

# Florida Building Code



Welcome to At Your Pace Online's continuing education course for Florida contractors. This lesson will cover the Advanced Florida 2010 Building Code Education requirements. The building codes are big and so we won't be able to cover the whole thing. Instead we will be providing you with an overview of select portions of the code so that you'll be familiar with the requirements.

We will be covering the residential codes, chapter 6-wall construction. This course will present a review of the Florida Building Code requirements for residential wooden wall framing and construction, concrete wall construction, window and door installation, structural insulated panel wall construction, combined concrete/masonry/ICF/wood wall construction, impact resistant wall coverings, and soffit installation.

This overview isn't a replacement for knowing the actual code but will help you know exactly where to find the answers to your technical questions.

## Florida Building Code - Residential Code

The Florida building codes are divided into a number of different volumes. These volumes are: building, residential, existing building, energy conservation, fuel gas, plumbing, mechanical, test protocols, and accessibility code.

This course will be covering a portion of the residential code. The scope of the residential code is given in chapter 1 of the residential code. Codes from the residential section are marked with the designator "R" such as R503.4 and R101.1.2.



Certain sections of the code are marked as "reserved". We will not be covering any of the reserved sections. There are many reasons why a section may be reserved and if you have questions about a specific reserved section you will want to contact the Florida Department of Business and Professional Regulation.

# SECTION R101 GENERAL

## R101.1 Title.

These provisions shall be known as the Florida Building Code, Residential and shall be cited as such and will be referred to herein as "this code."

## R101.2 Scope.

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

### Exceptions:

1. Live/work units complying with the requirements of Section 438 of the *Florida Building Code, Building* shall be permitted to be built as one- and two-family *dwellings* or townhouses. Fire suppression required by Section 438.5 of the *Florida Building Code, Building* when constructed under the *Florida Building Code, Residential* shall conform to Section 903.3.1.3 of the *Florida Building Code, Building*.
2. Existing buildings undergoing repair, alteration or additions, and change of occupancy shall comply with the *Florida Building Code, Existing Building*.

### R101.2.1

The provisions of [Chapter 1](#), *Florida Building Code, Building*, shall govern the administration and enforcement of the *Florida Building Code, Residential*.

### Question 1

The Florida Building Code, Residential covers which of the following types of buildings	Townhouses (Correct Answer)	All buildings constructed on County land (Incorrect Answer)	five story residential homes (Incorrect Answer)	living spaces with no doors leading to the outside (Incorrect Answer)
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# Chapter 6 Part 1- Wooden Wall Construction

Chapter 6 of the Florida Building Codes covers wall construction. This section uses a lot of diagrams and tables. In order to fully understand what the code is describing we recommend that you open a copy of the building codes so that you can peruse the illustrations. If you will be working extensively on wall construction you may wish to purchase a hard copy of the building codes from the state.

# SECTION R601 GENERAL

## R601.1 Application.

The provisions of this chapter shall control the design and construction of all walls and partitions for all buildings.

## R601.2 Requirements.

Wall construction shall be capable of accommodating all loads imposed according to [Section R301](#) and of transmitting the resulting loads to the supporting structural elements.

### R601.2.1 Compressible floor-covering materials.

Compressible floor-covering materials that compress more than  $\frac{1}{32}$  inch (0.8 mm) when subjected to 50 pounds (23 kg) applied over 1 inch square (645 mm) of material and are greater than  $\frac{1}{8}$  inch (3 mm) in thickness in the uncompressed state shall not extend beneath walls, partitions or columns, which are fastened to the floor.

# SECTION R602 WOOD WALL FRAMING

## R602.1 General requirements.

### R602.1.1 [IRC 602.1] Identification.

Load-bearing dimension lumber for studs, plates and headers shall be identified by a grade mark of a lumber grading or inspection agency that has been *approved* by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certification of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.

Dimension Grades



#### R602.1.1.1 [IRC 602.1.1] End-jointed lumber.

*Approved* end-jointed lumber identified by a grade mark conforming to [Section R602.1.1](#) may be used interchangeably with solid-sawn members of the same species and grade.

#### R602.1.1.2 [IRC 602.1.2] Structural glued laminated timbers.

Glued laminated timbers shall be manufactured and identified as required in ANSI/AITC A190.1 and ASTM D 3737.

#### R602.1.1.3 [IRC 602.1.3] Structural log members.

Stress grading of structural log members of nonrectangular shape, as typically used in log buildings, shall be in accordance with ASTM D 3957. Such structural log members shall be identified by the grade mark of an *approved* lumber grading or inspection agency. In lieu of a grade mark on the material, a certificate of inspection as to species and grade, issued by a lumber-grading or inspection agency meeting the requirements of this section, shall be permitted to be accepted.

#### R602.1.2 [IRC 602.8] Fireblocking required.

Fireblocking shall be provided in accordance with [Section R302.11](#).

### **R602.1.3 [IRC 602.7.2] Nonbearing walls.**

Load-bearing headers are not required in interior or exterior nonbearing walls. A single flat 2-inch-by-4-inch (51 mm by 102 mm) member may be used as a header in interior or exterior nonbearing walls for openings up to 8 feet (2438 mm) in width if the vertical distance to the parallel nailing surface above is not more than 24 inches (610 mm). For such nonbearing headers, no cripples or blocking are required above the header.

#### **R602.1.3.1 [IRC 602.5] Interior nonbearing walls.**

Interior nonbearing walls shall be permitted to be constructed with 2-inch-by-3-inch (51 mm by 76 mm) studs spaced 24 inches (610 mm) on center or, when not part of a braced wall line, 2-inch-by-4-inch (51 mm by 102 mm) flat studs spaced at 16 inches (406 mm) on center. Interior nonbearing walls shall be capped with at least a single top plate. Interior nonbearing walls shall be fireblocked in accordance with [Section R302.11](#).

#### **R602.1.4 [IRC 602.6] Drilling and notching studs.**

Drilling and notching of studs shall be in accordance with the following:

1. Notching. Any stud in an exterior wall or bearing partition may be cut or notched to a depth not exceeding 25 percent of its width. Studs in nonbearing partitions may be notched to a depth not to exceed 40 percent of a single stud width.
2. Drilling. Any stud may be bored or drilled, provided that the diameter of the resulting hole is no more than 60 percent of the stud width, the edge of the hole is no more than  $\frac{5}{8}$  inch (16 mm) to the edge of the stud, and the hole is not located in the same section as a cut or notch. Studs located in exterior walls or bearing partitions drilled over 40 percent and up to 60 percent shall also be doubled with no more than two successive doubled studs bored. See [Figures R602.1.1.4\(1\)](#) and [R602.1.1.4\(2\)](#).

**Exception:** Use of *approved* stud shoes is permitted when they are installed in accordance with the manufacturer's recommendations.

#### **R602.1.4.1 [R602.6.1] Drilling and notching of top plate.**

When piping or ductwork is placed in or partly in an exterior wall or interior load-bearing wall, necessitating cutting, drilling or notching of the top plate by more than 50 percent of its width, a galvanized metal tie not less than 0.054 inch thick (1.37 mm) (16 ga) and 1½ inches (38 mm) wide shall be fastened across and to the plate at each side of the opening with not less than eight 10d (0.148 inch diameter) having a minimum length of 1½ inches (38 mm) at each side or equivalent. The metal tie must extend a minimum of 6 inches past the opening. See [Figure R602.1.4.1](#).

**Exception:** When the entire side of the wall with the notch or cut is covered by wood structural panel sheathing.

### **R602.3 Design and construction.**

Exterior walls of light-frame wood construction shall be designed and constructed in accordance with the provisions of [Section R301.2.1.1](#) or in accordance with the AF&PA NDS. Exterior wall of light-frame wood construction shall also comply with [Section R602.1.1](#).

## **SECTION R604 WOOD STRUCTURAL PANELS**

### R604.1 Identification and grade.



Wood structural panels shall conform to DOC PS 1 or DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified by a grade mark or certificate of inspection issued by an *approved* agency.

### R604.2 Allowable spans.

The maximum allowable spans for wood structural panel wall sheathing shall not exceed the values set forth in the standards used for the design of the building as specified in [Section R301.2.1.1](#).

### R604.3 Installation.

Wood structural panel wall sheathing shall be attached to framing in accordance with the standards used for the design of the building as specified in [Section R301.2.1.1](#). Wood structural panels marked Exposure 1 or Exterior are considered water-repellent sheathing under the code.

## SECTION R605 PARTICLEBOARD

### R605.1 Identification and grade.

Particleboard shall conform to ANSI A208.1 and shall be so identified by a grade mark or certificate of inspection issued by an *approved* agency. Particleboard shall comply with the grades specified in standards used for the design of the building as specified in [Section R301.2.1.1](#).

#### Question 2

Interior nonbearing walls can be constructed with 2x3 inch studs. How far apart must these studs be spaced?	24 (Correct Answer)	48 (Incorrect Answer)	16 (Incorrect Answer)	8 (Incorrect Answer)
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#### Question 3

What is the maximum depth that studs in exterior walls can be notched?	25% (Correct Answer)	40% (Incorrect Answer)	10% (Incorrect Answer)	50% (Incorrect Answer)
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#### Question 4

Non-rectangular structural log members must comply with which standard?	ASTM D 3957 (Correct Answer)	ASTM C 399 (Incorrect Answer)	DOC PS 1 (Incorrect Answer)	ANSI/AITC A190.1 (Incorrect Answer)
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# Chapter 6 Part 2-Concrete Wall Construction

This course does not cover [sections R606](#) through [R610](#). These sections pertain to masonry walls. We will be continuing our overview of the Florida Building Code, Residential: Chapter 6 by moving to R611-Concrete walls.

