

Soffit Installation in Florida



FEMA

HURRICANE IRMA IN FLORIDA

Recovery Advisory 2, May 2018

Purpose and Intended Audience

This Recovery Advisory provides soffit installation guidance and resources to meet or exceed minimum provisions of the 6th Edition (2017) Florida Building Code, Residential (FBCR). The primary audience for this advisory includes contractors and homeowners, but may also be helpful for building officials and design professionals.

Key Issues

- Wind-damaged soffits allowed wind-driven rain to enter building envelopes, resulting in costly damage to building interiors.
- While some water was blown into attics through soffit vents, the amount of water intrusion increased dramatically when the soffit material was missing (Figure 1).
- Need for clarification of how to meet the 6th Edition (2017) FBCR soffit installation criteria.

This Recovery Advisory Addresses

- Soffit design wind loads and installation in the Florida Building Code
- Installing the soffit

Soffit Design Wind Loads and Installation in the Florida Building Code

Compliance with the 6th Edition (2017) of the Florida Building Code (FBC) is required throughout the state for building permits issued after December 31, 2017, including projects to repair and rebuild Hurricane Irma damage. One- and two-family dwellings are covered under the scope of the FBCR. Soffit provisions in the 6th Edition (2017) of FBCR were updated from the previous (5th) edition as follows:

1. In the 6th Edition (2017) FBCR Component and Cladding Load Table R301.2(2), design wind pressures are tabulated as Allowable Stress Design (ASD)-level values. The 5th Edition (2014) FBCR tabulated strength design-level

Florida Building Code and International Code Council Codes

The 2015 International Residential Code (IRC) serves as the base code for the 6th Edition (2017) FBCR. Florida-specific amendments are added through the state's established code development process. The Florida Building Codes can be viewed for free through the "Public Access" option on the ICC website: <https://codes.iccsafe.org/public/collections/FL>.



Figure 1: Vinyl soffit damage on a home in Sugarloaf Key

Soffit Vents

Refer to the 6th Edition (2017) of FBCR Section R806 for roof venting provisions. To avoid water entry at soffit vents, options include eliminating soffit vents and providing an alternate method for air to enter the attic, or designing for an unvented attic. Another approach is to place filter fabric (like that used for heating, ventilation, or air conditioning system filters) above the vent openings; however, such an approach needs to be custom designed. For additional guidance on mitigating water intrusion through attic vents and strengthening undamaged soffits, refer to Technical Fact Sheet No. 7.5, "Minimizing Water Intrusion Through Roof Vents in High-Wind Regions" in FEMA P-499, *Homebuilder's Guide to Coastal Construction* (FEMA 2010).

wind pressures and included a note that permitted the values to be multiplied by 0.6 for ASD. Since component and cladding products are rated using ASD wind pressures, the 6th Edition table values should be easier to use than the previous edition's.

2. The effective wind area for soffit design pressures is specified as 10 square feet. The clarification simplifies soffit load determination. Unlike Table R301.2(2) in the FBCR, Table 1 on page 3 of this advisory is further simplified for soffit applications and only includes design pressures for effective wind areas of 10 square feet.

Installing the Soffit

Meeting the 6th Edition (2017) FBCR soffit installation criteria requires determining (1) the site- and location-specific wind loads that soffits must resist, and (2) which soffit assemblies are rated and approved to meet the wind load demand, and how the chosen soffit assembly must be installed to perform as designed.

Step 1: Determine the Wind Loads

Follow the steps below to find minimum soffit wind loads (pressures) in accordance with the 2017 FBCR.

1. Determine location- and site-specific factors that affect the soffit wind pressures.
 - a. Design wind speed:** Find location-specific design wind speeds in Figure R301.2(4) of the 6th Edition (2017) FBCR. Wind speeds for specific addresses and latitude/longitude can be found at <http://windspeed.atcouncil.org> or <https://asce7hazardtool.online/>. For one- and two-family dwellings, select wind speeds given for ASCE 7-10, Risk Category II.
 - b. Exposure category:** Check with your local building official to determine site-specific exposure category (B, C, or D) in accordance with the 6th Edition (2017) FBCR Section 301.2.1.4.3. Keep in mind that exposure category can vary within individual neighborhoods because it is related to the terrain that surrounds the building.
 - c. Mean roof height:** Determine the mean roof height (MRH) in accordance with the 6th Edition (2017) FBCR Section R202 definition: "The average of the roof eave height and the height to the highest point on the roof surface, except that eave height shall be used for a roof angle of less than or equal to 10 degrees." Refer to Figure 2 for clarification.
2. Using the site-specific wind speed determined in Step 1a, find the Zone 4 and Zone 5 pressures using Table 1.

