Cob-braced wall paneleE** |
| 10 | 10 | 0 | 0 | 8.3i | 7.8i | NP |
| 10 | 10 | 0 | 50 | 6.5 | 6.1 | NP |
| 10 | 10 | 25 | 0 | 7.4i | 6.9i | NP |
| 10 | 10 | 50 | 50 | 4.7 | 4.4 | NP |
| 10 | 15 | 0 | 0 | 10.6 | 9.9 | NP |
| 10 | 15 | 0 | 50 | 8.7 | 8.2 | NP |
| 10 | 15 | 50 | 0 | 7.8 | 7.3 | NP |
| 10 | 15 | 50 | 50 | 6.0 | 5.6 | NP |
| 10 | 20 | 0 | 0 | 12.8 | 11.9 | NP |
| 10 | 20 | 0 | 50 | 11.0 | 10.2 | NP |
| 10 | 20 | 50 | 0 | 9.1 | 8.5 | NP |
| 10 | 20 | 50 | 50 | 7.3 | 6.8 | NP |
| 15 | 10 | 25 | 0 | 9.6 | 9.0 | NP |
| 15 | 10 | 0 | 50 | 7.8 | 7.3 | NP |
| 15 | 10 | 50 | 0 | 8.7 | 8.2 | NP |
| 15 | 10 | 50 | 50 | 6.0 | 5.6 | NP |
| 15 | 15 | 0 | 0 | 12.9 | 12.1 | NP |
| 15 | 15 | 0 | 50 | 10.2 | 9.5 | NP |
| 15 | 15 | 50 | 0 | 10.2 | 9.5 | NP |
| 15 | 15 | 50 | 50 | 7.5 | 7.0 | NP |
| 15 | 20 | 0 | 0 | 15.3 | 14.3 | NP |
| 15 | 20 | 0 | 50 | 12.6 | 11.7 | NP |
| 15 | 20 | 50 | 0 | 11.7 | 10.9 | NP |
| 15 | 20 | 50 | 50 | 8.9 | 8.3 | NP |
| 20 | 10 | 25 | 0 | NP | NP | NP |
| 20 | 10 | 0 | 50 | 9.1 | 8.5 | NP |
| 20 | 10 | 50 | Any %g | NP | NP | NP |
| 20 | 10 | 50 | 50 | 7.3 | 6.8 | NP |
| 20 | 15 | 0 | 0 | NP | NP | NP |
| 20 | 15 | 0 | 50 | 11.7i | 10.9i | NP |
| 20 | 15 | 50 | 0 | NP | NP | NP |
| 20 | 15 | 50 | 50 | 8.9i | 8.3i | NP |
| 20 | 20 | 0 | 0 | NP | NP | NP |
| 20 | 20 | 0 | 50 | 14.2 | 13.3 | NP |
| 20 | 20 | 50 | 0 | NP | NP | NP |
| 20 | 20 | 50 | 50 | NP | 9.9 | NP |

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

NP = Not Permitted

a. Interpolation is not permitted.

b. Braced wall panels shall be without openings.

c. Braced wall panel types A, B and E shall have an aspect ratio (H:L) ≤ 1:1. Braced wall panel types C and D shall have an aspect ratio (H:L) ≤ 2:1.

d. Subject to applicable seismic adjustment factors associated with item 5 in Table R602.10.3(4).

e. Cob braced panel types indicated shall comply with Sections AU106.11.1, AU106.11.2 and Table AU106.11(1).

f. Wall bracing lengths are based on a soil site class “D.” Interpolation of bracing lengths between *Sds* values associated with the seismic design categories is allowable where a site-specific *Sds* value is determined in accordance with Section 1613.3 of the *International Building Code*.

g. Openings in the braced wall line shall not be limited, except that the minimum total braced wall panel length shall be as determined by Tables AU106.11(3A) and AU106.11(2).

h. For total plaster thicknesses 3” to 6”, multiply the minimum total length of braced wall panels by 1.2.

i. Total plaster thickness > 3” is not permitted. Substitute 15/32” roof sheathing and 10d at 6” edge nailing for requirements in Table R602.3(1).

**AU106.12 Resistance to wind uplift forces.** *Cob* walls that resist uplift forces from the roof assembly, as determined in accordance with Section R802.11, shall be in accordance with Table AU106.12.

**TABLE AU106.12**

**ANCHORAGE OF BOND BEAMS FOR WIND UPLIFT**

|  |  |  |  |
| --- | --- | --- | --- |
| · **ANCHORS: 5/8” ALL THREAD AT 12” O.C. a, b**  · **2”x2”x1/4” WASHERS AND NUT AT END IN COB**  · **4” EMBEDMENT IN CONCRETE BOND BEAMS**  · **FULL PENETRATION THROUGH WOOD BOND BEAMS WITH 2”X2”X1/4” WASHER AND NUT** | | | |
| **ANCHORAGE DEPTH IN INCHES, PER WALL WIDTH AND WIND UPLIFT FORCE** | | |  |
| **WIND UPLIFT FORCE FROM TABLE R802.11 (PLF)** | **≤ 12” wall widthc** | **≤ 16” wall widthc** | **≤ 24” wall widthc** |
| < 75 | 16 | 12 | 12 |
| < 100 | 24 | 16 | 12 |
| < 150 | 4’ o.c. continuous from foundation to bond beamd | 24 | 16 |
| < 200 | 4’ o.c. continuous from foundation to bond beamd | 4’ o.c. continuous from foundation to bond beamd | 24 |

a. For wood bond beams a maximum of 6” from bond beam ends.

b. For min. 6”x8” concrete bond beams, at 18” o.c. for wind uplift forces < 75 plf., and at 16” o..c for wind uplift forces < 100 plf.

c. Excluding finishes.

d. With 7-inch embedment in foundation, 4-inch embedment in concrete bond beam or full penetration through wood bond beam with 2”x2”x1/4” washer and nut.

**AU106.13 Post-and-beam with cob infill.** Post-and-beam with *cob* infill wall systems shall be in accordance with an *approved* engineered design.

**AU106.14 Buttresses.** *Cob* buttresses that are intended to provide out-of-plane wall bracing, or additional capacity for *braced wall panels* shall be in accordance with an *approved* engineered design.

**SECTION AU107  
COB FLOORS**

**AU107.1 Cob floors.** *Cob* floors supported by grade shall be in accordance with an *approved* specification. Straw shall not be required in the material mix.

