

Part III—Building Planning and Construction

CHAPTER 3

BUILDING PLANNING

SECTION R301 DESIGN CRITERIA

R301.1 Application. Buildings and structures, and parts thereof, shall be constructed to safely support all loads, including dead loads, live loads, roof loads, flood loads, snow loads, wind loads and seismic loads as prescribed by this code. The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets the requirements for the transfer of loads from their point of origin through the load-resisting elements to the foundation. Buildings and structures constructed as prescribed by this code are deemed to comply with the requirements of this section.

R301.1.1 Alternative provisions. As an alternative to the requirements in Section R301.1, the following standards are permitted subject to the limitations of this code and the limitations therein. Where engineered design is used in conjunction with these standards, the design shall comply with the *International Building Code*.

1. AF&PA *Wood Frame Construction Manual* (WFCM).
2. AISI *Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings* (AISI S230).
3. ICC *Standard on the Design and Construction of Log Structures* (ICC 400).

R301.1.2 Construction systems. The requirements of this code are based on platform and balloon-frame construction for light-frame buildings. The requirements for concrete and masonry buildings are based on a balloon framing system. Other framing systems must have equivalent detailing to ensure force transfer, continuity and compatible deformations.

R301.1.3 Engineered design. Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the *International Building Code* is permitted for buildings and structures, and parts thereof, included in the scope of this code.

R301.2 Climatic and geographic design criteria. Buildings shall be constructed in accordance with the provisions of this code. Additional criteria is established and set forth in Table R301.2(1).

R301.2.1 Wind limitations. Buildings and portions thereof shall be limited by wind speed, as defined in Table R301.2(1), and construction methods in accordance with this code. Basic wind speeds shall be determined from Table R301.2(1) and Figure R301.2(4) A and B. Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this sections for each portion shall apply. Where loads for windows, skylights and exterior doors are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure per Table R301.2(3), shall be used to determine design load performance requirements for windows and doors.

Exception: All accessory structures less than 200 square feet in area.

R301.2.1.1 Design criteria. Construction in regions where the ultimate wind speeds from Figure 301.2(4)A equal or exceed 110 mph (177.1 km/h) shall be designed in accordance with one of the following.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM).
2. Southern Building Code Congress International *Standard for Hurricane Resistant Residential Construction* (SSTD 10).
3. International Code Council (ICC) *Standard for Residential Construction in High-wind Regions* (ICC-600).
4. Hurricane Resistant Residential Construction (SSTD 10); or *Minimum Design Loads for Buildings and Other Structures* (ASCE-7).
5. Cold-formed steel construction shall be designed in accordance with the provisions of this code.
6. Concrete construction shall be designed in accordance with the provisions of this code.
7. Structural insulated panel (SIP) walls shall be designed in accordance with the provisions of this code.
8. For all communities located in the 110 mph and 120 mph wind zones, the prescriptive criteria in

Appendix AA may be used for buildings and structures in lieu of Items 1-3.

Exceptions:

1. Buildings and structures of any size in 110 mph or 120 mph wind zones located in a V zone as determined by community FIRMS.
2. Two or more story buildings and structures of any size located in 120 mph wind zone with more than 20 percent exterior fenestration.
3. Two or more story structures with a building height greater than 33 feet as measured from Grade Plane to the average height of the highest roof surface.
4. Any two or more story structure or building with opening fenestration greater than 40 percent on any one wall.

R301.2.1.1.1 Sunrooms. Sunrooms shall comply with AAMA/NPEA/NSA 2100. For the purpose of applying the criteria of AAMA/NPEA/NSA 2100 based on the intended use, sunrooms shall be identified as one of the following categories by the permit applicant, design professional or the property owner or owner’s agent in the construction documents. Component and cladding pressures shall be used for the design of elements that do not qualify as main windforce-resisting systems. Main windforce-resisting system pressures shall be used for the design of elements assigned to provide support and stability for the overall *sunroom*.

Category I: A thermally isolated sunroom with walls that are open or enclosed with insect screening or 0.5 mm (20 mil) maximum thickness plastic film. The space is nonhabitable and unconditioned.

Category II: A thermally isolated sunroom with enclosed walls. The openings are enclosed with translucent or transparent plastic or glass. The space is nonhabitable and unconditioned.