## SECTION R611 EXTERIOR CONCRETE WALL CONSTRUCTION

### R611.1 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 or ACI 318. When PCA 100, ACI 318 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.



#### R611.1.1 Interior construction.

These provisions are based on the assumption that interior walls and partitions, both load-bearing and nonload-bearing, floors and roof/ceiling assemblies are constructed of *light-framed construction* complying with the limitations of this code and the additional limitations of [Section R611.2](#). Design and construction of light-framed assemblies shall be in accordance with the applicable provisions of this code. Where second-story exterior walls are of *light-framed construction*, they shall be designed and constructed as required by this code.

Aspects of concrete construction not specifically addressed by this code, including interior concrete walls, shall comply with ACI 318.

#### R611.1.2 Other concrete walls.

Exterior concrete walls constructed in accordance with this code shall comply with the shapes and minimum concrete cross-sectional dimensions of [Table R611.3](#). Other types of forming systems resulting in concrete walls not in compliance with this section shall be designed in accordance with ACI 318.

### R611.2 Applicability limits.

The provisions of this section shall apply to the construction of exterior concrete walls for buildings not greater than 60 feet (18 288 mm) in plan dimensions, floors with clear spans not greater than 32 feet (9754 mm) and roofs with clear spans not greater than 40 feet (12 192 mm). Buildings shall not exceed 35 feet

(10 668 mm) in mean roof height or two stories in height above-grade. Floor/ceiling dead loads shall not exceed 10 pounds per square foot (479 Pa), roof/ceiling dead loads shall not exceed 15 pounds per square foot (718 Pa) and *attic* live loads shall not exceed 20 pounds per square foot (958 Pa). Roof overhangs shall not exceed 2 feet (610 mm) of horizontal projection beyond the exterior wall and the dead load of the overhangs shall not exceed 8 pounds per square foot (383 Pa).

Walls constructed in accordance with the provisions of this section shall be limited to buildings subjected to a maximum  $V_{asd}$ , determined in accordance with [Section R301.2.1.3](#), of 130 miles per hour (58 m/s) Exposure B, 110 miles per hour (49 m/s) Exposure C and 100 miles per hour (45 m/s) Exposure D. Walls constructed in accordance with the provisions of this section shall be limited to detached one- and two-family *dwelling*s and townhouses.

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

### **R611.3 Concrete wall systems.**

Concrete walls constructed in accordance with these provisions shall comply with the shapes and minimum concrete cross-sectional dimensions of [Table R611.3](#).

#### **R611.3.1 Flat wall systems.**

Flat concrete wall systems shall comply with [Table R611.3](#) and [Figure R611.3\(1\)](#) and have a minimum nominal thickness of 4 inches (102 mm).

#### **R611.3.2 Waffle-grid wall systems.**

Waffle-grid wall systems shall comply with [Table R611.3](#) and [Figure R611.3\(2\)](#), and shall have a minimum nominal thickness of 6 inches (152 mm) for the horizontal and vertical concrete members (cores). The core and web dimensions shall comply with [Table R611.3](#). The maximum weight of waffle-grid walls shall comply with [Table R611.3](#).

#### **R611.3.3 Screen-grid wall systems.**

Screen-grid wall systems shall comply with [Table R611.3](#) and [Figure R611.3\(3\)](#) and shall have a minimum nominal thickness of 6 inches (152 mm) for the horizontal and vertical concrete members (cores). The core dimensions shall comply with [Table R611.3](#). The maximum weight of screen-grid walls shall comply with [Table R611.3](#).

### **R611.4 Stay-in-place forms.**

Stay-in-place concrete forms shall comply with this section.

#### **R611.4.1 Surface burning characteristics.**

The flame spread index and smoke-developed index of forming material, other than foam plastic, left exposed on the interior shall comply with [Section R302.9](#). The surface burning characteristics of foam plastic used in insulating concrete forms shall comply with [Section R316.3](#).

#### **R611.4.2 Interior covering.**

Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the building as required by [Sections R316.4](#) and [R702.3.4](#). Where gypsum board is used to protect the foam plastic, it shall be installed with a mechanical fastening system. Use of adhesives is permitted in addition to mechanical fasteners.

#### **R611.4.3 Exterior wall covering.**

Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an *approved* exterior wall covering complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.

Requirements for installation of masonry veneer, stucco and other finishes on the exterior of concrete walls and other construction details not covered in this section shall comply with the requirements of this code.

## R611.5 Materials.

Materials used in the construction of concrete walls shall comply with this section.

### R611.5.1 Concrete and materials for concrete.

Materials used in concrete, and the concrete itself, shall conform to requirements of this section, or ACI 318.

#### R611.5.1.1 Concrete mixing and delivery.

Mixing and delivery of concrete shall comply with ASTM C 94 or ASTM C 685.

#### R611.5.1.2 Maximum aggregate size.

The nominal maximum size of coarse aggregate shall not exceed one-fifth the narrowest distance between sides of forms, or three-fourths the clear spacing between reinforcing bars or between a bar and the side of the form.

**Exception:** When *approved*, these limitations shall not apply where removable forms are used and workability and methods of consolidation permit concrete to be placed without honeycombs or voids.

#### R611.5.1.3 Proportioning and slump of concrete.

Proportions of materials for concrete shall be established to provide workability and consistency to permit concrete to be worked readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding. Slump of concrete placed in removable forms shall not exceed 6 inches (152 mm).

**Exception:** When *approved*, the slump is permitted to exceed 6 inches (152 mm) for concrete mixtures that are resistant to segregation, and are in accordance with the form manufacturer's recommendations.

Slump of concrete placed in stay-in-place forms shall exceed 6 inches (152 mm). Slump of concrete shall be determined in accordance with ASTM C 143.

#### R611.5.1.4 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 pounds per square inch (17.2 MPa) at 28 days.

#### R611.5.1.5 Consolidation of concrete.

Concrete shall be consolidated by suitable means during placement and shall be worked around embedded items and reinforcement and into corners of forms. Where stay-in-place forms are used, concrete shall be consolidated by internal vibration.

**Exception:** When *approved*, self-consolidating concrete mixtures with slumps equal to or greater than 8 inches (203 mm) that are specifically designed for placement without internal vibration need not be internally vibrated.

### R611.5.2 Steel reinforcement and anchor bolts.





#### **R611.5.2.1 Steel reinforcement.**

Steel reinforcement shall comply with ASTM A 615, A 706, or A 996. ASTM A 996 bars produced from rail steel shall be Type R.

#### **R611.5.2.2 Anchor bolts.**

Anchor bolts for use with connection details in accordance with [Figures R611.9\(1\)](#) through [R611.9\(12\)](#) shall be bolts with heads complying with ASTM A 307 or ASTM F 1554. ASTM A 307 bolts shall be Grade A (i.e., with heads). ASTM F 1554 bolts shall be Grade 36 minimum. Instead of bolts with heads, it is permissible to use rods with threads on both ends fabricated from steel complying with ASTM A 36. The threaded end of the rod to be embedded in the concrete shall be provided with a hex or square nut.

#### **R611.5.2.3 Sheet steel angles and tension tie straps.**

Angles and tension tie straps for use with connection details in accordance with [Figures R611.9\(1\)](#) through [R611.9\(12\)](#) shall be fabricated from sheet steel complying with ASTM A 653 SS, ASTM A 792 SS, or ASTM A 875 SS. The steel shall be minimum Grade 33 unless a higher grade is required by the applicable figure.

#### **R611.5.3 Form materials and form ties.**

Forms shall be made of wood, steel, aluminum, plastic, a composite of cement and foam insulation, a composite of cement and wood chips, or other *approved* material suitable for supporting and containing concrete. Forms shall provide sufficient strength to contain concrete during the concrete placement operation.

Form ties shall be steel, solid plastic, foam plastic, a composite of cement and wood chips, a composite of cement and foam plastic, or other suitable material capable of resisting the forces created by fluid pressure of fresh concrete.

#### **R611.5.4 Reinforcement installation details.**

##### **R611.5.4.1 Support and cover.**

Reinforcement shall be secured in the proper location in the forms with tie wire or other bar support system such that displacement will not occur during the concrete placement operation. Steel reinforcement in concrete cast against the earth shall have a minimum cover of 3 inches (76 mm). Minimum cover for reinforcement in concrete cast in removable forms that will be exposed to the earth or weather shall be 1½ inches (38 mm) for No. 5 bars and smaller, and 2 inches (50 mm) for No. 6 bars and larger. For concrete cast in removable forms that will not be exposed to the earth or weather, and for concrete cast in stay-in-place forms, minimum cover shall be ¾ inch (19 mm). The minus tolerance for cover shall not exceed the smaller of one-third the required cover and ⅜ inch (10 mm). See [Section R611.5.4.4](#) for cover requirements for hooks of bars developed in tension.

##### **R611.5.4.2 Location of reinforcement in walls.**

For location of reinforcement in foundation walls and above-grade walls, see [Sections R404.1.2.3.7.2](#) and [R611.6.5](#), respectively.

##### **R611.5.4.3 Lap splices.**

Vertical and horizontal wall reinforcement required by [Sections R611.6](#) and [R611.7](#) shall be the longest lengths practical. Where splices are necessary in reinforcement, the length of lap splices shall be in accordance with [Table R611.5.4\(1\)](#) and [Figure R611.5.4\(1\)](#). The maximum gap between noncontact parallel bars at a lap splice shall not exceed the smaller of one-fifth the required lap length and 6 inches (152 mm). See [Figure R611.5.4\(1\)](#).