**SECTION AU108  
FIRE RESISTANCE**

**AU108.1 Fire-resistance rating.** *Cob* walls shall be considered to exhibit a 1-hour fire-resistance rating in accordance with the following:

1. Wall thickness shall be 10 inches (254 mm) or greater.

2. Density shall be 70 pcf (1121 kg/m3) or greater.

3. When used as a *load-bearing wall*, the maximum design load shall be 1000 pounds per lineal foot (14,590 N/m) in accordance with Section AS106.8.

4. When used as a *braced wall panel*, the wall shall be in accordance with Section AS106.11.

**AU108.2 Clearance to fireplaces and chimneys.** *Cob* walls or other *cob* surfaces shall not require clearance to fireplaces and chimneys, except where clearance to non-combustibles is required by the manufacturer’s instructions.

**SECTION AU109  
THERMAL PERFORMANCE**

**AU109.1 Thermal characteristics.** *Cob walls* shall be classified as mass walls in accordance with Section N1102.2.5 (R402.2.5) and shall meet the R-value requirements for mass walls in Table N1102.1.2 (R402.1.2).

**AU109.2 Thermal resistance.** The unit R-value for *cob* walls with a density of 110 pcf (1762 kg/m3) shall be R-0.22 per inch of *cob* thickness. Walls that vary in thickness along their height or length shall use the average thickness of the wall to determine its R-value. The thermal resistance values of air films and finish materials or additional insulation shall be added to the cob wall's thermal resistance value to determine the R-value of the wall assembly.

**AU109.3 Additional insulation.** When insulating materials are added to the face of a *cob* wall, the combination of additional insulation and any associated connecting, weather-resisting, or protective materials shall comply with Section AU104.1, Items 1-4.

**SECTION AU110**

**REFERENCED STANDARDS**

ASTM C5—10 Standard Specification for Quicklime for Structural Purposes - AU104.4.6.1

ASTM C141/C141M—14 Standard Specification for Hydrated Hydraulic Lime for Structural Purposes - AU104.4.6.1

ASTM C206—14 Standard Specification for Finishing Hydrated Lime - AU104.4.6.1

ASTM C1707—11 Standard Specification for Pozzolanic Hydraulic Lime for Structural Purposes - AU104.4.6.1

ASTM E2392/ E2392M—10 Standard Guide for Design of Earthen Wall Building Systems - AU104.4.3.23

ASTM BS1, ASTM BS EN 459—2015 Part 1: Building Lime. Definitions, Specifications and Conformity Criteria; Part 2: Test Methods - AU104.4.6.1

MODIFICATION

Public Comment 1

**APPENDIX U  
COB CONSTRUCTION (MONOLITHIC ADOBE)**

**AU104.1 General.** *Cob* walls shall not require a *finish*, except as required by Section AU104.2. Finishes applied to *cob* walls shall comply with this section and with Chapters 3 and 7 unless stated otherwise in this section.~~be plasters in accordance with Section AU104.4, non-plaster exterior wall coverings in accordance with Section R703 or other finish systems in accordance with the following:~~

~~1. Specifications and details of the finish system’s means of attachment to the wall or its independent support and means of draining or evaporating water that penetrates the exterior finish shall be provided.~~

~~2. The vapor permeance of the combination of finish materials shall be 5 perms or greater to allow the transpiration of water vapor from the wall.~~

~~3. Finish systems with weights >10 and ≤ 20 pounds per square foot (> 48.9 and ≤ 97.8 kg/m~~~~2~~~~) of wall shall require that the minimum total length of braced wall panels in Table AU106.11(3) be multiplied by a factor of 1.2.~~

~~4. Finish systems with weights > 20 pounds per square foot (> 97.8 kg/m~~~~2~~~~) of wall area shall require an engineered design.~~

**AU104.1.1 Interior wall finishes.**  Where installed, interior wall finishes and interior fire protection shall comply with the applicable provisions of Section R302, and shall be plasters in accordance with Section AU104.4, or non-plaster wall coverings in accordance with Section R702.

**AU104.1.2  Exterior wall finishes.** Where installed, exterior wall finishes shall be plasters in accordance with Section AU104.4, or non-plaster exterior wall coverings in accordance with Section R703, or other finish system in accordance with the following:

1. Specifications and details of the finish system’s means of attachment to the wall or its independent support and means of draining or evaporating water that penetrates the exterior finish shall be provided.

2. The vapor permeance of the combination of finish materials shall be 5 perms or greater to allow the transpiration of water vapor from the wall.

3. Finish systems with weights >10 and ≤ 20 pounds per square foot (> 48.9 and ≤ 97.8 kg/m2) of wall shall require that the minimum total length of braced wall panels in Table AU106.11(3) be multiplied by a factor of 1.2.

4. Finish systems with weights > 20 pounds per square foot (> 97.8 kg/m2) of wall area shall require an engineered design.

**AU105.2 Building limitations and requirements for cob wall construction.** *Cob* walls shall be subject to the following limitations and requirements:

1. Number of stories: not more than one.

2. *Building* height: not more than ~~25~~ 20 feet (~~7620~~ 6096 mm).

3. Seismic design categories: limited to use in Seismic Design Categories A, B and C, except where an *approved* engineered design is provided.

4. Wall height: in accordance with Table ~~AU105.~~4 AU105.3, and with Table AU106.11(1) for *braced wall panels*.

5. Wall thickness, excluding finish, shall be not less than 10 inches, not greater than 24 inches at the top two-thirds, not limited at the bottom third and, for structural walls, shall comply with Section AU106.2(2). Wall taper is permitted in accordance with Section AU106.5(1).

6. Interior *cob* walls shall require an *approved* engineered design that accounts for the seismic load of the interior *cob* walls, except in Seismic Design Category A for walls with a height to thickness ratio ≤ to 6.