Zone 5 wind pressures apply to soffit surfaces within 4 feet of wall corners, and Zone 4 wind pressures apply to all other areas. The selected soffit system must resist the building's highest (Zone 5) wind pressures, so calculating Zone 4 pressures will not be necessary for many assemblies (refer to Figure R301.2(7)).
3. Modify the wind pressure(s) for the specific wind zone, as determined in Step 2, for factors determined in Steps 1b and 1c.

FBCR Soffit Installation Provision

The following Chapter 7 (Wall Covering) provisions specifically address soffit installation:

R703.1.2.1 Wind resistance of soffits: Soffits and their attachments shall be capable of resisting wind loads specified in Tables R301.2(2) and R301.2(3) for walls using an effective wind area of 10 square feet.

R703.11.1.4 Vinyl soffit panels: Soffit panels shall be individually fastened to a supporting component such as a nailing strip, fascia or subfascia component or as specified by the manufacturer's instructions.

Source: 6th Edition (2017) FBCR

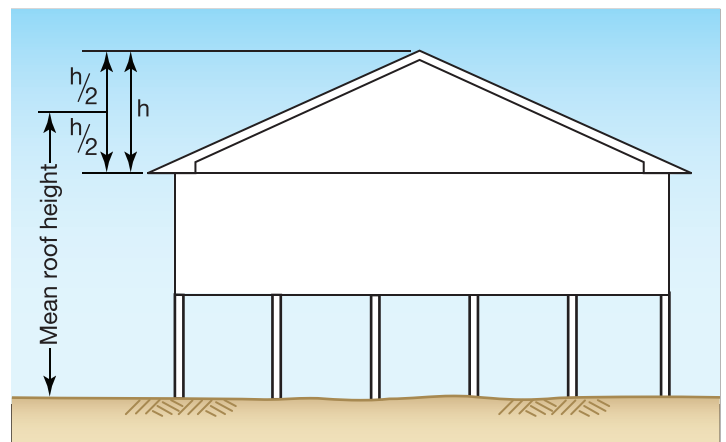


Figure 2: Illustration showing how to determine the MRH

To do this, multiply wind pressure values by the coefficients in Table 2 as needed to adjust for exposure categories other than B and MRHs other than 30 feet. For MRHs between those given in Table 2, use the value assigned to the higher MRH or interpolate between the higher and lower values.

4. Select a soffit system rated to resist Zone 5 pressures determined in Step 3.

In some cases, such as the prescriptive wood structural panel soffit, the soffit attachment schedule may be reduced for (lesser) Zone 4 pressures where soffit sections are 4 feet or more from building corners. Follow material-specific guidance in Step 2 of this advisory to ensure compliant application.

Table 1: Soffit Positive and Negative Pressures (Pounds per Square Foot) for Zones 4 and 5 with MRH=30 feet, Exposure B

	115 mph	120 mph	130 mph	140 mph	150 mph	160 mph	170 mph	180 mph
Zone 4	-15.0	-16.0	-19.0	-22.0	-26.0	-30.0	-33.0	-37.9
	14.3	15.5	18.2	21.2	24.3	27.7	31.2	35.0
Zone 5	14.3	-20.0	-24.0	-28.0	-32.0	-37.0	-41.0	-46.8
	-19.0	15.5	18.2	21.2	24.3	27.7	31.2	35.0

Source: Table R301.2(2) in the FBCR, abbreviated to address Florida-specific wind speeds and wall zones only; available at <https://codes.iccsafe.org/public/collections/FL>.

Table 2: Height and Exposure Adjustment Coefficients for Soffit Pressure

Mean Roof Height (feet)	Exposure B	Exposure C	Exposure D
15	1.00	1.21	1.47
20	1.00	1.29	1.55
25	1.00	1.35	1.61
30	1.00	1.40	1.66
35	1.05	1.45	1.70
40	1.09	1.49	1.74
45	1.12	1.53	1.78
50	1.16	1.56	1.81
55	1.19	1.59	1.84
60	1.22	1.62	1.87

Source: Table R301.2(3) in the FBCR available at <https://codes.iccsafe.org/public/collections/FL>.