Category III: A thermally isolated sunroom with enclosed walls. The openings are enclosed with

translucent or transparent plastic or glass. The sunroom fenestration complies with additional requirements for air infiltration resistance and water penetration resistance. The space is nonhabitable and unconditioned.

Category IV: A thermally isolated sunroom with enclosed walls. The sunroom is designed to be heated or cooled by a separate temperature control or system and is thermally isolated from the primary structure. The sunroom fenestration complies with additional requirements for water penetration resistance, air infiltration resistance and thermal performance. The space is nonhabitable and conditioned.

Category V: A sunroom with enclosed walls. The sunroom is designed to be heated or cooled and is open to the main structure. The sunroom fenestration complies with additional requirements for water penetration resistance, air infiltration resistance and thermal performance. The space is habitable and conditioned.

R301.2.1.2 Protection of openings. Windows in buildings located in Wind Zone 3 shall have glazed openings protected from windborne debris or the building shall be designed as a partially enclosed building in accordance with the International Building Code. Glazed opening protection for windborne debris shall meet the requirements of the Large Missile Test of ASTM E 1996 and of ASTM E 1886 referenced therein.

Exception: Wood structural panels with a minimum thickness of $\frac{7}{16}$ inch (11.1 mm) and a maximum span of 8 feet (2438 mm) shall be permitted for opening protection in one- and two-story buildings. Panels shall be precut to cover the glazed openings with attachment hardware provided. Attachments shall be provided in accordance with Table R301.2.1.2 or shall be designed to resist the components and cladding loads determined in accordance with the provisions of the International Building Code. All shutter systems must be approved by Building Code Standards Committee.

TABLE R301.2(1)
CLIMATE DESIGN CRITERIA

GROUND SNOW LOAD	WIND	TOPOGRAPHIC EFFECTS	SEISMIC DESIGN CRITERIA	WEATHERING	FROST LINE DEPTH ^{2,3}	TERMITE	DECAY	WINTER DESIGN TEMP	ICE SHIELD UNDERLAYMENT REQUIRED	FLOOD HAZARDS	AIR FREEZING INDEX	MEAN TEMPERATURE ANNUAL
30 psf ^{1,2}	See Figure R301.2(4)	No	None ⁴	Severe	40"	Moderate to Heavy	Slight to Moderate	0° F in Prov County 5° All Other	Yes	Yes (See Community FIRMS)	1200° Days B.F.	50° F

NOTES:

1. Roof live load and roof snow load are not additive
2. New Shoreham frost depth is 30" and Ground Snow Load is 25 psf.
3. Requirements for frost footings for accessory attached and detached structures are as follows:
 - a. Structures and detached accessory buildings of 0-199 sq. feet do not require any frost depth foundations or footings. Two ground screw anchors or other means approved by the building official shall be provided to resist overturning.
 - b. Accessory attached structures such as decks, platforms or landings shall have footings extending to 3 feet 4 inches below grade. Exterior stairs and steps off decks, balconies and platforms greater than 30 inches above grade shall have stringer supports extending to 12 inches below grade, and shall be supported and secured to prevent lateral displacement or vertical collapse due to grade changes.
4. Seismic design criteria is not required for buildings and structures regulated by this code.

TABLE R301.2(2)
COMPONENT AND CLADDING LOADS FOR A BUILDING WITH A MEAN
ROOF HEIGHT OF 30 FEET LOCATED IN EXPOSURE B (ASD) (psf)^{a, b, c, d, e}