**TABLE AU105.3**

**OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL HEIGHT LIMITS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **WALL TYPEa, g, h**  **and**  **METHOD OF**  **OUT-OF-PLANE LOAD RESISTANCE** | **FOR ULTIMATE DESIGN WIND SPEEDS**  **(mph)** | **FOR SEISMIC DESIGN CATEGORIES** | **UNRESTRAINED COB WALL HEIGHT Hb, c** | | **TOP ANCHORe SPACING**  **(inches)** | **TENSION TIEf SPACING**  **(inches)** |
| **Absolute limit in feet** | **Limit based on wall thickness Td**  **in feet** |
| Wall 1i: no anchors, no steel wall reinforcing | ≤ 110 | A | *H* ≤ 8 | *H* ≤ 6*T* | none | 48 |
| Wall 2: top anchorsj, continuous vertical 6”x6”x6 gage steel mesh in center of wall embedded in foundation 12” | ≤ 140 | A, B, C | *H* ≤ 8 | *H* ≤ 8*T* | 12 | 24 |
| Wall Ai: top anchors, no vertical steel reinforcing | ≤ 120 | A, B | *H* ≤ 8 | *H* ≤ 6*T* | 12 | 48 |
| Wall Bi: top & bottom anchors, no vertical steel reinforcing | ≤ 130 | A, B | *H* ≤ 8 | *H* ≤ 6*T* | 12 | 48 |
| Wall C: top and bottom anchors, continuous vertical threaded rod at 4’ oc embedded in foundation and connected to bond beam | ≤ 140 | A, B, C | *H* ≤ 8 | *H* ≤ 8*T* | 12 | 24 |
| Wall D: continuous vertical threaded rod at 1’ oc embedded in foundation and connected to bond beam | ≤ 140 | A, B, C | *H* ≤ 8 | *H* ≤ 8*T* | NA | 24 |
| Wall E: top anchors, continuous vertical 6”x6”x6 gage steel mesh 2” from each face of wall embedded in foundation | ≤ 140 | A, B, C | *H* ≤ 8 | *H* ≤ 8*T* | 12 | 24 |

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

N/A = Not Applicable

a. See Table AU106.11(1) for reinforcing and anchorage specifications for wall types A, B, C, D and E.

b.  *H* = height of the cob portion of the wall only. See Figure AU101.4. The maximum H is the absolute limit or the limit based on wall thickness, whichever is more restrictive.

c. Bond beams or other horizontal restraints are capable of separating a wall into more than one unrestrained wall height with an *approved* engineered design.

d.  *T* = Cob wall thickness (in feet) at its minimum, without plaster.

e. 5/8-inch threaded rod anchors at prescribed spacing with 12” embedment in cob, full embedment in concrete bond beams or full penetration in wood bond beam with a nut and washer.

f. Attach rafters to bond beam with 4-inch by 3-inch by 3-inch by 18 gage tension tie angles at prescribed spacing. See Figure ~~R608.9(9)~~ AU106.9.5. Where rafters are attached to tension ties shall, roof sheathing shall be edge nailed.

g. All walls shall be tested for compressive strength in accordance with Section AU106.6.

h. For curved walls with an arc length:radius ratio of 1.5:1 or greater, the H/T factor shall be increased by 1, and the absolute height limit by 1 foot.

i. Wall type requires a modulus of rupture test in accordance with Section AU106.7.

j. See wall type A in Table AU106.11(1) for top anchor requirements.

**AU105.5 Inspections.** The *building official* shall inspect the following aspects of *cob* *construction* in addition to the required tests of, and accordance with Section R109.1:

1. Anchors and vertical and horizontal reinforcing in *cob* walls, where required in accordance with Tables ~~AU105.~~2 AU105.3 and AU106.11(1) and Sections AU105.3.4 and AU105.3.5.

2. Reinforcing in any concrete bond beams or lintels, in accordance with Sections AU106.9.2 and Table AU106.10.

**AU106.2 Requirements for cob structural walls.** In addition to the requirements of Section AU105.2, *cob* *structural walls* shall be subject to the following:

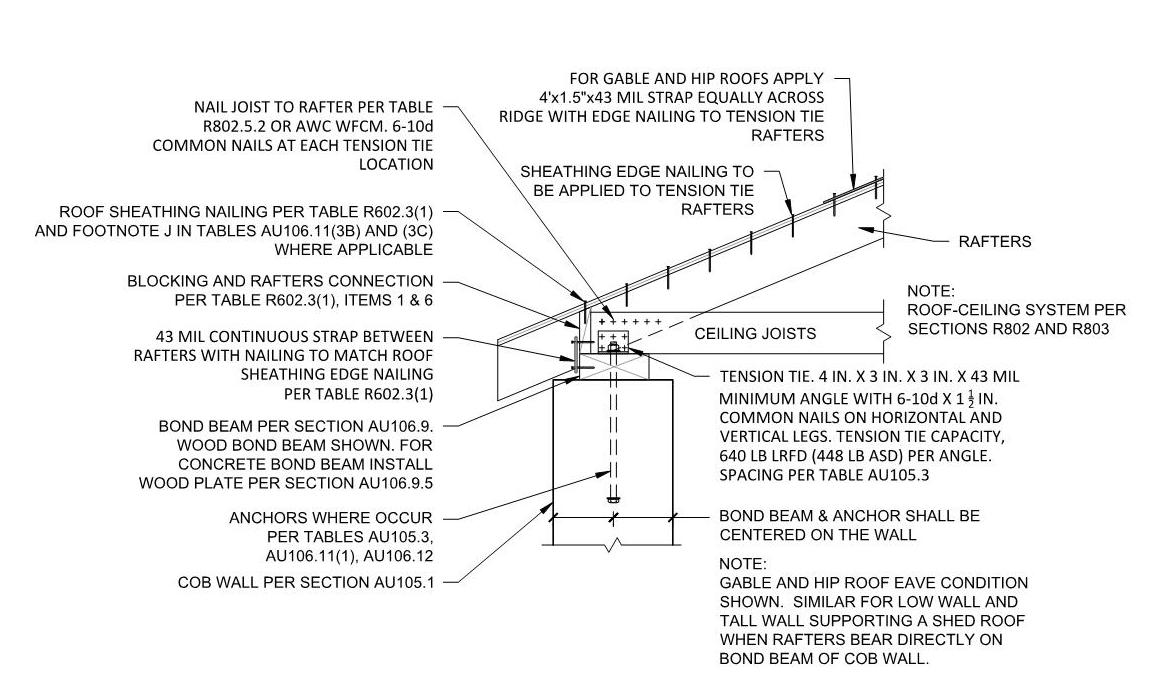
1. Wall height: shall be in accordance with Table AU105.3 for load-bearing cob walls or AU106.11(1) for cob braced wall panels, as applicable and most restrictive.