Step 2: Material-Specific Soffit Installation

Whether or not a soffit installation is code-compliant depends on both the material and product. In Florida, manufactured soffit products must be approved as described in the text box titled “Florida Product Approval” because they are part of the building envelope and included under the “panel walls” product category. As such, selecting manufactured soffit products with up-to-date Florida product approval is the first required step for most soffit installations. Alternately, wood structural panel soffits may be assembled and installed on site to resist the wind pressures determined in Step 1 using the prescriptive approach described at the end of this section.

Soffit system support and corrosion resistance. Regardless of whether the chosen soffit system is manufactured or assembled prescriptively using wood structural panels, soffit system support and the corrosion resistance of the soffit fasteners must be addressed. Section 802 of the 6th Edition (2017) FBCR and Section 3.5 of the 2015 Edition Wood Frame Construction Manual provides requirements for ceiling joists, rafter overhangs, rake overhangs, and outlookers that support soffit systems. Section R703.3.2 of the 6th Edition (2017) FBCR requires corrosion-resistant wall covering fasteners in accordance with manufacturer’s installation instructions. Refer to Note 1 of Table 3 for guidance on corrosion protection specific to wood structural panel soffits.

Florida Product Approval

Rule 61G20-3 of the Florida Administrative Code applies to products and systems that comprise the building envelope and structural frame. The rule requires the following products to have product approval for compliance with the structural requirements of the Florida Building Code:

- Panel walls
- Exterior doors
- Roofing products
- Skylights
- Windows
- Shutters
- Structural components
- Impact protective systems

Products may be approved using either the optional statewide product approval system or local product approval. Regardless of the method used, products have to be evaluated for compliance (evaluation report, certification, test report, etc.), be validated for compliance with the evaluation, and approved by the Florida Building Commission. For additional information on product approval in the State of Florida, see Rule 61G20-3 of the Florida Administrative Code or the Building Code Information System at <http://www.floridabuilding.org> administered by the Florida Department of Business and Professional Regulation. A database of products approved using the statewide product approval system can be found under the “Product Approval” tab at <http://www.floridabuilding.org>.

Navigating the Florida Approval Website to Find Approved Products for Your Location

1. Link to the main page: <http://www.floridabuilding.org>
2. Select the “Product Approval” option from the left margin
3. From the Product Approval menu, select “Find a Product or Application”
4. From the “Category” pull-down options, select “Panel Walls”
5. From the “Subcategory” pull-down options, select “Soffits”
6. For “Application Status,” select “Approved”
7. If in Broward or Miami-Dade Counties, select “Yes” from “Approved for use in HVHZ”
8. Click on “Search”
9. Select any given listing to determine allowable “Design Pressure” and installation instructions

In some cases, allowable design pressures are shown in “Summary of Products” at the bottom of the page. In other cases, it is necessary to open the Evaluation Report(s) or Installation Instructions linked in the right column of “Summary” for design pressures.

Since fastener vulnerability to corrosion varies with location, check with your local building official for any specific requirements or guidelines. For further recommendations on corrosion-resistant connectors, see Table 1 in the National Flood Insurance Program Technical Bulletin 8, *Corrosion Protection for Metal Connectors in Coastal Areas* (FEMA 1996).

Manufactured soffit systems. Since February 2018, the Florida Product Approval website has listed approved soffit assemblies for vinyl, metal (aluminum and steel), fiber cement, and engineered wood assemblies.

To find the rated design pressures approved for each product, refer to the evaluation report and/or the installation instructions linked at the bottom of each product page. Only soffit panels that have been rated to meet or exceed the wind pressures determined for the specific location and site should be installed. See the text box for Florida Product Approval website navigation tips.