ZONE	EFFECTIVE WIND AREA (feet ²)	ULTIMATE DESIGN WIND SPEED, V_{ULT} (mph)																		
		110		115		120		130		140		150		160		170		180		
Roof 0 to 7 degrees	1	10	10.0	-13.0	10.0	-14.0	10.0	-15.0	10.0	-18.0	10.0	-21.0	9.9	-24.0	11.2	-27.0	12.6	-31.0	14.2	-35.0
	1	20	10.0	-12.0	10.0	-13.0	10.0	-15.0	10.0	-17.0	10.0	-20.0	9.2	-23.0	10.6	-26.0	11.9	-30.0	13.3	-34.1
	1	50	10.0	-12.0	10.0	-13.0	10.0	-14.0	10.0	-17.0	10.0	-19.0	8.5	-22.0	10.0	-26.0	10.8	-29.0	12.2	-32.9
	1	100	10.0	-11.0	10.0	-13.0	10.0	-14.0	10.0	-16.0	10.0	-19.0	7.8	-22.0	10.0	-25.0	10.0	-28.0	11.3	-32.0
	2	10	10.0	-21.0	10.0	-23.0	10.0	-26.0	10.0	-30.0	10.0	-35.0	9.9	-40.0	11.2	-46.0	12.6	-52.0	14.2	-58.7
	2	20	10.0	-19.0	10.0	-21.0	10.0	-23.0	10.0	-27.0	10.0	-31.0	9.2	-36.0	10.6	-41.0	11.9	-46.0	13.3	-52.4
	2	50	10.0	-16.0	10.0	-18.0	10.0	-19.0	10.0	-23.0	10.0	-26.0	8.5	-30.0	10.0	-34.0	10.8	-39.0	12.2	-44.1
	2	100	10.0	-14.0	10.0	-15.0	10.0	-16.0	10.0	-19.0	10.0	-22.0	7.8	-26.0	10.0	-30.0	10.0	-33.0	11.3	-37.9
	3	10	10.0	-33.0	10.0	-36.0	10.0	-39.0	10.0	-46.0	10.0	-53.0	9.9	-61.0	11.2	-69.0	12.6	-78.0	14.2	-88.3
	3	20	10.0	-27.0	10.0	-29.0	10.0	-32.0	10.0	-38.0	10.0	-44.0	9.2	-50.0	10.6	-57.0	11.9	-65.0	13.3	-73.1
	3	50	10.0	-19.0	10.0	-21.0	10.0	-23.0	10.0	-27.0	10.0	-32.0	8.5	-36.0	10.0	-41.0	10.8	-47.0	12.2	-53.1
	3	100	10.0	-14.0	10.0	-15.0	10.0	-16.0	10.0	-19.0	10.0	-22.0	7.8	-26.0	10.0	-30.0	10.0	-33.0	11.3	-37.9
Roof > 7 to 27 degrees	1	10	10.0	-11.0	10.0	-13.0	10.0	-14.0	10.5	-16.0	12.2	-19.0	14.0	-22.0	15.9	-25.0	17.9	-28.0	20.2	-32.0
	1	20	10.0	-11.0	10.0	-12.0	10.0	-13.0	10.0	-16.0	11.1	-18.0	12.8	-21.0	14.5	-24.0	16.4	-27.0	18.4	-31.1
	1	50	10.0	-11.0	10.0	-12.0	10.0	-13.0	10.0	-15.0	10.0	-18.0	11.1	-20.0	12.7	-23.0	14.3	-26.0	16.0	-29.9
	1	100	10.0	-10.0	10.0	-11.0	10.0	-12.0	10.0	-15.0	10.0	-17.0	9.9	-20.0	11.2	-22.0	12.6	-25.0	14.2	-29.0
	2	10	10.0	-20.0	10.0	-22.0	10.0	-24.0	10.5	-29.0	12.2	-33.0	14.0	-38.0	15.9	-44.0	17.9	-49.0	20.2	-55.8
	2	20	10.0	-19.0	10.0	-20.0	10.0	-22.0	10.0	-26.0	11.1	-31.0	12.8	-35.0	14.5	-40.0	16.4	-45.0	18.4	-51.2
	2	50	10.0	-16.0	10.0	-18.0	10.0	-20.0	10.0	-23.0	10.0	-27.0	11.1	-31.0	12.7	-35.0	14.3	-40.0	16.0	-45.4
	2	100	10.0	-15.0	10.0	-16.0	10.0	-18.0	10.0	-21.0	10.0	-24.0	9.9	-28.0	11.2	-32.0	12.6	-36.0	14.2	-40.9
	3	10	10.0	-30.0	10.0	-33.0	10.0	-36.0	10.5	-43.0	12.2	-49.0	14.0	-57.0	15.9	-65.0	17.9	-73.0	20.2	-82.4
	3	20	10.0	-28.0	10.0	-31.0	10.0	-34.0	10.0	-40.0	11.1	-46.0	12.8	-53.0	14.5	-60.0	16.4	-68.0	18.4	-77.0