2. Wall thickness: shall be in accordance with Section AU105.2(5) and Section AU106.8.1 for load-bearing cob walls or Table AU106.11(1) for cob braced wall panels, as applicable and most restrictive.

3. *Braced wall panel* lengths: for *buildings* using *cob braced wall panels*, the greater of the values determined in accordance with Tables AU106.11(2) for wind loads and AU106.11(3A), AU106.11(3B), or AU106.11(3C) for seismic loads shall be used.

**AU106.9.1.3 Corners and curved walls.** Wood bond beams at corners and discontinuities atop curved walls shall be connected across their exterior faces with a metal strap with a capacity of not less than that determined ~~in~~ in accordance with Section AU106.9.1.2.

**AU106.9.5 Connection of roof framing to bond beams.** Roof and ceiling framing shall be attached to bond beams in accordance with Table R602.3(1), Items 2~~,~~ and 6~~, 30, 31 and 32~~ and Figure AU106.9.5. Roof sheathing shall be attached to roof framing in accordance with Figure AU106.9.5. ~~Tension ties shall be provided in accordance with Figure R608.9(9) and Footnote f of Table AU105.3. 10d toe nails at 6 inches (152 mm) on center shall be provided from the rim blocking to top plate for the entirety of braced wall lines, instead of the43 mil strap shown in Figure R608.9(9).~~ A minimum nominal 2-inch by 6-inch (51 mm by 152 mm) wood plate shall be installed on concrete bond beams with 5/8-inch (16 mm) diameter anchor bolts with 5-inch (127 mm) embedment at 2 feet (610 mm) on center to allow the required fastening of roof and ceiling framing, including tension ties and straps ~~toe nailing of rim blocking~~.

****

**FIGURE AU106.9.5**

**CONNECTION OF ROOF FRAMING TO BOND BEAMS**

**AU106.9.6 Bond beams and connections at gable and shed roof end walls.** Bond beams and connections at end walls of buildings with gable roofs or and shed roofs shall comply with Figure AU106.9.6 and the following:

1. End walls shall not exceed 20 feet (6096 mm) in length.

2. ~~Shall~~ Bond beams shall be continuous and straight for the entire wall line.

3. Wood bond beams when used shall comply with the following:

3.1. Not less than nominal 4x8 (102 mm by 203 mm) when wind design governs in accordance with Tables AU106.11(2), and when seismic design governs in accordance with Tables AU106.11(3A), AU106.11(3B), or AU106.11(3C), ~~and~~ for wall lengths ≤ 20 feet (6096 mm) in Seismic Design Category A, ~~and for~~ or wall lengths ≤ 10 feet (3048 mm) in Seismic Design Categories B and C.

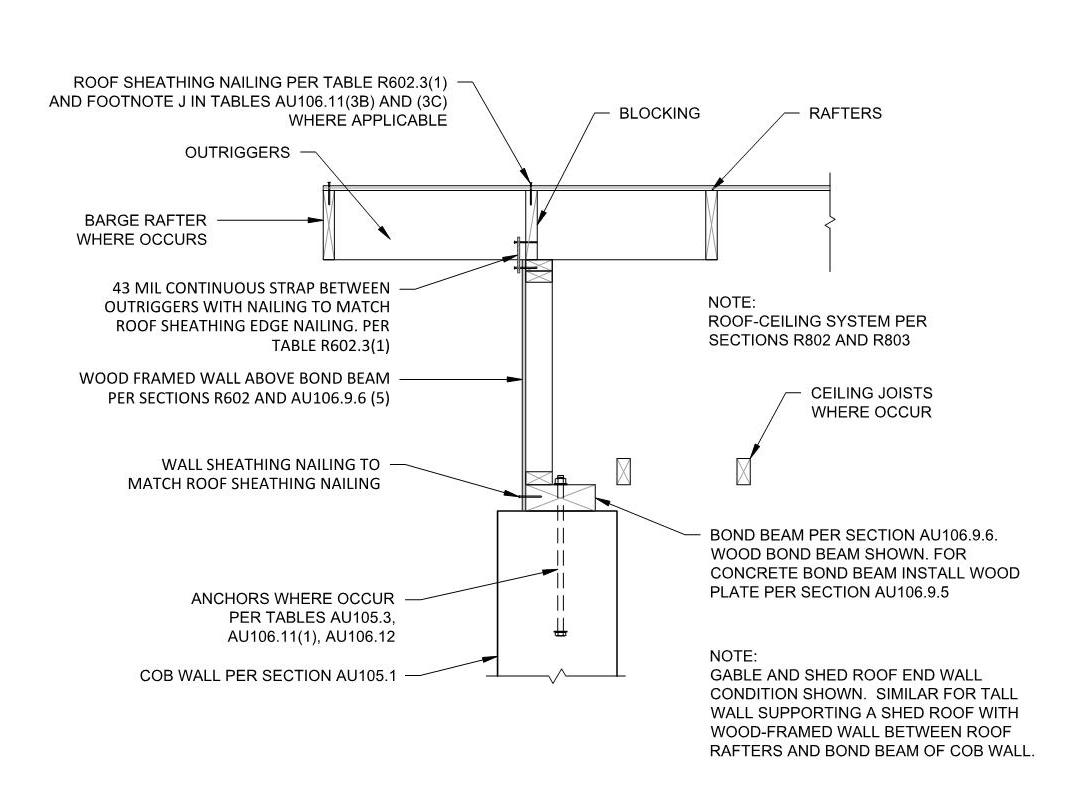
3.2. Not less than nominal 4x10 (102 mm by 254 mm) for wall lengths ≤ 20 feet (6096 mm) in Seismic Design Category B.

3.3. Not less than nominal 6x12 (152 mm by 305 mm) or 4x16 (102 mm by 406 mm) for wall lengths ≤ 20 feet (6096 mm) in Seismic Design Category C.

3.4. Corners shall be connected in accordance with Section AU106.9.3.

4. Concrete bond beams when used shall be in accordance with Section AU106.9.2 in Seismic Design Categories A, B, and C and for ultimate design wind speeds ≤ 140 mph (63.6 m/s).

5. Walls between thebond beam and roof shall be of wood-framed construction in accordance with Section R602. The ratio of its largest height to its length shall not exceed 1:2. The wall shall contain no openings.