##### **R611.5.4.4 Development of bars in tension.**

Where bars are required to be developed in tension by other provisions of this code, development lengths and cover for hooks and bar extensions shall comply with [Table R611.5.4\(1\)](#) and [Figure R611.5.4\(2\)](#). The development lengths shown in [Table R611.5.4\(1\)](#) also apply to bundled bars in lintels installed in accordance with [Section R611.8.2.2](#).

##### **R611.5.4.5 Standard hooks.**

Where reinforcement is required by this code to terminate with a standard hook, the hook shall comply with [Figure R611.5.4\(3\)](#).

#### **R611.5.4.6 Webs of waffle-grid walls.**

Reinforcement, including stirrups, shall not be placed in webs of waffle-grid walls, including lintels. Webs are permitted to have form ties.

#### **R611.5.4.7 Alternate grade of reinforcement and spacing.**

Where tables in [Sections R404.1.2](#) and [R611.6](#) specify vertical wall reinforcement based on minimum bar size and maximum spacing, which are based on Grade 60 (420 MPa) steel reinforcement, different size bars and/or bars made from a different grade of steel are permitted provided an equivalent area of steel per linear foot of wall is provided. Use of [Table R611.5.4\(2\)](#) is permitted to determine the maximum bar spacing for different bar sizes than specified in the tables and/or bars made from a different grade of steel. Bars shall not be spaced less than one-half the wall thickness, or more than 48 inches (1219 mm) on center.

#### **R611.5.5 Construction joints in walls.**

Construction joints shall be made and located to not impair the strength of the wall. Construction joints in plain concrete walls, including walls required to have not less than No. 4 bars at 48 inches (1219 mm) on center by [Section R611.6](#), shall be located at points of lateral support, and a minimum of one No. 4 bar shall extend across the construction joint at a spacing not to exceed 24 inches (610 mm) on center. Construction joint reinforcement shall have a minimum of 12 inches (305 mm) embedment on both sides of the joint. Construction joints in reinforced concrete walls shall be located in the middle third of the span between lateral supports, or located and constructed as required for joints in plain concrete walls.

**Exception:** Vertical wall reinforcement required by this code is permitted to be used in lieu of construction joint reinforcement, provided the spacing does not exceed 24 inches (610 mm), or the combination of wall reinforcement and No. 4 bars described above does not exceed 24 inches (610 mm).

### **R611.6 Above-grade wall requirements.**

#### **R611.6.1 General.**

The minimum thickness of load-bearing and nonload-bearing above-grade walls and reinforcement shall be as set forth in the appropriate table in this section based on the type of wall form to be used. Where the wall or building is not within the limitations of [Section R611.2](#), design is required by the tables in this section, or the wall is not within the scope of the tables in this section, the wall shall be designed in accordance with ACI 318.

Above-grade concrete walls shall be constructed in accordance with this section and [Figure R611.6\(1\)](#), [R611.6\(2\)](#), [R611.6\(3\)](#), or [R611.6\(4\)](#). Above-grade concrete walls that are continuous with stem walls and not laterally supported by the slab-on-ground shall be designed and constructed in accordance with this section. Concrete walls shall be supported on continuous foundation walls or slabs-on-ground that are monolithic with the footing in accordance with [Section R403](#). The minimum length of solid wall without openings shall be in accordance with [Section R611.7](#). Reinforcement around openings, including lintels, shall be in accordance with [Section R611.8](#). Lateral support for above-grade walls in the out-of-plane direction shall be provided by connections to the floor framing system, if applicable, and to ceiling and roof framing systems in accordance with [Section R611.9](#). The wall thickness shall be equal to or greater than the thickness of the wall in the *story* above.

#### **R611.6.2 Wall reinforcement for wind.**

Vertical wall reinforcement for resistance to out-of-plane wind forces shall be determined from [Tables R611.6\(1\)](#), [R611.6\(2\)](#), [R611.6\(3\)](#) or [R611.6\(4\)](#). Also, see [Sections R611.7.2.2.2](#) and [R611.7.2.2.3](#). There shall be a vertical bar at all corners of exterior walls. Unless more horizontal reinforcement is required by [Section R611.7.2.2.1](#), the minimum horizontal reinforcement shall be four No. 4 bars [Grade 40 (280 MPa)] placed as follows: top bar within 12 inches (305 mm) of the top of the wall, bottom bar within 12 inches (305 mm) of the finish floor, and one bar each at approximately one-third and two-thirds of the wall height.

#### **R611.6.3 Continuity of wall reinforcement between stories.**

Vertical reinforcement required by this section shall be continuous between elements providing lateral support for the wall. Reinforcement in the wall of the *story* above shall be continuous with the reinforcement in the wall of the *story* below, or the foundation wall, if applicable. Lap splices, where required, shall comply with [Section R611.5.4.3](#) and [Figure R611.5.4\(1\)](#). Where the above-grade wall is supported by a monolithic slab-on-ground and footing, dowel bars with a size and spacing to match the vertical above-grade concrete

wall reinforcement shall be embedded in the monolithic slab-on-ground and footing the distance required to develop the dowel bar in tension in accordance with [Section R611.5.4.4](#) and [Figure R611.5.4\(2\)](#) and lap-spliced with the above-grade wall reinforcement in accordance with [Section R611.5.4.3](#) and [Figure R611.5.4\(1\)](#).

**Exception:** Where reinforcement in the wall above cannot be made continuous with the reinforcement in the wall below, the bottom of the reinforcement in the wall above shall be terminated in accordance with one of the following:

1. Extend below the top of the floor the distance required to develop the bar in tension in accordance with [Section R611.5.4.4](#) and [Figure R611.5.4\(2\)](#).
2. Lap-spliced in accordance with [Section R611.5.4.3](#) and [Figure R611.5.4\(1\)](#) with a dowel bar that extends into the wall below the distance required to develop the bar in tension in accordance with [Section R611.5.4.4](#) and [Figure R611.5.4\(2\)](#).

Where a construction joint in the wall is located below the level of the floor and less than the distance required to develop the bar in tension, the distance required to develop the bar in tension shall be measured from the top of the concrete below the joint. See [Section R611.5.5](#).

#### **R611.6.4 Termination of reinforcement.**

Where indicated in items 1 through 3 below, vertical wall reinforcement in the top-most *story* with concrete walls shall be terminated with a 90-degree (1.57 rad) standard hook complying with [Section R611.5.4.5](#) and [Figure R611.5.4\(3\)](#).

1. Vertical bars adjacent to door and window openings required by [Section R611.8.1.2](#).
2. Vertical bars at the ends of required solid wall segments. See [Section R611.7.2.2.2](#).
3. Vertical bars (other than end bars see item 2) used as shear reinforcement in required solid wall segments where the reduction factor for design strength,  $R_3$ , used is based on the wall having horizontal and vertical shear reinforcement. See [Section R611.7.2.2.3](#).

The bar extension of the hook shall be oriented parallel to the horizontal wall reinforcement and be within 4 inches (102 mm) of the top of the wall.

Horizontal reinforcement shall be continuous around the building corners by bending one of the bars and lap-splicing it with the bar in the other wall in accordance with [Section R611.5.4.3](#) and [Figure R611.5.4\(1\)](#).

**Exception:** In lieu of bending horizontal reinforcement at corners, separate bent reinforcing bars shall be permitted provided that the bent bar is lap-spliced with the horizontal reinforcement in both walls in accordance with [Section R611.5.4.3](#) and [Figure R611.5.4\(1\)](#).

In required solid wall segments where the reduction factor for design strength,  $R_3$ , is based on the wall having horizontal and vertical shear reinforcement in accordance with [Section R611.7.2.2.1](#), horizontal wall reinforcement shall be terminated with a standard hook complying with [Section R611.5.4.5](#) and [Figure R611.5.4\(3\)](#) or in a lap-splice, except at corners where the reinforcement shall be continuous as required above.

#### **R611.6.5 Location of reinforcement in wall.**

Except for vertical reinforcement at the ends of required solid wall segments, which shall be located as required by [Section R611.7.2.2.2](#), the location of the vertical reinforcement shall not vary from the center of the wall by more than the greater of 10 percent of the wall thickness and  $3/8$ -inch (10 mm). Horizontal and vertical reinforcement shall be located to provide not less than the minimum cover required by [Section R611.5.4.1](#).

## R611.7 Solid walls for resistance to lateral forces.

### R611.7.1 Length of solid wall.

Each exterior wall line in each *story* shall have a total length of solid wall required by [Section R611.7.1.1](#). A solid wall is a section of flat, waffle-grid or screen-grid wall, extending the full *story height* without openings or penetrations, except those permitted by [Section R611.7.2](#). Solid wall segments that contribute to the total length of solid wall shall comply with [Section R611.7.2](#).

#### R611.7.1.1 Length of solid wall for wind.

All buildings shall have solid walls in each exterior endwall line (the side of a building that is parallel to the span of the roof or floor framing) and sidewall line (the side of a building that is perpendicular to the span of the roof or floor framing) to resist lateral in-plane wind forces. The site-appropriate basic wind speed and exposure category shall be used in [Tables R611.7\(1A\) through \(1C\)](#) to determine the unreduced total length,  $UR$ , of solid wall required in each exterior endwall line and sidewall line. For buildings with a mean roof height of less than 35 feet (10 668 mm), the unreduced values determined from [Tables R611.7\(1A\) through \(1C\)](#) is permitted by multiplying by the applicable factor,  $R_1$ , from [Table R611.7\(2\)](#); however, reduced values shall not be less than the minimum values in [Tables R611.7\(1A\) through \(1C\)](#). Where the floor-to-ceiling height of a *story* is less than 10 feet (3048 mm), the unreduced values determined from [Tables R611.7\(1A\) through \(1C\)](#), including minimum values, is permitted to be reduced by multiplying by the applicable factor,  $R_2$ , from [Table R611.7\(3\)](#). To account for different design strengths than assumed in determining the values in [Tables R611.7\(1A\) through \(1C\)](#), the unreduced lengths determined from [Tables R611.7\(1A\) through \(1C\)](#), including minimum values, are permitted to be reduced by multiplying by the applicable factor,  $R_3$ , from [Table R611.7\(4\)](#). The reductions permitted by [Tables R611.7\(2\)](#), [R611.7\(3\)](#) and [R611.7\(4\)](#) are cumulative.