	3	50	10.0	-26.0	10.0	-28.0	10.0	-31.0	10.0	-36.0	10.0	-42.0	11.1	-48.0	12.7	-55.0	14.3	-62.0	16.0	-69.9
	3	100	10.0	-24.0	10.0	-26.0	10.0	-28.0	10.0	-33.0	10.0	-39.0	9.9	-44.0	11.2	-51.0	12.6	-57.0	14.2	-64.6
Roof > 27 to 45 degrees	1	10	11.9	-13.0	13.1	-14.0	14.2	-15.0	16.7	-18.0	19.4	-21.0	22.2	-24.0	25.3	-27.0	28.5	-31.0	32.0	-35.0
	1	20	11.6	-12.0	12.7	-13.0	13.8	-14.0	16.2	-17.0	18.8	-20.0	21.6	-23.0	24.6	-26.0	27.7	-29.0	31.1	-33.2
	1	50	11.2	-11.0	12.2	-12.0	13.3	-13.0	15.6	-16.0	18.1	-18.0	20.8	-21.0	23.6	-24.0	26.7	-27.0	29.9	-30.8
	1	100	10.9	-10.0	11.9	-11.0	12.9	-12.0	15.1	-15.0	17.6	-17.0	20.2	-20.0	22.9	-22.0	25.9	-25.0	29.0	-29.0
	2	10	11.9	-15.0	13.1	-16.0	14.2	-18.0	16.7	-21.0	19.4	-24.0	22.2	-28.0	25.3	-32.0	28.5	-36.0	32.0	-40.9
	2	20	11.6	-14.0	12.7	-16.0	13.8	-17.0	16.2	-20.0	18.8	-23.0	21.6	-27.0	24.6	-30.0	27.7	-34.0	31.1	-39.1
	2	50	11.2	-13.0	12.2	-15.0	13.3	-16.0	15.6	-19.0	18.1	-22.0	20.8	-25.0	23.6	-29.0	26.7	-32.0	29.9	-36.8
	2	100	10.9	-13.0	11.9	-14.0	12.9	-15.0	15.1	-18.0	17.6	-21.0	20.2	-24.0	22.9	-27.0	25.9	-31.0	29.0	-35.0
	3	10	11.9	-15.0	13.1	-16.0	14.2	-18.0	16.7	-21.0	19.4	-24.0	22.2	-28.0	25.3	-32.0	28.5	-36.0	32.0	-40.9
	3	20	11.6	-14.0	12.7	-16.0	13.8	-17.0	16.2	-20.0	18.8	-23.0	21.6	-27.0	24.6	-30.0	27.7	-34.0	31.1	-39.1
	3	50	11.2	-13.0	12.2	-15.0	13.3	-16.0	15.6	-19.0	18.1	-22.0	20.8	-25.0	23.6	-29.0	26.7	-32.0	29.9	-36.8
	3	100	10.9	-13.0	11.9	-14.0	12.9	-15.0	15.1	-18.0	17.6	-21.0	20.2	-24.0	22.9	-27.0	25.9	-31.0	29.0	-35.0
Wall	4	10	13.1	-14.0	14.3	-15.0	15.5	-16.0	18.2	-19.0	21.2	-22.0	24.3	-26.0	27.7	-30.0	31.2	-33.0	35.0	-37.9
	4	20	12.5	-13.0	13.6	-14.0	14.8	-16.0	17.4	-19.0	20.2	-22.0	23.2	-25.0	26.4	-28.0	29.7	-32.0	33.4	-36.4
	4	50	11.7	-12.0	12.8	-14.0	13.9	-15.0	16.3	-17.0	19.0	-20.0	21.7	-23.0	24.7	-27.0	27.9	-30.0	31.3	-34.3
	4	100	11.1	-12.0	12.1	-13.0	13.2	-14.0	15.5	-17.0	18.0	-19.0	20.6	-22.0	23.5	-25.0	26.5	-29.0	29.8	-32.7
	4	500	10.0	-10.0	10.6	-11.0	11.6	-12.0	13.6	-15.0	15.8	-17.0	18.1	-20.0	20.6	-22.0	23.2	-25.0	26.1	-29.0
	5	10	13.1	-17.0	14.3	-19.0	15.5	-20.0	18.2	-24.0	21.2	-28.0	24.3	-32.0	27.7	-37.0	31.2	-41.0	35.0	-46.8
	5	20	12.5	-16.0	13.6	-17.0	14.8	-19.0	17.4	-22.0	20.2	-26.0	23.2	-30.0	26.4	-34.0	29.7	-39.0	33.4	-43.7
	5	50	11.7	-14.0	12.8	-16.0	13.9	-17.0	16.3	-20.0	19.0	-23.0	21.7	-27.0	24.7	-31.0	27.9	-35.0	31.3	-39.5
	5	100	11.1	-13.0	12.1	-14.0	13.2	-16.0	15.5	-19.0	18.0	-22.0	20.6	-25.0	23.5	-28.0	26.5	-32.0	29.8	-36.4
	5	500	10.0	-10.0	10.6	-11.0	11.6	-12.0	13.6	-15.0	15.8	-17.0	18.1	-20.0	20.6	-22.0	23.2	-25.0	26.1	-29.0