****

**FIGURE AU106.9.6**

**CONNECTIONS AT GABLE AND SHED ROOF END WALLS**

**AU106.11.1 Non-orthogonal braced wall panels.** *Braced wall panels* at an angle to the orthogonal braced wall lines shall be considered to contribute to the minimum total braced wall lengths in Tables AU106.11(2),~~and~~ AU106.11(3A),AU106.11(3B), and AU106.11(3C) as follows:

1. A braced wall panel not more than 45 degrees and greater than 30 degrees to an adjacent orthogonal braced wall line shall contribute 50% of its length to that line.

2. A braced wall panel not more than 30 degrees to an orthogonal braced wall line shall contribute 65 percent of its length to that line.

3. A braced wall panel greater than 45 degrees and not more than 60 degrees to an orthogonal braced wall line shall contribute 35 percent of its length to that line.

4. The angle of a curved braced wall panel to a braced wall line shall be determined with the chord of that section of wall, connecting the end points of the arc at the center of the wall.

**AU106.11.2 Braced wall lines for buildings with curved walls.** Buildings with curved *cob* walls shall contain two braced wall lines in two orthogonal directions. The spacing of the braced wall lines for wind design in Table AU106.11(2) and the spacing and length of the braced wall lines for seismic design in Tables AU106.11(3A),AU106.11(3B) and AU106.11(3C) shall be the maximum widths of the building in the two orthogonal directions.

**TABLE AU106.11(2)**

**BRACING REQUIREMENTS FOR COB BRACED WALL PANELS BASED ON WIND SPEED**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **EXPOSURE CATEGORY Bd**  • **25-FOOT MEAN ROOF HEIGHT**  • **10-FOOT EAVE-TO-RIDGE HEIGHTd**  • **10-FOOT WALL HEIGHTd**  • **2 BRACED WALL LINESd** | | | **MINIMUM TOTAL LENGTH (FEET) OF COB BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINEa, b, c, d** | | | |
| **Ultimate Design Wind Speed**  **(mph)** | **Story Location** | **Braced Wall Line Spacing (feet)** | **Cob braced wall panele** **A**  **(aspect ratio**  **H:L ≤ 1:1)** | **Cob braced wall panele** **B**  **(aspect ratio**  **H:L ≤ 1:1)** | **Cob braced wall panele** **C, D**  **(aspect ratio**  **H:L ≤ 2:1)** | **Cob braced wall panele** **E**  **(aspect ratio**  **H:L ≤ 1:1)** |
| ~~10~~ ≤ 110 | ~~6.~~0 One-story building | ~~6.0~~10 | ~~3.~~7 6.0 | ~~NP~~ 6.0 | 3.7 | 6.0 |
| ≤ 110 | One-story building | 20 | 7.9 | 7.4 | 7.4 | ~~NP~~ 6.0 |
| ~~30~~ ≤ 110 | ~~11.~~8 One-story building | ~~11.~~0 30 | ~~11.~~0 11.8 | ~~NP~~ 11.0 | 11.0 | 6.9 |
| ~~10~~ ≤ 115 | ~~6.~~0 One-story building | ~~6.~~0 10 | ~~4.~~1 6.0 | ~~NP~~ 6.0 | 4.1 | 6.0 |
| ≤ 115 | One-story building | 20 | 8.7 | 8.1 | 8.1 | ~~NP~~ 6.0 |
| ~~30~~ ≤ 115 | ~~13.~~0 One-story building | ~~12.~~1 30 | ~~12.1~~ ​​​​​​​13.0 | ~~NP~~ 12.1 | 12.1 | 7.6 |
| ~~10~~ ≤ 120​​​​​​​ | ~~6.~~0 One-story building | ~~6.~~0 10 | ~~4.~~4 6.0 | ~~NP~~ 6.0 | 4.4 | 6.0 |
| ≤ 120 | One-story building | 20 | 9.4 | 8.8 | 8.8 | ~~NP~~ 6.0 |
| ~~30~~ ≤ 120 | ~~14.~~1 One-story building​​​​​​​ | ~~13.~~1 30 | ~~13.~~1 14.1 | ~~NP~~ 13.1 | 13.1 | 8.3 |
| ~~10~~ ≤ 130 | ~~6.~~0 One-story building​​​​​​​ | ~~6.~~0 10 | ~~5.~~1 6.0 | ~~NP~~ 6.0 | 5.1 | 6.0 |
| ≤ 130 | One-story building | 20 | 11.0 | 10.3 | 10.3 | ~~NP~~ 6.5 |
| ~~30~~ ≤ 130​​​​​​​ | ~~16.~~5 One-story building | ~~15.~~4 30 | ~~15.~~4 16.5 | ~~NP~~ 15.4 | 15.4 | 9.7 |
| ~~10~~ ≤ 140​​​​​​​ | ~~6.~~0 One-story building​​​​​​​ | ~~6.~~0 10 | ~~5.~~9 6.0 | ~~NP~~ 6.0 | 5.9 | 6.0 |
| ≤ 140 | One-story building | 20 | 12.7 | 11.9 | 11.9 | ~~NP~~ 7.5 |
| ~~30~~ ≤ 140 | ~~19.~~1 One-story building | ~~17.8~~ ​​​​​​​30 | ~~17.~~8 19.1 | ~~NP~~ 17.8 | 17.8 | 11.2 |

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

a. Linear interpolation shall be permitted.

b. Braced wall panels shall be without openings.

c. Braced wall panel types A, B and E shall have an aspect ratio (H:L) ≤ 1:1. Braced wall panel types C and D shall have an aspect ratio (H:L) ≤ 2:1.

d. Subject to applicable wind adjustment factors associated with Items 1 and 2 of Table R602.10.3(2)

e.  *Cob* braced wall panel types indicated shall comply with Sections AU106.11.1, AU106.11.2 and Table AU106.11(1).