The total length of solid wall segments,  $TL$ , in a wall line that comply with the minimum length requirements of [Section R611.7.2.1](#) [see [Figure R611.7\(1\)](#)] shall be equal to or greater than the product of the unreduced length of solid wall from [Tables R611.7\(1A\) through \(1C\)](#),  $UR$  and the applicable reduction factors, if any, from [Tables R611.7\(2\)](#), [R611.7\(3\)](#) and [R611.7\(4\)](#) as indicated by Equation R611-1.

$$TL \geq R_1 \cdot R_2 \cdot R_3 \cdot UR \quad \text{(Equation R611-1)}$$

Where

$TL$	=	total length of solid wall segments in a wall line that comply with <a href="#">Section R611.7.2.1</a> [see <a href="#">Figure R611.7(1)</a> ], and
$R_1$	=	1.0 or reduction factor for mean roof height from <a href="#">Table R611.7(2)</a> ,
$R_2$	=	1.0 or reduction factor for floor-to-ceiling wall height from <a href="#">Table R611.7(3)</a> ,
$R_3$	=	1.0 or reduction factor for design strength from <a href="#">Table R611.7(4)</a> , and
$UR$	=	unreduced length of solid wall from <a href="#">Tables R611.7(1A) through (1C)</a> .

The total length of solid wall in a wall line,  $TL$ , shall not be less than that provided by two solid wall segments complying with the minimum length requirements of [Section R611.7.2.1](#).

To facilitate determining the required wall thickness, wall type, number and *grade* of vertical bars at the each end of each solid wall segment, and whether shear reinforcement is required, use of Equation R611-2 is permitted.

$$R_3 \leq TL / (R_1 \cdot R_2 \cdot UR) \quad \text{(Equation R611-2)}$$

After determining the maximum permitted value of the reduction factor for design strength,  $R_3$ , in accordance with Equation R611-2, select a wall type from [Table R611.7\(4\)](#) with  $R_3$  less than or equal to the value calculated.

### R611.7.2 Solid wall segments.

Solid wall segments that contribute to the required length of solid wall shall comply with this section.

Reinforcement shall be provided in accordance with [Section R611.7.2.2](#) and [Table R611.7\(4\)](#). Solid wall segments shall extend the full story-height without openings, other than openings for the utilities and other building services passing through the wall. In flat walls and waffle-grid walls, such openings shall have an area of less than 30 square inches (19 355 mm<sup>2</sup>) with no dimension exceeding 6<sup>1</sup>/<sub>4</sub> inches (159 mm), and shall not be located within 6 inches (152 mm) of the side edges of the solid wall segment. In screen-grid walls, such openings shall be located in the portion of the solid wall segment between horizontal and vertical cores of concrete and opening size and location are not restricted provided no concrete is removed.

#### **R611.7.2.1 Minimum length of solid wall segment and maximum spacing.**

Only solid wall segments equal to or greater than 24 inches (610 mm) in length shall be included in the total length of solid wall required by [Section R611.7.1](#). In addition, no more than two solid wall segments equal to or greater than 24 inches (610 mm) in length and less than 48 inches (1219 mm) in length shall be included in the required total length of solid wall. The maximum clear opening width shall be 18 feet (5486 mm). See [Figure R611.7\(1\)](#).

#### **R611.7.2.2 Reinforcement in solid wall segments.**

##### **R611.7.2.2.1 Horizontal shear reinforcement.**

Where reduction factors for design strength,  $R_3$ , from [Table R611.7\(4\)](#) based on horizontal and vertical shear reinforcement being provided are used, solid wall segments shall have horizontal reinforcement consisting of minimum No. 4 bars. Horizontal shear reinforcement shall be the same grade of steel required for the vertical reinforcement at the ends of solid wall segments by [Section R611.7.2.2.2](#).

The spacing of horizontal reinforcement shall not exceed the smaller of one-half the length of the solid wall segment, minus 2 inches (51 mm), and 18 inches (457 mm). Horizontal shear reinforcement shall terminate in accordance with [Section R611.6.4](#).

##### **R611.7.2.2.2 Vertical reinforcement.**

Vertical reinforcement applicable to the reduction factor(s) for design strength,  $R_3$ , from [Table R611.7\(4\)](#) that is used, shall be located at each end of each solid wall segment in accordance with the applicable detail in [Figure R611.7\(2\)](#). The No. 4 vertical bar required on each side of an opening by [Section R611.8.1.2](#) is permitted to be used as reinforcement at the ends of solid wall segments where installed in accordance with the applicable detail in [Figure R611.7\(2\)](#). There shall be not less than two No. 4 bars at each end of solid wall segments located as required by the applicable detail in [Figure R611.7\(2\)](#). One of the bars at each end of solid wall segments shall be deemed to meet the requirements for vertical wall reinforcement required by [Section R611.6](#).

The vertical wall reinforcement at each end of each solid wall segment shall be developed below the bottom of the adjacent wall opening [see [Figure R611.7\(3\)](#)] by one of the following methods:

1. Where the wall height below the bottom of the adjacent opening is equal to or greater than 22 inches (559 mm) for No. 4 or 28 inches (711 mm) for No. 5 vertical wall reinforcement, reinforcement around openings in accordance with [Section R611.8.1](#) shall be sufficient, or
2. Where the wall height below the bottom of the adjacent opening is less than required by Item 1 above, the vertical wall reinforcement adjacent to the opening shall extend into the footing far enough to develop the bar in tension in accordance with [Section R611.5.4.4](#) and [Figure R611.5.4\(2\)](#), or shall be lap-spliced with a dowel that is embedded in the footing far enough to develop the dowel-bar in tension.

##### **R611.7.2.2.3 Vertical shear reinforcement.**

Where reduction factors for design strength,  $R_3$ , from [Table R611.7\(4\)](#) based on horizontal and vertical shear reinforcement being provided are used, solid wall segments shall have vertical reinforcement consisting of minimum No. 4 bars. Vertical shear reinforcement shall be the same grade of steel required by [Section R611.7.2.2.2](#) for the vertical reinforcement at the ends of solid wall segments. The spacing of vertical reinforcement throughout the length of the segment shall not exceed the smaller of one third the length of the segment, and 18 inches (457 mm). Vertical shear reinforcement shall be continuous between stories in accordance with [Section R611.6.3](#), and shall terminate in accordance with [Section R611.6.4](#). Vertical shear reinforcement required by this section is permitted to be used for vertical reinforcement required by [Table R611.6\(1\)](#), [R611.6\(2\)](#), [R611.6\(3\)](#) or [R611.6\(4\)](#), whichever is applicable.

### **R611.7.2.3 Solid wall segments at corners.**

At all interior and exterior corners of exterior walls, a solid wall segment shall extend the full height of each wall *story*. The segment shall have the length required to develop the horizontal reinforcement above and below the adjacent opening in tension in accordance with [Section R611.5.4.4](#). For an exterior corner, the limiting dimension is measured on the outside of the wall, and for an interior corner the limiting dimension is measured on the inside of the wall. See [Section R611.8.1](#). The length of a segment contributing to the required length of solid wall shall comply with [Section R611.7.2.1](#).

The end of a solid wall segment complying with the minimum length requirements of [Section R611.7.2.1](#) shall be located no more than 6 feet (1829 mm) from each corner.

## **R611.8 Requirements for lintels and reinforcement around openings.**

### **R611.8.1 Reinforcement around openings.**

Reinforcement shall be provided around openings in walls equal to or greater than 2 feet (610 mm) in width in accordance with this section and [Figure R611.8\(1\)](#), in addition to the minimum wall reinforcement required by [Sections R404.1.2](#), [R611.6](#) and [R611.7](#). Vertical wall reinforcement required by this section is permitted to be used as reinforcement at the ends of solid wall segments required by [Section R611.7.2.2.2](#) provided it is located in accordance with [Section R611.8.1.2](#). Wall openings shall have a minimum depth of concrete over the width of the opening of 8 inches (203 mm) in flat walls and waffle-grid walls, and 12 inches (305 mm) in screen-grid walls. Wall openings in waffle-grid and screen-grid walls shall be located such that not less than one-half of a vertical core occurs along each side of the opening.

#### **R611.8.1.1 Horizontal reinforcement.**

Lintels complying with [Section R611.8.2](#) shall be provided above wall openings equal to or greater than 2 feet (610 mm) in width.

**Exception:** Continuous horizontal wall reinforcement placed within 12 inches (305 mm) of the top of the wall *story* as required in [Sections R404.1.2.2](#) and [R611.6.2](#) is permitted in lieu of top or bottom lintel reinforcement required by [Section R611.8.2](#) provided that the continuous horizontal wall reinforcement meets the location requirements specified in [Figures R611.8\(2\)](#), [R611.8\(3\)](#), and [R611.8\(4\)](#) and the size requirements specified in [Tables R611.8\(2\)](#) through [R611.8\(10\)](#).

Openings equal to or greater than 2 feet (610 mm) in width shall have a minimum of one No. 4 bar placed within 12 inches (305 mm) of the bottom of the opening. See [Figure R611.8\(1\)](#).