When selecting soffit systems from the Florida Product Approval website that meet the wind pressure loading for your building, note that individual product installation instructions vary with respect to the information and

level of detail provided. Review the installation instructions on the Florida Product Approval website for any prospective product prior to purchasing while considering the following:

- When determining soffit pressure resistance from the evaluation report or installation instructions, select “Allowable Design Load,” not “Ultimate Load.” If needed, Ultimate Loads can be converted to Allowable Design Loads by multiplying values by 0.6.
- Check whether the installation instructions have sufficient detail needed to install and inspect the soffits. In cases where blocking or substrate size and/or attachment to framing indicates “by others” or “per project requirements,” the details will need to be specified and sealed by a professional engineer licensed in Florida for site-specific loads.
- Ensure that the installation instructions include all referenced details needed for the chosen design pressure application.

Wood structural panel, closed soffit.

As an alternative to manufactured soffit systems, wood structural panel soffits may be prescriptively installed to resist the location- and site-specific wind pressures determined in Step 1.

Where the design pressure is 30 pounds per square foot (psf) or less, wood structural panel soffits should be a minimum of 3/8 inch in thickness and fastened to framing or nailing strips with a minimum of 6d box nails (2-inch x 0.099-inch x 0.266-inch head diameter [flat head]) spaced not more than 6 inches on center at panel edges and 12 inches on center at intermediate supports.

For design pressures greater than 30 psf, refer to Table 3 for modified panel thickness, fastener type, size, and spacing. See Figure 3 for a detail of a wood structural panel, closed soffit.

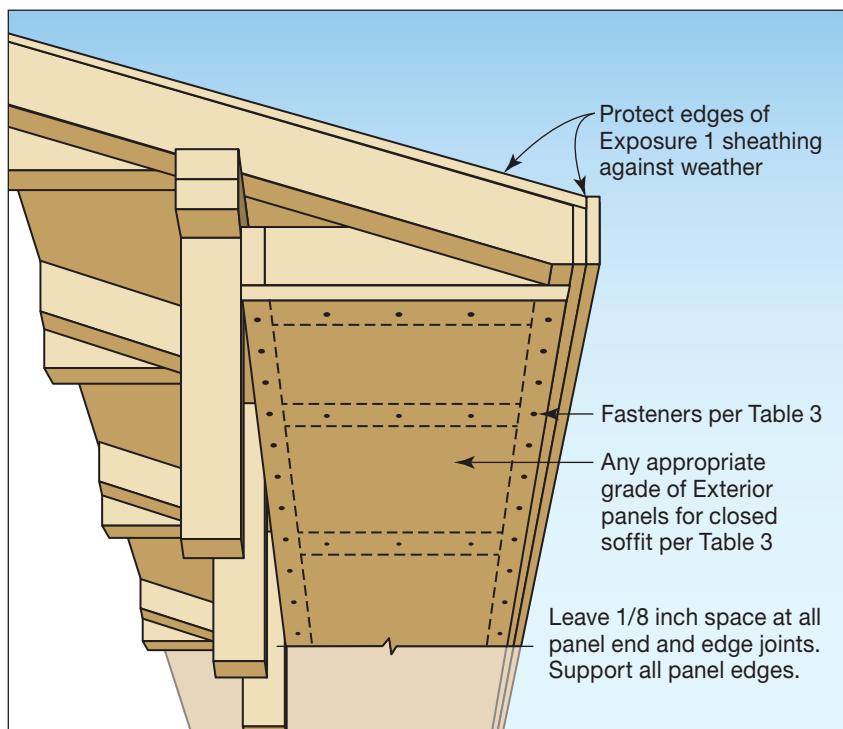


Figure 3: Detail of wood structural panel, closed soffit

Wood Structural Panel Sheathing

Wood structural panel sheathing is manufactured with span ratings of 12/0, 16/0, 20/0, 24/0, 24/16, 32/16, 40/20, and 48/24, in performance categories ranging from 5/16 to 3/4, and in two bond classifications: Exterior and Exposure 1.

Span ratings appear as two numbers separated by a slash, such as 32/16, 48/24, etc. The left-hand number denotes the maximum recommended spacing of supports when the panel is used for roof sheathing with the strength axis of the panel across three or more supports (two or more spans). The right-hand number denotes the maximum recommended spacing of supports when the panel is used for subflooring with the strength axis of the panel across three or more supports (two or more spans). A panel marked 32/16, for example, may be used for roof decking over supports up to 32 inches on center or for subflooring over supports up to 16 inches on center.