**TABLE AU106.11(3A)**

**BRACING REQUIREMENTS FOR COB-BRACED WALL PANELS BASED ON SEISMIC DESIGN CATEGORY A**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **SOIL CLASS D~~e~~f**  • **TOTAL WALL HEIGHT = 10 FEET (INCLUDING STEM WALL AND BOND BEAM)**  • **COB WALL HEIGHT PER TABLE AS106.11(1)**  • **15 PSF ROOF-CEILING DEAD LOADd**  • **STORY LOCATION: ONE-STORY BUILDING**  • **SEISMIC DESIGN CATEGORY A**  • **1.5”** **PLASTER THICKNESS EACH SIDE~~h~~g** | | | | **MINIMUM TOTAL LENGTH (FEET) OF COB- BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINEa, b, c, d, e** | | |
| **Braced wall line spacing (feet)** | **Braced wall line length (feet)** | **Min. Braced wall line % openings** | **Min. Perpendicular braced wall line % openings** | **Cob-braced wall paneleA, B** | **Cob-braced wall paneleC, D** | **Cob-braced wall paneleE** |
| 10 | 30 | ~~Any %~~~~g~~0 | ~~Any %~~~~g~~ 0 | ~~Wind~~~~i~~ | ~~Wind~~~~i~~ 3.4 | ~~NP~~ 6.0 |
| 20 | 20 | ~~Any %~~~~g~~0 | ~~Any %~~~~g~~ 0 | ~~Wind~~~~i~~ | ~~Wind~~~~i~~ 3.5 | ~~NP~~ 6.0 |
| 20 | 30 | ~~Any %~~~~g~~ 0 | ~~Any %~~~~g~~ 0 | ~~Wind~~~~i~~ | 4.5 | ~~NP~~ 6.0 |
| 30 | 30 | ~~Any %~~~~g~~ 0 | ~~Any %~~~~g~~ 0 | ~~Wind~~~~i~~ | ~~Wind~~~~i~~ 5.6 | ~~NP~~ 6.0 |

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

a. Interpolation is not permitted.

b. Braced wall panels shall be without openings.

c. Braced wall panel types A, B and E shall have an aspect ratio (H:L) ≤ 1:1. Braced wall panel types C and D shall have an aspect ratio (H:L) ≤ 2:1.

d. Subject to applicable seismic adjustment factors associated with item 5 in Table R602.10.3(4).

e. Cob braced panel types indicated shall comply with Section~~s~~ AU106.11~~.1 and AU106.11.2~~ and Table AU106.11(1).

f. Wall bracing lengths are based on a soil site class “D.” Interpolation of bracing lengths between *Sds* values associated with the seismic design categories is allowable where a site-specific *Sds* value is determined in accordance with Section 1613.3 of the *International Building Code*.

~~g. Openings in the braced wall line shall not be limited, except that the minimum total braced wall panel length shall be as determined by Tables AU106.11(3A) and AU106.11(2).~~

~~h~~g. For total plaster thickness between 3-inches and 6-inches, the minimum total length of braced wall panels shall be mulitplied by 1.2.

~~i. The minimum total braced wall panel length shall be governed by Table AU106.11(2).~~

**AU106.11(3B)**

**BRACING REQUIREMENTS FOR COB-BRACED WALL PANELS BASED ON SEISMIC DESIGN CATEGORY B**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **SOIL CLASS D~~e~~f**  • **TOTAL WALL HEIGHT = 10 FEET (INCLUDING STEM WALL AND BOND BEAM)**  • **COB WALL HEIGHT PER TABLE AS106.11(1)**  • **15 PSF ROOF-CEILING DEAD LOADd**  • **STORY LOCATION: ONE-STORY BUILDING**  • **SESIMIC DESIGN CATEGORY B**  • **1.5”** **PLASTER THICKNESS EACH SIDE~~h~~g** | | | | **MINIMUM TOTAL LENGTH (FEET) OF COB- BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINEa, b, c, d, e** | | |
| **Braced wall line spacing (feet)** | **Braced wall line length (feet)** | **Min. Braced wall line % openings** | **Min. Perpendicular braced wall lines % openings** | **Cob-braced wall paneleA, B** | **Cob-braced wall paneleC, D** | **Cob-braced wall paneleE** |
| 10 | 10 | ~~Any %~~~~g~~ 0 | ~~Any %~~~~g~~0 | ~~Wind~~~~i~~6.0 | ~~Wind~~~~i~~3.2 | ~~NP~~ 6.0 |
| 10 | 20 | 0 | ~~Any %~~~~g~~0 | 6.0 | 4.9 | ~~NP~~ 6.0 |
| 10 | 20 | 50 | ~~Any %~~~~g~~0 | 6.0 | ~~Wind~~~~i~~3.5 | ~~NP~~ 6.0 |
| 10 | 30 | 0 | ~~Any %~~~~g~~0 | 7.1 | 6.6 | ~~NP~~ 6.0 |
| 10 | 30 | 50 | ~~Any %~~~~g~~0 | 6.0 | 4.5 | ~~NP~~ 6.0 |
| 20 | 10 | 0 | 0 | 6.0~~j~~h | 4.9~~j~~h | ~~NP~~ 6.0 |
| 20 | 10 | 0 | 50 | 6.0 | ~~Wind~~~~i~~3.5 | ~~NP~~ 6.0 |
| 20 | 10 | 50 | ~~Any %~~~~g~~0 | ~~6.0~~NP | 4.2 | NP |
| 20 | 10 | 50 | 50 | ~~6.0~~NP | ~~4.2~~3.0 | NP |
| 20 | 20 | 0 | 0 | 7.4 | 6.9 | ~~NP~~ 6.0 |
| 20 | 20 | 0 | 50 | 6.0 | 5.5 | ~~NP~~ 6.0 |
| 20 | 20 | 50 | 0 | 6.0 | 5.5 | ~~NP~~ 6.0 |
| 20 | 20 | 50 | 50 | 6.0 | 4.1 | ~~NP~~ 6.0 |
| 20 | 30 | 0 | 0 | 9.4 | 8.8 | ~~NP~~ 6.0 |
| 20 | 30 | 0 | 50 | 7.9 | 7.4 | ~~NP~~ 6.0 |
| 20 | 30 | 50 | 0 | 7.2 | 6.7 | ~~NP~~ 6.0 |
| 20 | 30 | 50 | 50 | 6.0 | 5.3 | ~~NP~~ 6.0 |
| 30 | 10 | ~~Any %~~~~g~~ 0 | ~~Any %~~~~g~~ 0 | ~~Wind~~~~i~~7.1 | ~~Wind~~~~i~~6.6 | ~~NP~~ 6.0 |
| 30 | 20 | 0 | 0 | 9.4 | 8.8 | ~~NP~~ 6.0 |
| 30 | 20 | 0 | 50 | ~~Wind~~~~i~~ 7.2 | ~~Wind~~~~i~~ 6.7 | ~~NP~~ 6.0 |
| 30 | 20 | 50 | ~~Any %~~~~g~~ 0 | 7.9 | ~~Wind~~ 7.4 | ~~NP~~ 6.0 |
| 30 | 30 | 0 | 0 | 11.8 | 11.0 | ~~NP~~6.0 |
| 30 | 30 | 0 | 50 | 9.5 | 8.9 | ~~NP~~ 6.0 |
| 30 | 30 | 50 | 0 | 9.5 | 8.9 | ~~NP~~ 6.0 |
| 30 | 30 | 50 | 50 | ~~Wind~~~~i~~ 7.3 | ~~Wind~~~~i~~ 6.8 | ~~NP~~ 6.0 |