Horizontal reinforcement placed above and below an opening shall extend beyond the edges of the opening the dimension required to develop the bar in tension in accordance with [Section R611.5.4.4](#).

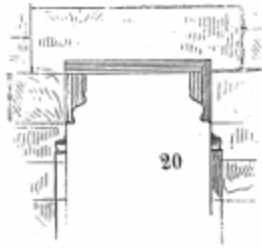
#### **R611.8.1.2 Vertical reinforcement.**

Not less than one No. 4 bar [Grade 40 (280 MPa)] shall be provided on each side of openings equal to or greater than 2 feet (610 mm) in width. The vertical reinforcement required by this section shall extend the full height of the wall *story* and shall be located within 12 inches (305 mm) of each side of the opening. The vertical reinforcement required on each side of an opening by this section is permitted to serve as reinforcement at the ends of solid wall segments in accordance with [Section R611.7.2.2.2](#), provided it is located as required by the applicable detail in [Figure R611.7\(2\)](#). Where the vertical reinforcement required by this section is used to satisfy the requirements of [Section R611.7.2.2.2](#) in waffle- and screen-grid walls, a concrete flange shall be created at the ends of the solid wall segments in accordance with [Table R611.7\(4\)](#), note e. In the top-most *story*, the reinforcement shall terminate in accordance with [Section R611.6.4](#).

#### **R611.8.2 Lintels.**

Lintels shall be provided over all openings equal to or greater than 2 feet (610 mm) in width. Lintels with uniform loading shall conform to [Sections R611.8.2.1](#), [R611.8.2.2](#), or [Section R611.8.2.3](#). Lintels supporting concentrated loads, such as from roof or floor beams or girders, shall be designed in accordance

with ACI 318.



#### **R611.8.2.1 Lintels designed for gravity load-bearing conditions.**

Where a lintel will be subjected to gravity load condition 1 through 5 of [Table R611.8\(1\)](#), the clear span of the lintel shall not exceed that permitted by [Tables R611.8\(2\)](#) through [R611.8\(8\)](#). The maximum clear span of lintels with and without stirrups in flat walls shall be determined in accordance with [Tables R611.8\(2\)](#) through [R611.8\(5\)](#), and constructed in accordance with [Figure R611.8\(2\)](#). The maximum clear span of lintels with and without stirrups in waffle-grid walls shall be determined in accordance with [Tables R611.8\(6\)](#) and [R611.8\(7\)](#), and constructed in accordance with [Figure R611.8\(3\)](#). The maximum clear span of lintels with and without stirrups in screen-grid walls shall be determined in accordance with [Table R611.8\(8\)](#), and constructed in accordance with [Figure R611.8\(4\)](#).

Where required by the applicable table, No. 3 stirrups shall be installed in lintels at a maximum spacing of  $d/2$  where  $d$  equals the depth of the lintel,  $D$ , less the cover of the concrete as shown in [Figures R611.8\(2\)](#) through [R611.8\(4\)](#). The smaller value of  $d$  computed for the top and bottom bar shall be used to determine the maximum stirrup spacing. Where stirrups are required in a lintel with a single bar or two bundled bars in the top and bottom, they shall be fabricated like the letter "c" or "s" with 135-degree (2.36 rad) standard hooks at each end that comply with [Section R611.5.4.5](#) and [Figure R611.5.4\(3\)](#) and installed as shown in [Figures R611.8\(2\)](#) through [R611.8\(4\)](#). Where two bars are required in the top and bottom of the lintel and the bars are not bundled, the bars shall be separated by a minimum of 1 inch (25 mm). The free end of the stirrups shall be fabricated with 90- or 135-degree (1.57 or 2.36 rad) standard hooks that comply with [Section R611.5.4.5](#) and [Figure R611.5.4\(3\)](#) and installed as shown in [Figures R611.8\(2\)](#) and [R611.8\(3\)](#). For flat, waffle-grid and screen-grid lintels, stirrups are not required in the center distance,  $A$ , portion of spans in accordance with [Figure R611.8\(1\)](#) and [Tables R611.8\(2\)](#) through [R611.8\(8\)](#). See [Section R611.8.2.2](#), item 5, for requirement for stirrups throughout lintels with bundled bars.

#### **R611.8.2.2 Bundled bars in lintels.**

It is permitted to bundle two bars in contact with each other in lintels if all of the following are observed:

1. Bars no larger than No. 6 are bundled.
2. Where the wall thickness is not sufficient to provide not less than 3 inches (76 mm) of clear space beside bars (total on both sides) oriented horizontally in a bundle, the bundled bars shall be oriented in a vertical plane.
3. Where vertically oriented bundled bars terminate with standard hooks to develop the bars in tension beyond the support (see [Section R611.5.4.4](#)), the hook extensions shall be staggered to provide a minimum of one inch (25 mm) clear spacing between the extensions.
4. Bundled bars shall not be lap spliced within the lintel span and the length on each end of the lintel that is required to develop the bars in tension.
5. Bundled bars shall be enclosed within stirrups throughout the length of the lintel. Stirrups and the installation thereof shall comply with [Section R611.8.2.1](#).

#### **R611.8.2.3 Lintels without stirrups designed for nonload-bearing conditions.**

The maximum clear span of lintels without stirrups designed for nonload-bearing conditions of [Table R611.8\(1\).1](#) shall be determined in accordance with this section. The maximum clear span of lintels without stirrups in flat walls shall be determined in accordance with [Table R611.8\(9\)](#), and the maximum

clear span of lintels without stirrups in walls of waffle-grid or screen-grid construction shall be determined in accordance with [Table R611.8\(10\)](#).

## **R611.9 Requirements for connections – general.**

Concrete walls shall be connected to footings, floors, ceilings and roofs in accordance with this section.

### **R611.9.1 Connections between concrete walls and light-framed floor, ceiling and roof systems.**

Connections between concrete walls and light-framed floor, ceiling and roof systems using the prescriptive details of [Figures R611.9\(1\)](#) through [R611.9\(12\)](#) shall comply with this section and [Sections R611.9.2](#) and [R611.9.3](#).

#### **R611.9.1.1 Anchor bolts.**

Anchor bolts used to connect light-framed floor, ceiling and roof systems to concrete walls in accordance with [Figures R611.9\(1\)](#) through [R611.9\(12\)](#) shall have heads, or shall be rods with threads on both ends with a hex or square nut on the end embedded in the concrete. Bolts and threaded rods shall comply with [Section R611.5.2.2](#). Anchor bolts with J- or L-hooks shall not be used where the connection details in these figures are used.

#### **R611.9.1.2 Removal of stay-in-place form material at bolts.**

Holes in stay-in-place forms for installing bolts for attaching face-mounted wood ledger boards to the wall shall be a minimum of 4 inches (102 mm) in diameter for forms not greater than 1<sup>1</sup>/<sub>2</sub> inches (38 mm) in thickness, and increased 1 inch (25 mm) in diameter for each 1/2-inch (13 mm) increase in form thickness. Holes in stay-in-place forms for installing bolts for attaching face-mounted cold-formed steel tracks to the wall shall be a minimum of 4 inches (102 mm) square. The wood ledger board or steel track shall be in direct contact with the concrete at each bolt location.

**Exception:** A vapor retarder or other material less than or equal to 1/16-inch (1.6 mm) in thickness is permitted to be installed between the wood ledger or cold-formed track and the concrete.

### **R611.9.2 Connections between concrete walls and light-framed floor systems.**

Connections between concrete walls and light-framed floor systems shall be in accordance with one of the following:

1. For floor systems of wood frame construction, the provisions of [Section R611.9.1](#) and the prescriptive details of [Figures R611.9\(1\)](#) through [R611.9\(4\)](#), where permitted by the tables accompanying those figures. Portions of connections of wood-framed floor systems not noted in the figures shall be in accordance with [Section R502](#), or AF&PA/WFCM, if applicable.
2. For floor systems of cold-formed steel construction, the provisions of [Section R611.9.1](#) and the prescriptive details of [Figures R611.9\(5\)](#) through [R611.9\(8\)](#), where permitted by the tables accompanying those figures. Portions of connections of cold-formed-steel framed floor systems not noted in the figures shall be in accordance with [Section R505](#), or AISI S230, if applicable.
3. Proprietary connectors selected to resist loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
4. An engineered design using loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
5. An engineered design using loads and material design provisions in accordance with this code, or in accordance with ASCE 7, ACI 318, and AF&PA/NDS for wood frame construction or AISI S100 for cold-formed steel frame construction.

### **R611.9.3 Connections between concrete walls and light-framed ceiling and roof systems.**

Connections between concrete walls and light-framed ceiling and roof systems shall be in accordance with one of the following:



1. For ceiling and roof systems of wood frame construction, the provisions of [Section R611.9.1](#) and the prescriptive details of [Figures R611.9\(9\)](#) and [R611.9\(10\)](#), where permitted by the tables accompanying those figures. Portions of connections of wood-framed ceiling and roof systems not noted in the figures shall be in accordance with [Section R802](#), or AF&PA/WFCM, if applicable.
2. For ceiling and roof systems of cold-formed-steel construction, the provisions of [Section R611.9.1](#) and the prescriptive details of [Figures R611.9\(11\)](#) and [R611.9\(12\)](#), where permitted by the tables accompanying those figures. Portions of connections of cold-formed-steel framed ceiling and roof systems not noted in the figures shall be in accordance with [Section R804](#), or AISI S230, if applicable.
3. Proprietary connectors selected to resist loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
4. An engineered design using loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
5. An engineered design using loads and material design provisions in accordance with this code, or in accordance with ASCE 7, ACI 318, and AF&PA/NDS for wood-frame construction or AISI S100 for cold-formed-steel frame construction.

