

Issue: DS 2023-044: The petitioner Jeffrey Arneson, of Jax Apex Technology Inc is seeking a declaratory statement on whether Section R301.2.1.1 allows performance-based design of roof deck thickness.

Petitioner seeks clarification of the following question:

Exception #5 of R301.2.1.1 (highlighted within this petition) only applies to attachment of the roof deck. As you can see from Table 1, Performance based design generally results in roof deck thicknesses that are less than those prescribed in Table R803.2.2. Is Apex correct to interpret Section R301.2.1.1 as allowing performance-based design of roof deck thickness?

Background:

Jax Apex Technology is a structural engineering company that services high volume home builders throughout Florida. They are currently updating their residential base plan designs to the 2023 Florida Building Code. The base plans are wood framed single family detached dwellings and multifamily townhomes. The structural roof framing assemblies for the proposed projects consist of either wood framed trusses or rafters supporting wood structural panel roof decks and the structural building assembly is engineered to resist loads as determined using ASCE 7.

Currently, Apex performs calculations to determine roof deck thickness by applying ASCE 7 wind loads using the properties of wood structural panel provided in APA Technical Bulletin Q225G. Except for Table R803.2.2, their calculated results meet or exceed the performance requirements of the 8th Edition (2023) Florida Building Code, Building and Residential.

8th Edition (2023) Florida Building Code - Residential

CHAPTER 3 BUILDING PLANNING

R301.2.1.1 Wind design required.

In regions where the ultimate design wind speed, V_{ult} , from Figure R301.2(4) equals or exceeds 115 miles per hour (51 m/s), the design of concrete, masonry, wood and steel buildings for wind loads shall be in accordance with one or more of the following methods:

1. *AWC Wood Frame Construction Manual (WFCM).*
2. Concrete and masonry walls are permitted to be designed in accordance with *ICC Standard for Residential Construction in High-Wind Regions (ICC 600).*
3. *ASCE Minimum Design Loads for Buildings and Other Structures (ASCE 7).*
4. *AISI Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings (AISI S230).*
5. *Florida Building Code, Building;* or
6. The *MAF Guide to Concrete Masonry Residential Construction in High Wind Areas* shall be permitted for applicable concrete masonry buildings for a basic wind speed of 130 mph (58 m/s) or less in Exposure B and 110 mph (49 m/s) or less in Exposure C in accordance with Figure R301.2(4) as converted in accordance with R301.2.1.3.

Exceptions:

1. Footings and foundations shall comply with Chapter 4.
2. Exterior windows and doors shall comply with Section R609.
3. For structural insulated panels, the provisions of this code apply in accordance with the limitations of Section R610.

4. Exterior wall coverings and soffits shall comply with Chapter 7.
5. Roof sheathing shall be attached in accordance with Section R803.
6. Roof coverings shall comply with Chapter 9.
7. For concrete construction, the provisions of this code apply in accordance with the limitations of Section R608.2.

The elements of design not addressed by the methods in Items 1 through 6 shall be in accordance with the provisions of this code.

CHAPTER 8 ROOF-CEILING CONSTRUCTION

R801.2 Requirements.

Roof and ceiling construction shall be capable of accommodating all loads imposed in accordance with Section R301 and of transmitting the resulting loads to the supporting structural elements.

R803.2.2 Allowable spans.

The minimum thickness and span rating for wood structural panel roof sheathing shall not exceed the values set forth in Table R803.2.2.

**TABLE R803.2.2
MINIMUM ROOF SHEATHING THICKNESS**

Rafter/Trusses Spacing 2 4 in. o.c.	WIND SPEED							
	115 mph	120 mph	130 mph	140 mph	150 mph	160 mph	170 mph	180 mph
Minimum Sheathing Thickness, inches (Panel Span Rating) Exposure B	7/16(24/16)	7/16(24/16)	7/16(24/16)	7/16(24/16)	15/32(32/16)	19/32(40/20)	19/32(40/20)	19/32(40/20)
Minimum Sheathing Thickness, inches (Panel Span Rating) Exposure C	7/16(24/16)	7/16(24/16)	15/32(32/16)	19/32(40/20)	19/32(40/20)	19/32(40/20)	19/32(40/20)	23/32(48/24)
Minimum Sheathing Thickness, inches	15/32(32/16)	19/32(40/20)	19/32(40/20)	19/32(40/20)	19/32(40/20)	19/32(40/20)	23/32(48/24)	23/32(48/24)

inches(Pa nel Span Rating) Exposure D								
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Staff Analysis

Question:

Exception #5 of R301.2.1.1 (highlighted within this petition) only applies to attachment of the roof deck. As you can see from Table 1, Performance based design generally results in roof deck thicknesses that are less than those prescribed in Table R803.2.2. Is Apex correct to interpret Section R301.2.1.1 as allowing performance-based design of roof deck thickness?

Answer:

The answer to the Petitioner’s question is yes. As per Section R301.2.1.1 of the 8th Edition (2023) Florida Building Code, Residential, performance-based design (i.e. ASCE 7) is an acceptable option for designing wood buildings and their roof deck thickness for wind load.