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

NP = Not Permitted

a. Interpolation is not permitted.

b. Braced wall panels shall be without openings.

c. Braced wall panel types A, B and E shall have an aspect ratio (H:L) ≤ 1:1. Braced wall panel types C and D shall have an aspect ratio (H:L) ≤ 2:1.

d. Subject to applicable seismic adjustment factors associated with Item 5 in Table R602.10.3(4)

e. Cob braced panel types indicated shall comply with Section~~s~~ AU106.11~~.1, AU106.11.2~~ and Table AU106.11(1).

f. Wall bracing lengths are based on a soil site class “D.” Interpolation of bracing lengths between *Sds* values associated with the seismic design categories is allowable where a site-specific *Sds* value is determined in accordance with Section 1613.3 of the *International Building Code*.

~~g. Openings in the braced wall line shall not be limited, except that the minimum total braced wall panel length shall be as determined by Tables AU106.11(3A) and AU106.11(2).~~

~~h.~~g.  For total plaster thicknesses 3-inches to 6-inches, the minimum total length of braced wall panels shall be multiplied by 1.2.

~~i. The minimum total braced wall panel length shall be governed by Table AU106.11(2).~~

~~j.~~h.  Total plaster thicknesses shall be not greater than 3-inches. Substitute 15/32” roof sheathing and 10d at 6” edge nailing for requirements in Table R602.3(1).

**AU106.11(3C)**

**BRACING REQUIREMENTS FOR COB-BRACED WALL PANELS BASED ON SEISMIC DESIGN CATEGORY C**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| • **SOIL CLASS D~~e~~f**  • **TOTAL WALL HEIGHT = 10 FEET (INCLUDING STEM WALL AND BOND BEAM)**  • **COB WALL HEIGHT PER TABLE AS106.11(1)**  • **15 PSF ROOF-CEILING DEAD LOADd**  • **STORY LOCATION: ONE-STORY BUILDING**  • **SESIMIC DESIGN CATEGORY C**  • **1.5”** **PLASTER THICKNESS EACH SIDE~~h~~g** | | | | **MINIMUM TOTAL LENGTH (FEET) OF COB- BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINEa, b, c, d, e** | | |
| **Braced wall line spacing (feet)** | **Braced wall line length (feet)** | **Min. Braced wall line % openings** | **Min. Perpendicular braced wall lines % openings** | **Cob-braced wall paneleA, B** | **Cob-braced wall paneleC, D** | **Cob-braced wall paneleE** |
| 10 | 10 | 0 | 0 | 8.3~~i~~h | 7.8~~i~~h | ~~NP~~ 6.0 |
| 10 | 10 | 0 | 50 | 6.5 | 6.1 | ~~NP~~ 6.0 |
| 10 | 10 | 25 | 0 | 7.4~~i~~h | 6.9~~i~~ | ~~NP~~ 6.0 |
| 10 | 10 | 50 | 50 | ~~4.~~7 NP | 4.4 | ~~NP~~ 6.0 |
| 10 | 15 | 0 | 0 | 10.6 | 9.9 | ~~NP~~ 6.0 |
| 10 | 15 | 0 | 50 | 8.7 | 8.2 | ~~NP~~ 6.0 |
| 10 | 15 | 50 | 0 | ~~7.8~~​​​​​ NP | 7.3 | ~~NP~~ 6.0 |
| 10 | 15 | 50 | 50 | 6.0 | 5.6 | ~~NP~~ 6.0 |
| 10 | 20 | 0 | 0 | 12.8 | 11.9 | ~~NP~~ 6.0 |
| 10 | 20 | 0 | 50 | 11.0 | 10.2 | ~~NP~~ 6.0 |
| 10 | 20 | 50 | 0 | 9.1 | 8.5 | ~~NP~~ 6.0 |
| 10 | 20 | 50 | 50 | 7.3 | 6.8 | ~~NP~~ 6.0 |
| 15 | 10 | 25 | 0 | ~~9.6~~ NP | ~~9.0~~ NP | ~~NP~~ 6.0h |
| 15 | 10 | 0 | 50 | 7.8 | 7.3 | ~~NP~~ 6.0 |
| 15 | 10 | 50 | 0 | ~~8.7~~ NP | ~~8.2~~ NP | NP |
| 15 | 10 | 50 | 50 | ~~6.0~~ ​​​​​​​NP | ~~5.6~~ ​​​​​​​NP | NP |
| 15 | 15 | 0 | 0 | 12.9 | 12.1 | ~~NP~~ 6.0 |
| 15 | 15 | 0 | 50 | 10.2 | 9.5 | ~~NP~~ 6.0 |
| 15 | 15 | 50 | 0 | ~~10.2~~ ​​​​NP | ~~9.5~~ NP | ~~NP~~ 6.0 |
| 15 | 15 | 50 | 50 | 7.5 | 7.0 | ~~NP~~ 6.0 |
| 15 | 20 | 0 | 0 | 15.3 | 14.3 | ~~NP~~ 6.0 |
| 15 | 20 | 0 | 50 | 12.6 | 11.7 | ~~NP~~ 6.0 |
| 15 | 20 | 50 | 0 | ~~11.7~~ ​​​​​​​NP | ~~10.9~~ ​​​​​​​NP | ~~NP~~ 6.0 |
| 15 | 20 | 50 | 50 | 8.9 | 8.3 | ~~NP~~ 6.0 |
| 20 | 10 | 25 | 0 | NP | NP | NP |
| 20 | 10 | 0 | 50 | 9.1 | 8.5 | ~~NP~~ 6.0 |
| 20 | 10 | 50 | ~~Any %~~~~g~~ 0 | NP | NP | NP |
| 20 | 10 | 50 | 50 | ~~7.3~~ ​​​​​​​NP | ~~6.8~~ ​​​​​​​NP | NP |
| 20 | 15 | 0 | 0 | NP | ~~NP~~ 14.3h | ~~NP~~ 6.0h |
| 20 | 15 | 0 | 50 | 11.7~~i~~h | 10.9~~i~~h | ~~NP~~ 6.0 |
| 20 | 15 | 50 | 0 | NP | NP | ~~NP~~ 6.0h |
| 20 | 15 | 50 | 50 | ~~8.9~~~~i~~NP | ~~8.3~~~~i~~​​​​​​​NP | ~~NP~~ 6.0 |
| 20 | 20 | 0 | 0 | ~~NP~~ 17.8 | ~~NP~~ 16.7 | ~~NP~~ 6.9 |
| 20 | 20 | 0 | 50 | 14.2 | 13.3 | ~~NP~~ 6.0 |
| 20 | 20 | 50 | 0 | NP | NP | ~~NP~~ 6.0 |
| 20 | 20 | 50 | 50 | NP | 9.9 | ~~NP~~ 6.0 |