### **R611.10 Floor, roof and ceiling diaphragms.**

Floors and roofs in all buildings with exterior walls of concrete shall be designed and constructed as *diaphragms*. Where gable-end walls occur, ceilings shall also be designed and constructed as *diaphragms*. The design and construction of floors, roofs and ceilings of wood framing or cold-formed-steel framing serving as *diaphragms* shall comply with the applicable requirements of this code, or AF&PA/WFCM or AISI S230, if applicable.

#### **Question 5**

The minimum nominal thickness for flat concrete wall systems is...	4 inches (Correct Answer)	6 inches (Incorrect Answer)	8 inches (Incorrect Answer)	5 inches (Incorrect Answer)
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#### **Question 6**

What grade of bar must be used for vertical reinforcement on the sides of openings greater than 2 feet in width?	No. 4 (Correct Answer)	No. 6 (Incorrect Answer)	No. 5 (Incorrect Answer)	No. 2 (Incorrect Answer)
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#### **Question 7**

How long must a solid wall segment be to contribute to the total length of solid wall requirements	24 inches (Correct Answer)	20 inches (Incorrect Answer)	15 inches (Incorrect Answer)	12 inches (Incorrect Answer)
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# Chapter 6 Part 3-Windows, Doors, and Other Types of Walls

## SECTION R612 EXTERIOR WINDOWS AND DOORS

### R612.1 General.

This section prescribes performance and construction requirements for exterior windows and doors installed in walls. Windows shall be installed in accordance with the fenestration manufacturer's written installation instructions. Window and door openings shall be flashed in accordance with [Section R703.8](#). Written installation instructions shall be provided by the manufacturer.

### R612.2 Window sills

In *dwelling* units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished *grade* or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch (102 mm) diameter sphere where such openings are located within 24 inches (610 mm) of the finished floor.

#### Exceptions:

1. Windows whose openings will not allow a 4-inch diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. Openings that are provided with window fall prevention devices that comply with [Section R612.3](#).
3. Openings that are provided with fall prevention devices that comply with ASTM F 2090.
4. Windows that are provided with opening limiting devices that comply with [Section R612.4](#).

### R612.3 Window fall prevention devices.

Window fall prevention devices and window guards, where provided, shall comply with the requirements of ASTM F 2090.

### R612.4 Window opening limiting devices.

When required elsewhere in this code, window opening limiting devices shall comply with the provisions of this section.



#### **R612.4.1 General requirements.**

Window opening limiting devices shall be self acting and shall be positioned to prohibit the free passage of a 4-in. (102-mm) diameter rigid sphere through the window opening when the window opening limiting device is installed in accordance with the manufacturer's instructions.

#### **R612.4.2 Operation for emergency escape.**

Window opening limiting devices shall be designed with release mechanisms to allow for emergency escape through the window opening without the need for keys, tools or special knowledge. Window opening limiting devices shall comply with all of the following:

1. Release of the window opening-limiting device shall require no more than 15 pounds (66 N) of force.
2. The window opening limiting device release mechanism shall operate properly in all types of weather.
3. Window opening limiting devices shall have their release mechanisms clearly identified for proper use in an emergency.
4. The window opening limiting device shall not reduce the minimum net clear opening area of the window unit below what is required by [Section R310.1.1](#) of the code.

#### **R612.5 Performance.**

Exterior windows and doors shall be designed to resist the design wind loads specified in [Table R301.2\(2\)](#) adjusted for height and exposure per [Table R301.2\(3\)](#). For testing required in [Sections R612.6](#), [R612.7](#), and [R612.8](#), design pressures determined from [Table R301.2\(2\)](#) or ASCE 7 are permitted to be multiplied by 0.6.

#### **R612.6 Testing and labeling.**

Exterior windows and glass doors shall be tested by an approved independent testing laboratory, and shall be labeled to indicate compliance with the requirements of one of the following specifications:

ANSI/AAMA/NWDA101/I.S.2 or ANSI/AAMA/WDMA 101/I.S.2/NAFS or AAMA/WDMA/CSA 101/I.S.2/A440 or TAS 202 (HVHZ shall comply with TAS 202 utilizing ASTM E 1300-98 or ASTM E 1300-04 02).

Exterior windows and sliding glass doors shall be labeled with a permanent label, marking, or etching providing traceability to the manufacturer and product. The following shall also be required either on a permanent label or on a temporary supplemental label applied by the manufacturer: information identifying the manufacturer, the product model/series number, positive and negative design pressure rating, product maximum size, glazing thickness, impact resistance. Approval number, applicable test standard(s), and approved product certification agency, testing laboratory, evaluation entity or Miami-Dade Product Approval.

The labels are limited to one design pressure rating per reference standard. The temporary supplemental label shall remain on the window or door until final approval by the building official.

**Exceptions:**

1. Door assemblies installed in nonhabitable areas where the door assembly and area are designed to accept water infiltration need not be tested for water infiltration.
2. Door assemblies installed where the overhang (OH) ratio is equal to or more than 1 need not be tested for water infiltration. The overhang ratio shall be calculated by the following equation:

$$\text{OH ratio} = \text{OH length} / \text{OH height}$$

Where:

OH length = The horizontal measure of how far an overhang over a door projects out from door's surface.

OH height = The measure of the distance from the door's sill to the bottom of the overhang over a door.

3. Pass-through windows for serving from a single-family kitchen where protected by a roof overhang of 5 feet (1.5 m) or more shall be exempted from the requirements of the water infiltration test.
4. Decorative glazed openings.

**Glass Strength:** Products tested and labeled as conforming to ANSI/AAMA/NWDA 101/I.S.2 or ANSI/AAMA/WDMA 101/I.S.2/NAFS or AAMA/WDMA/CSA 101/I.S.2/A440 or TAS 202 shall not be subject to the requirements of the *Florida Building Code, Building*. Determination of load resistance of glass for specific loads of products not tested and certified in accordance with [Section R612.6](#) shall be designed to comply with ASTM E 1300. The temporary supplemental label shall designate the type and thickness of glass or glazing material.

**R612.6.1 Comparative Analysis Label.**

A temporary supplemental label conforming to AAMA 203, Procedural Guide for the Window Inspection and Notification System, shall be acceptable for establishing and communicating the calculated allowable design pressures higher than indicated on the label required by [Section R612.6](#) for window or door sizes smaller than that required by the ANSI/AAMA/NWDA 101/I.S.2 or ANSI/AAMA/WDMA 101/I.S.2/NAFS or AAMA/WDMA/CSA 101/I.S.2/A440 test requirements. This temporary supplemental label shall be applied by the manufacturer and remain on the window or door until final approval by the building official.

**Exception 1:**

Comparative analysis of operative windows and glazed doors may be made, provided the proposed unit complies with the following:

1. Shall always be compared with a tested and currently approved unit.
2. Varies only in width, height and/or load requirements.
3. Shall not exceed 100 percent of the proportional deflection for fiber stress of the intermediate members of the approved unit.
4. Shall conform as to extruded members, reinforcement and in all other ways with the tested approved unit.
5. Shall not exceed 100 percent of the concentrated load at the juncture of the intermediate members and the frame of the approved unit.
6. Shall not permit more air and water infiltration than the approved unit based on the height above grade.

7. Compared unit shall not exceed the maximum cyclic pressure when tested per TAS 203 or ASTM E 1886 and ASTM E 1996.

**Exception 2:**

Comparative analysis of fixed glass windows may be made, provided the proposed unit complies with the following:

1. Shall always be compared with a tested and currently approved unit.
2. Varies only in width, height and/or load requirements.
3. The design is identical in all respects. e.g., extrusions, glazing system, joinery, fasteners, etc.
4. Shall not permit more air and water infiltration than the approved unit based on height above grade.
5. The maximum uniform load distribution (ULD) of any side is equal to the uniform load carried by the side divided by the length of the side.
6. The ULD of any member must not exceed the ULD of the corresponding member of the tested window.
7. The uniform load distribution on each member shall be calculated in accordance to Section 2, Engineering Design Rules, of the AAMA 103.3 Procedural Guide.
8. Compared unit shall not exceed the maximum cyclic pressure when tested per TAS 203 or ASTM E 1886 and ASTM E 1996.

**R612.7 Vehicular access doors.**

Vehicular access doors shall be tested in accordance with either ASTM E 330 or ANSI/DASMA 108, and shall meet the acceptance criteria of ANSI/DASMA 108.

**R612.8 Exterior door assemblies.**

Exterior door assemblies not covered by [Sections R612.6](#) or [R612.8.3](#) shall comply with [Sections R612.8.1](#) or [R612.8.2](#).

**R612.8.1**

Exterior door assemblies shall be tested for structural integrity in accordance with ASTM E 330 Procedure A at a load of 1.5 times the required design pressure load. The load shall be sustained for 10 seconds with no permanent deformation of any main frame or panel member in excess of 0.4 percent of its span after the load is removed. HVHZ shall comply with TAS 202. After each specified loading, there shall be no glass breakage, permanent damage to fasteners, hardware parts, or any other damage which causes the door to be inoperable.

The minimum test sizes and minimum design pressures shall be as indicated in [Table R612.8](#).

The unit size tested shall qualify all units smaller in width and/or height of the same operation type and be limited to cases where frame, panels and structural members maintain the same profile as tested.

**R612.8.2**

Sectional garage doors shall be tested for determination of structural performance under uniform static air pressure difference in accordance with ANSI/DASMA 108 or TAS 202 (HVHZ shall comply with TAS 202).

**R612.8.3 Custom doors.**

Custom (one of a kind) exterior door assemblies shall be tested by an approved testing laboratory or be engineered in accordance with accepted engineering practices.