Source: APA, <http://www.wooduniversity.org/glossary>

Table 3: Installation Information for Wood Structural Panel, Closed Soffit

Maximum Design Pressure (- or + psf)	Minimum Nominal Panel Thickness (inch)	Nail Type and Size (inch)	Fastener Spacing along Supports (inch)	
			Galvanized Steel	Stainless Steel
40	3/8	6d box (2 x 0.099 x 0.266 head diameter)	6	4
50	3/8	6d box (2 x 0.099 x 0.266 head diameter)	4	4
		8d common (2½ x 0.131 x 0.281 head diameter)	6	6
60	3/8	6d box (2 x 0.099 x 0.266 head diameter)	4	3
		8d common (2½ x 0.131 x 0.281 head diameter)	6	4
70	7/16	8d common (2½ x 0.131 x 0.281 head diameter)	4	4
		10d box (3 x 0.128 x 0.312 head diameter)	6	4
80	7/16	8d common (2½ x 0.131 x 0.281 head diameter)	4	4
		10d box (3 x 0.128 x 0.312 head diameter)	6	4
90	15/32	8d common (2½ x 0.131 x 0.281 head diameter)	4	3
		10d common (3 x 0.148 x 0.312 head diameter)	6	4

Notes:

- 1: Fastener spacing for galvanized steel nails can be larger than for stainless steel nails of the same diameter and length because galvanized steel nails have better withdrawal resistance from wood. Hot-dip galvanized steel nails or stainless steel nails are recommended in coastal areas.
- 2: Maximum spacing of soffit framing members = 24 inches; tabulated values assume minimum two-span continuous condition.
- 3: Only exterior panels should be used for closed soffits. To achieve pressure values shown in Table 3, panels must be installed with strong axis across supports. A 3/8-inch, 7/16-inch, and 15/32-inch minimum nominal panel thickness is associated with minimum panel span ratings (e.g., panel grade) of 24/0, 24/16, and 32/16, respectively.
- 4: Tabulated nail spacing assumes sheathing is attached to soffit framing members with a specific gravity of at least 0.42, which includes the following species combinations: spruce-pine-fir, hem-fir, Douglas-fir-larch, and southern pine.

Source: Table adapted from data available in *National Design Specifications for Wood Construction* (AWC 2015) and *Special Design Provisions for Wind & Seismic* (AWC 2015).

References and Useful Links

References

ASCE (American Society of Civil Engineers). 2010. ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures*.

AWC (American Wood Council). 2015. *National Design Specifications for Wood Construction*. http://www.awc.org/pdf/codes-standards/publications/nds/AWC-NDS2015-ViewOnly-1603.pdf?_sm_au_=iVV06qrjPvPZPnZj.

AWC. 2015. *Special Design Provisions for Wind & Seismic*. <http://www.awc.org/pdf/codes-standards/publications/sdpws/AWC-SDPWS2015-ViewOnly-1508.pdf>.

AWC. 2015. *Wood Frame Construction Manual for One- and Two-Family Dwellings*. <http://www.awc.org/pdf/codes-standards/publications/wfcm/AWC-WFCM2015-ViewOnly-1510.pdf>.

FEMA (Federal Emergency Management Agency). 1996. Technical Bulletin 8, *Corrosion Protection of Metal Connectors in Coastal Areas*. <https://www.fema.gov/media-library/assets/documents/3509>.

FEMA. 2010. *Home Builder's Guide to Coastal Construction*. FEMA P-499. <https://www.fema.gov/media-library/assets/documents/6131>.

Useful Links

“Florida Building Codes.” Florida Department of Business & Professional Regulation (DBPR).

Link: https://www.floridabuilding.org/bc/bc_default.aspx.

“APA Glossary.” WoodUniversity.Org. Link: <https://www.wooduniversity.org/glossary>.

“APA Help Desk.” WoodUniversity.Org. Link: <https://www.apawood.org/help>.

“Hazards by Location.” Applied Technology Council. Link: <https://hazards.atcouncil.org/>.

“ASCE 7 Hazard Tool.” American Society of Civil Engineers (ASCE). Link: <https://asce7hazardtool.online/>.

For more information, see the FEMA Building Science Frequently Asked Questions website at <http://www.fema.gov/frequently-asked-questions-building-science>.

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