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

NP = Not Permitted

a. Interpolation is not permitted.

b. Braced wall panels shall be without openings.

c. Braced wall panel types A, B and E shall have an aspect ratio (H:L) ≤ 1:1. Braced wall panel types C and D shall have an aspect ratio (H:L) ≤ 2:1.

d. Subject to applicable seismic adjustment factors associated with item 5 in Table R602.10.3(4).

e. Cob braced panel types indicated shall comply with Section~~s~~ AU106.11~~.1, AU106.11.2~~ and Table AU106.11(1).

f. Wall bracing lengths are based on a soil site class “D.” Interpolation of bracing lengths between *Sds* values associated with the seismic design categories is allowable where a site-specific *Sds* value is determined in accordance with Section 1613.3 of the *International Building Code*.

~~g. Openings in the braced wall line shall not be limited, except that the minimum total braced wall panel length shall be as determined by Tables AU106.11(3A) and AU106.11(2).~~

~~h.~~g.  For total plaster thicknesses 3” to 6”, multiply the minimum total length of braced wall panels by 1.2.

~~i.~~ ​​​​​​​h.  Total plaster thickness > 3” is not permitted. Substitute 15/32” roof sheathing and 10d at 6” edge nailing for requirements in Table R602.3(1).

**AU108.1 Fire-resistance rating.** *Cob* walls ~~shall be considered to exhibit a 1-hour~~are not fire-resistance rated. ~~rating in accordance with the following:~~

~~1. Wall thickness shall be 10 inches (254 mm) or greater.~~

~~2. Density shall be 70 pcf (1121 kg/m~~~~3~~~~) or greater.~~

~~3. When used as a~~*~~load-bearing wall~~*~~, the maximum design load shall be 1000 pounds per lineal foot (14,590 N/m) in accordance with Section AS106.8.~~

~~4. When used as a~~*~~braced wall panel~~*~~, the wall shall be in accordance with Section AS106.11.~~

**(S8962)(RB299-19 AMPC1)**

## Appendix U 3D PRINTED BUILDING CONSTRUCTION

## SECTION U101 GENERAL

## U101 Scope. Buildings, structures and building elements fabricated in whole or in part using 3D printed construction techniques shall be designed, constructed and inspected in accordance with the provisions contained in this Appendix and other applicable requirements in this code.

## SECTION U102 DEFINITIONS

## U102.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

**3D PRINTED BUILDING CONSTRUCTION**. A process for fabricating buildings, structures and building elements from 3D model data using automated equipment that deposits construction material in a layer upon layer fashion.

**FABRICATION PROCESS**. Preparation of the job site and construction material, and the deposition, curing, finishing, insertion of components and other methods used to construct building elements such as walls, partitions, roof assemblies and structural components, and the means used to connect assemblies together.

<Other definitions unchanged>

## SECTION U103 BUILDING DESIGN

## U103.1 Design organization. 3D printed buildings, structures and building elements shall be designed by an organization certified in accordance with UL 3401 by an approved agency and approved by the building official in accordance with this section.

## U103.2 Design approval ~~Engineered design~~. The ~~plans included in the~~ structural design, construction documents, and UL 3401 report of findings shall be submitted for review and approval in accordance with Section 104.11 of this code.

## SECTION U104 BUILDING CONSTRUCTION

## U104.1 Construction. 3D printed buildings, structures, and building elements ~~and structures~~ shall be constructed in accordance with this section.

## U104.2 Construction method. The building construction method, consisting of the manufacturer’s *production equipment* and *fabrication process* shall be in accordance with the UL 3401 ~~compliance~~ report of findings. The unique identifier of the construction method used shall match the identifier in the UL 3401 ~~compliance~~ report of findings.

## U104.3 Additive manufacturing materials. Only the listed *additive manufacturing materials* identified in the UL 3401 ~~compliance~~ report of findings shall be used to fabricate the building structure or system components. Containers of the additive manufacturing materials shall be labeled.

## U104.4 Depositing of manufacturing materials. Manufacturing materials shall only be deposited where ambient temperature and environmental conditions at the job site are within limits specified in the UL 3401 ~~compliance~~ report of findings. The maximum number of layers permitted, specified curing time and any surface preparation or finishing shall be performed as specified in the UL 3401 ~~compliance~~ report of findings.

## SECTION U105 SPECIAL INSPECTIONS

## U105.1 Initial inspection. An initial inspection of the *production equipment*, including 3D printer, and the *fabrication process* shall be performed after the *production equipment* is located onsite and before building fabrication has begun. The inspection shall be conducted by representatives of the approved agency that evaluated the *fabrication process* for compliance with UL 3401. The inspection shall verify that the *fabrication~~s~~ process*, including *production equipment*, 3D printing parameters and additive manufacturing materials are in accordance with the UL 3401 ~~compliance~~ report of findings, and the proprietary information in the UL 3401 detailed report of findings.

**Exception:** Where approved by the building official, inspections of the *production equipment*, including 3D printer, and the *fabrication process* used in a single housing tract shall be conducted on the first building to be constructed, and on a selected number of subsequent buildings, where the same equipment, equipment operators and *fabrication process* are used on all buildings. The number of inspections to be performed shall be determined by the building official.

(**S8963) (RB302-19 AMPC1)**