#### **R612.8.4**

Door components evaluated by an approved product evaluation entity, certification agency, testing laboratory or engineer may be interchangeable in exterior door assemblies provided that the door component(s) provide equal or greater structural performance as demonstrated by accepted engineering practices.

##### **R612.8.4.1**

Optional exterior door component testing. With the exception of HVHZ, exterior side-hinged door assemblies not covered by [Section R612.6](#) shall have the option to have the components of the assembly tested and rated for structural integrity in accordance with the following specification: SDI A250.13

Following the structural testing of exterior door components, there shall be no permanent deformation of any perimeter frame or panel member in excess of 0.4 percent of its span after the load is removed. After each specified loading, there shall be no glass breakage, permanent damage to fasteners, hardware parts, or any other damage that causes the door to be inoperable, as applicable.

##### **R612.8.5 Garage door labeling.**

Garage doors shall be labeled with a permanent label provided by the manufacturer. The label shall identify the manufacturer, the garage door model/series number, the positive and negative design pressure rating, indicate impact rated if applicable, the installation instruction drawing reference number, the Florida Product Approval or Miami-Dade Product Approval number if applicable, and the applicable test standards.

The required garage door components for an approved garage door assembly may be indicated using a checklist format on the label. If a checklist format is used on the label, the installer or manufacturer shall mark the selected components on the checklist that are required to assemble an approved garage door system.

The installation instructions shall be provided and available on the job site.

#### **R612.9 Wind-borne debris protection.**

Protection of exterior windows, glass doors and other glazed areas shall be in accordance with [Section R301.2.1.2](#).

#### **R612.10 Anchorage methods.**

##### **R612.10.1 Anchoring requirements.**

Window and door assembly anchoring systems shall be tested to achieve the design pressure specified. Substitute anchoring systems shall provide equal or greater anchoring performance as demonstrated by accepted engineering practice. When provided, the manufacturer's published installation instructions for as tested or substitute anchoring systems can be used. In no case shall the anchorage exceed the spacing for the tested rated performance.

##### **R612.10.2 Anchorage details.**

###### **R612.10.2.1 Masonry, concrete or other structural substrate.**

Where the wood shim or buck thickness is less than 1<sup>1</sup>/<sub>2</sub> inches (38 mm), window and door assemblies shall be anchored through the main frame or by jamb clip or subframe system, in accordance with the manufacturers published installation instructions. Anchors shall be securely fastened directly into the masonry, concrete or other structural substrate material. Unless otherwise tested, bucks shall extend beyond the interior face of the window or door frame such that full support of the frame is provided. Shims shall be made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame to the rough opening substrate.

Where the wood buck thickness is 1<sup>1</sup>/<sub>2</sub> inches (38 mm) or greater, the buck shall be securely fastened to

transfer load to the masonry, concrete or other structural substrate and the buck shall extend beyond the interior face of the window or door frame. Window and door assemblies shall be anchored through the main frame or by jamb clip or subframe system or through the flange to the secured wood buck in accordance with the manufacturers published installation instructions. Unless otherwise tested, bucks shall extend beyond the interior face of the window or door frame such that full support of the frame is provided. Shims shall be made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame assembly to the secured wood buck.

#### **R612.10.2.2 Wood or other approved framing material.**

Where the framing material is wood or other approved framing material, window and glass door assemblies shall be anchored through the main frame or by jamb clip or subframe system or through the flange in accordance with the manufacturer's published installation instructions. Shims shall be made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame to the rough opening substrate.

### **R612.11 Mullions.**

Mullions, other than mullions which are an integral part of a window or glass door assembly tested and labeled in accordance with [Section R612.6](#), shall be tested by an approved testing laboratory in accordance with AAMA 450 or be engineered in accordance with accepted engineering practice and shall meet the following criteria:



1. Engineered mullions. Mullions qualified by accepted engineering practice shall comply with the performance criteria in [Sections R612.11.1, R612.11.2 and R612.11.3](#).
2. Mullions tested as stand alone units. Mullions tested as stand alone units in accordance with AAMA 450 shall comply with the performance criteria in [Sections R612.11.1, R612.11.2 and R612.11.3](#).
3. Mullions tested in an assembly. Mullions qualified by a test of an entire assembly in accordance with AAMA 450 shall comply with [Sections R612.11.1 and R612.11.3](#).

#### **R612.11.1 Load transfer.**

Mullions shall be designed to transfer the design pressure loads applied by the window and door assemblies to the rough opening substrate.

#### **R612.11.2 Deflection.**

Mullions shall be capable of resisting the design pressure loads applied by the window and door assemblies to be supported without deflecting more than  $L/175$ , where  $L$  is the span of the mullion in inches.

#### **R612.11.3 Structural safety factor.**

Mullions shall be capable of resisting a load of 1.5 times the design pressure loads applied by the window and door assemblies to be supported without exceeding the appropriate material stress levels. If tested by an *approved* laboratory, the 1.5 times the design pressure load shall be sustained for 10 seconds, and the permanent deformation shall not exceed 0.4 percent of the mullion span after the 1.5 times design pressure load is removed.

## **R612.12 Flashing, sealants and weather stripping.**

Flashing and sealants for exterior windows and doors shall comply with [Section R703.8](#).

### **R612.12.1**

All exterior fenestration products shall be sealed at the juncture with the building wall with a sealant complying with AAMA 800 or ASTM C 920 Class 25 Grade NS or greater for proper joint expansion and contraction, ASTM C 1281, AAMA 812, or other approved standard as appropriate for the type of sealant.

### **R612.12.2 Masonry rough openings.**

Masonry rough opening dimensions shall be within the tolerances specified at [Section R606.16](#) and in addition shall provide for a window perimeter sealant joint a maximum of  $\frac{1}{4}$  inches in width.

# **SECTION R613 STRUCTURAL INSULATED PANEL WALL CONSTRUCTION**

## **R613.1 General.**

Structural insulated panel (SIP) walls shall be designed in accordance with the provisions of this section. When the provisions of this section are used to design structural insulated panel 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.

## **R613.2 Applicability limits.**

The provisions of this section shall control the construction of exterior structural insulated panel walls and interior load-bearing structural insulated panel walls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist or truss span and not greater than two stories in height with each wall not greater than 10 feet (3048 mm) high. All exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Structural insulated panel walls constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum  $V_{asd}$ , determined in accordance with [Section R301.2.1.3](#), of 130 miles per hour (58 m/s), and Exposure A, B or C.

## **R613.3 Materials.**

SIPs shall comply with the following criteria:

### **R613.3.1 Core.**

The core material shall be composed of foam plastic insulation meeting one of the following requirements:

1. ASTM C 578 and have a minimum density of 0.90 pounds per cubic feet (14.4 kg/m<sup>3</sup>); or
2. Polyurethane meeting the physical properties shown in [Table R613.3.1](#), or;
3. An *approved* alternative.

All cores shall meet the requirements of [Section R316](#).

### **R613.3.2 Facing.**

Facing materials for SIPs shall be wood structural panels conforming to DOC PS 1 or DOC PS 2, each having a minimum nominal thickness of  $\frac{7}{16}$  inch (11 mm) and shall meet the additional minimum properties specified in [Table R613.3.2](#). Facing shall be identified by a grade mark or certificate of inspection issued by an *approved* agency.



### **R613.3.3 Adhesive.**

Adhesives used to structurally laminate the foam plastic insulation core material to the structural wood facers shall conform to ASTM D 2559 or *approved* alternative specifically intended for use as an adhesive used in the lamination of structural insulated panels. Each container of adhesive shall bear a *label* with the adhesive manufacturer's name, adhesive name and type and the name of the quality assurance agency.

### **R613.3.4 Lumber.**

The minimum lumber framing material used for SIPs prescribed in this document is NLGA graded No. 2 Spruce-pine-fir. Substitution of other wood species/grades that meet or exceed the mechanical properties and specific gravity of No. 2 Spruce-pine-fir shall be permitted.

### **R613.3.5 SIP screws.**

Screws used for the erection of SIPs as specified in [Section R613.5](#) shall be fabricated from steel, shall be provided by the SIPs manufacturer and shall be sized to penetrate the wood member to which the assembly is being attached by a minimum of 1 inch (25 mm). The screws shall be corrosion resistant and have a minimum shank diameter of 0.188 inch (4.7 mm) and a minimum head diameter of 0.620 inch (15.5 mm).

### **R613.3.6 Nails.**

Nails specified in [Section R613](#) shall be common or galvanized box unless otherwise stated.

## **R613.4 SIP wall panels.**

SIPs shall comply with [Figure R613.4](#) and shall have minimum panel thickness in accordance with [Tables R613.5\(1\) and R613.5\(2\)](#) for above-grade walls. All SIPs shall be identified by grade mark or certificate of inspection issued by an *approved* agency.

### **R613.4.1 Labeling.**

All panels shall be identified by grade mark or certificate of inspection issued by an *approved* agency. Each (SIP) shall bear a stamp or *label* with the following minimum information:

1. Manufacturer name/logo.
2. Identification of the assembly.
3. Quality assurance agency.

## **R613.5 Wall construction.**

Exterior walls of SIP construction shall be designed and constructed in accordance with the provisions of this section and [Tables R613.5\(1\) and R613.5\(2\)](#) and [Figures R613.5\(1\) through R613.5\(5\)](#). SIP walls shall be fastened to other wood building components in accordance with [Section R602.3](#).

Framing shall be attached in accordance with [R602.3](#) unless otherwise provided for in [Section R613](#).

### **R613.5.1 Top plate connection.**

SIP walls shall be capped with a double top plate installed to provide overlapping at corner, intersections and splines in accordance with [Figure R613.5.1](#). The double top plates shall be made up of a single 2 by top plate having a width equal to the width of the panel core, and shall be recessed into the SIP below. Over this top plate a cap plate shall be placed. The cap plate width shall match the SIP thickness and overlap the facers on both sides of the panel. End joints in top plates shall be offset at least 24 inches (610 mm).

### **R613.5.2 Bottom (sole) plate connection.**

SIP walls shall have full bearing on a sole plate having a width equal to the nominal width of the foam core. When SIP walls are supported directly on continuous foundations, the wall wood sill plate shall be anchored to the foundation in accordance with [Figure R613.5.2](#) and [Section R403.1](#).

### **R613.5.3 Wall bracing.**

SIP walls used for wall bracing shall be designed for wind loads in accordance with [Section R301.1](#) or [Section R602](#). SIP walls shall be considered continuous wood structural panel sheathing for purposes of computing required bracing. SIP corners shall be fabricated as shown in [Figure R613.9](#). When SIP walls are used for wall bracing, the SIP bottom plate shall be attached to wood framing below in accordance with [Section R602.3](#).

### **R613.6 Interior load-bearing walls.**

Interior load-bearing walls shall be constructed as specified for exterior walls.

### **R613.7 Drilling and notching.**

The maximum vertical chase penetration in SIPs shall have a maximum side dimension of 2 inches (51 mm) centered in the panel core. Vertical chases shall have a minimum spacing of 24-inches (610 mm) on center. Maximum of two horizontal chases shall be permitted in each wall panel, one at 14 inches (360 mm) from the bottom of the panel and one at mid-height of the wall panel. The maximum allowable penetration size in a wall panel shall be circular or rectangular with a maximum dimension of 12 inches (305 mm). Overcutting of holes in facing panels shall not be permitted.

### **R613.8 Connection.**

SIPs shall be connected at vertical in-plane joints in accordance with [Figure R613.8](#) or by other *approved* methods.

### **R613.9 Corner framing.**

Corner framing of SIP walls shall be constructed in accordance with [Figure R613.9](#).

#### **R613.10.1 Wood structural panel box headers.**

Wood structural panel box headers shall be allowed where SIP headers are not applicable. Wood structural panel box headers shall be constructed in accordance with [Section R602](#).

## **SECTION R614 COMBINED CONCRETE, MASONRY, OR ICF AND WOOD EXTERIOR WALL CONSTRUCTION**

### **R614.1 General.**

This section prescribes construction requirements for individual building elements where one or more exterior walls above the foundation contain multiple construction types. Where specific construction requirements are not specifically prescribed in this section, the requirements in the applicable sections of each material shall govern.

### **R614.2 Concrete, masonry, or ICF first story, wood frame second and third story.**

#### **R614.2.1 Foundation.**

The foundation system shall be designed in accordance with [Chapter 4](#).

**R614.2.2 First-story construction.**

The concrete, masonry or ICF first-story shall be in accordance with [Chapter 6](#) for the applicable first-story construction method.

**R614.2.3 Floor systems.**

The second- and third-story floor system shall be in accordance with [Chapter 5](#).

**R614.2.4 Second- and third-story construction.**

The second- and third-story walls, ceilings and roof shall be in accordance with the appropriate sections in Chapters [6](#), [8](#) and [9](#).

**R614.2.5 Shear wall connections.**

Second-story shearwalls shall be connected to first-story walls in accordance with Tables 3.2A, 3.2B, 3.2C, A-3.2A, A-3.2B or A-3.2C of the AF&PA Wood Frame Construction Manual for One- and Two-Family Dwellings as applicable.

**R614.3 Wood frame gable endwalls above concrete, masonry, or ICF walls.**

This condition is not permitted unless there is a ceiling diaphragm in accordance with Figures 3.7a and 3.15 of the AF&PA Wood Frame Construction Manual for One- and Two-Family Dwellings.

**R614.3.1 Gable construction.**

Gable construction shall be in accordance with the AF&PA Wood Frame Construction Manual for One- and Two-Family Dwellings.

**R614.3.2 Wall construction.**

Concrete, masonry or ICF wall construction shall be in accordance with [Chapter 6](#).

**R614.3.3 Gable connection.**

The connection of the wood frame gable endwall to the concrete, masonry or ICF wall shall be in accordance with [Figures R614.3\(1\) and R614.3\(2\)](#), or [Figure R609.4](#).

## SECTION R615 IMPACT-RESISTANT COVERINGS

**R615.1**

Impact resistant coverings shall be tested at 1.5 times the design pressure (positive or negative) expressed in pounds per square feet as determined by the [Florida Building Code, Building Section 1609](#) for which the specimen is to be tested. The design pressures, as determined from [Section 1609 of the Florida Building Code, Building](#) or ASCE 7, are permitted to be multiplied by 0.6.

**R615.1.1**

Impact resistant coverings shall be labeled in accordance with the provisions of [Section R615](#).

**R615.2. Labels.**

A permanent label shall be provided by the product approval holder on all impact resistant coverings.

### **R615.2.1**

The following information shall be included on the labels on impact resistant coverings:

1. Product approval holder name and address.
2. All applicable methods of approval. Methods of approval include, but, are not limited to Miami-Dade NOA; Florida Building Commission, TDI Product Evaluation; ICC-ES.
3. The test standard or standards specified at [Section R301.2.1.2](#), including standards referenced within the test standards specified at [Section R301.2.1.2](#) used to demonstrate code compliance.
4. For products with a Florida Product Approval Number or a Miami-Dade County Building and Neighborhood Compliance Department Notice of Acceptance Number (NOA), such numbers shall be included on the label.

### **R615.3 Location of label.**

The location of the label on the impact resistant covering shall be as follows:

1. Accordions: Bottom of the locking bar or center mate facing the exterior or outside.
2. Rollup: On the bottom of the hood facing the exterior or outside or on the bottom slat facing the exterior or outside.
3. Bahama Awning or Colonial Hinged: On the bottom, placed on the back of the shutter.
4. Panels: For metal and plastic panels the label may be embossed or printed spaced not more than every three (3) lineal feet on each panel. The label shall be applied by the holder of the product approval and shall face the exterior or outside.
5. Framed products: The label shall be on the side or bottom facing the exterior or outside.
6. Labels on all other products shall face the exterior or outside.

### **R615.4 Installation.**

All impact resistant coverings shall be installed in accordance with the manufacturer's installation instructions and in accordance with the product approval. Installation instructions shall be provided and shall be available to inspection personnel on the job site. Opening protection components, fasteners, and other parts evaluated by an approved product evaluation entity, certification agency, testing laboratory, architect, or engineer and approved by the holder of the product approval may be interchangeable in opening protection assemblies provided that the opening protection component(s) provide equal or greater structural performance and durability as demonstrated by testing in accordance with approved test standards.

## **SECTION R616 SOFFIT**

### **R616.1 Product Approval.**

Manufactured soffit materials and systems shall be subject to statewide or local product approval as specified in FAC Rule 9N-3. The net free area of the manufactured soffit material or system shall be included in the product approval submittal documents.



## R616.2 Labels.

Individual manufactured soffit pieces shall be permanently marked at not more than four feet on center with a number or marking that ties the product back to the manufacturer.

## R616.3

The following information shall be included on the manufactured soffit material packaging or on the individual manufactured soffit material or system pieces:

1. Product approval holder and/or manufacturer name and city and state of manufacturing plant.
2. Product model number or name.
3. Method of approval and approval numbers as applicable. Methods of approval include, but are not limited to: Florida Building Commission FL #; Miami-Dade NOA; TDI Product Evaluation; and, ICC-ES.
4. The test standard or standards specified in [Chapter 14](#) of the *Florida Building Code, Building* used to demonstrate code compliance.
5. The net free area shall be included on the packaging or label.

## R616.4 Installation.

All manufactured soffit materials shall be installed in accordance with the manufacturer's installation instructions and in accordance with the product approval. Installation instructions shall be provided and shall be available to inspection personnel on the job site. Soffit pieces, components, fasteners, and other parts evaluated by an approved product evaluation entity, certification agency, testing laboratory, architect, or engineer and approved by the holder of the product approval may be interchangeable in manufactured soffit systems provided that the soffit system component or components provide equal or greater structural performance and durability as demonstrated by testing in accordance with approved test standards.

All exterior wall coverings and soffits shall be capable of resisting the design pressures specified for walls for components and cladding loads in accordance with [Section R703.1.1](#). Manufactured soffits shall be tested at 1.5 times the design pressure. For testing purposes, the design pressures determined from [Section 1609 of the Florida Building Code, Building](#) or ASCE 7, are permitted to be multiplied by 0.6.

### Question 8

Which of the following would prohibit bundled bars being used as lintels?	The bundled bars have a lap splice which is 3 inches off the center of the lintel span. (Correct Answer)	The wall thickness only allows 4 inches on each side of the lintel. (Incorrect Answer)	The bars are No. 6 bars. (Incorrect Answer)	The bundled bars are enclosed within stirrups. (Incorrect Answer)
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**Question 9**

Impact resistant covering labels do not require which of the following?	Product model number or name. (Correct Answer)	Product approval holder name and address. (Incorrect Answer)	The Florida Product Approval Number or a Miami-Dade County Building and Neighborhood Compliance Department Notice of Acceptance Number (NOA). (Incorrect Answer)	Test standards used to demonstrate compliance. (Incorrect Answer)
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**Question 10**

In dwelling units, where the opening of an operable window is located more than _____ above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of _____ above the finished floor of the room in which the window is located.	72, 24 (Correct Answer)	60, 24 (Incorrect Answer)	60, 12 (Incorrect Answer)	72, 12 (Incorrect Answer)
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