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

- a. The effective wind area shall be equal to the span length multiplied by an effective width. This width shall be permitted to be not less than one-third the span length. For cladding fasteners, the effective wind area shall not be greater than the area that is tributary to an individual fastener.
- b. For effective areas between those given, the load shall be interpolated or the load associated with the lower effective area shall be used.
- c. Table values shall be adjusted for height and exposure by multiplying by the adjustment coefficient in Table R301.2(3).
- d. See Figure R301.2(7) for location of zones.
- e. Plus and minus signs signify pressures acting toward and away from the building surfaces.

**TABLE R301.2(3)
HEIGHT AND EXPOSURE ADJUSTMENT COEFFICIENTS FOR TABLE R301.2(2)**

MEAN ROOF HEIGHT	EXPOSURE		
	B	C	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

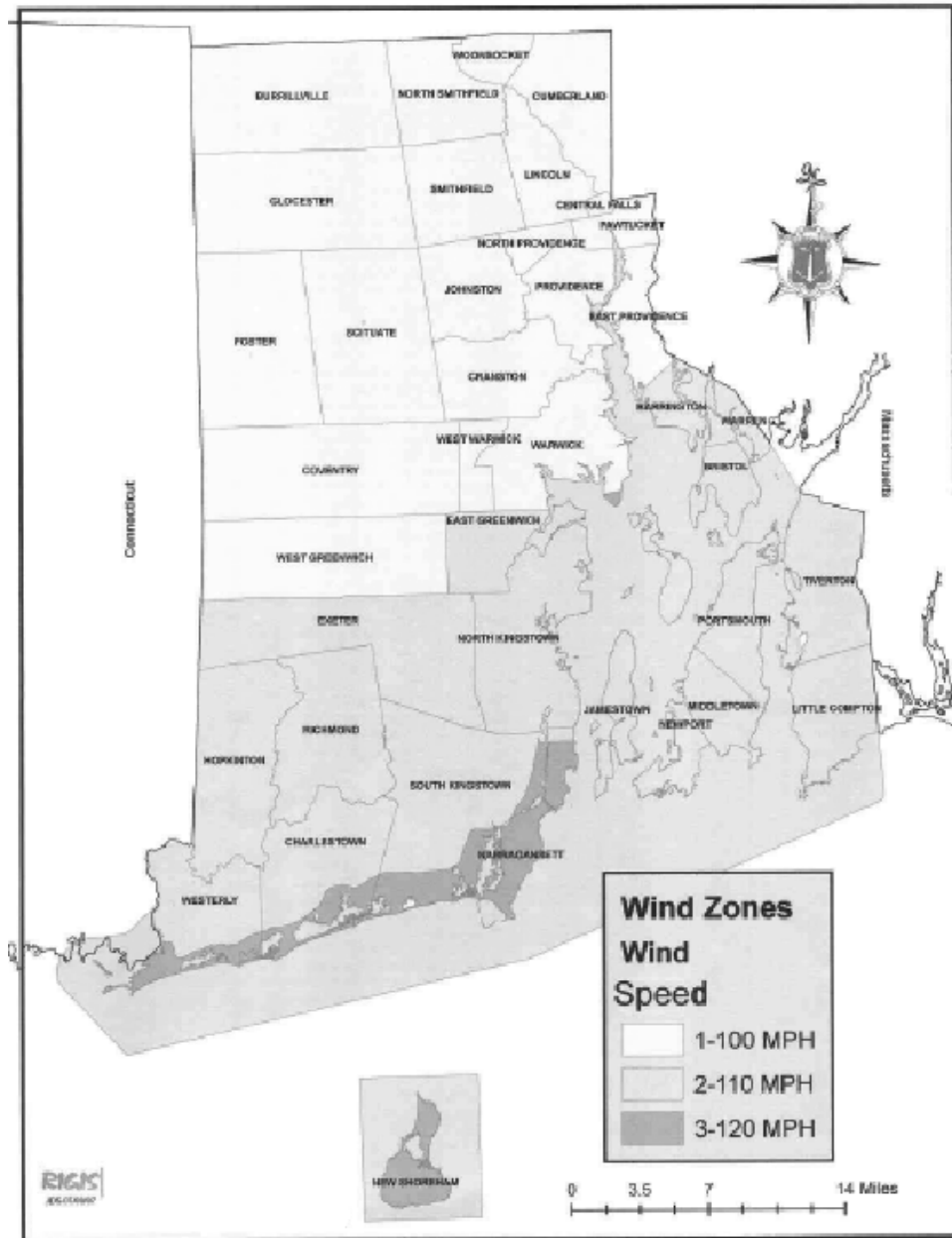
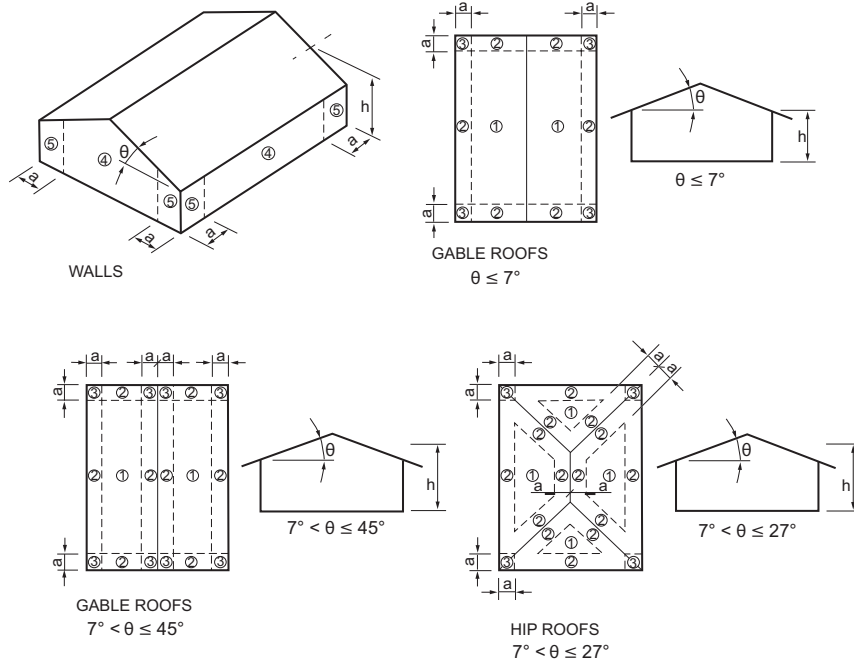


FIGURE R301.2(4)A
 ULTIMATE DESIGN WIND SPEEDS



For SI: 1 foot = 304.8 mm, 1 degree = 0.0175 rad.
 Note: a = 4 feet in all cases.

FIGURE R301.2(7)
COMPONENT AND CLADDING PRESSURE ZONES

R301.2.1.2.1 Application of ASTM E 1996. The text of Section 2.2 of ASTM E 1996 shall be substituted as follows:

2.2 ASCE Standard:

ASCE 7-10 American Society of Civil Engineers
Minimum Design Loads for Buildings and Other Structures

The text of Section 6.2.2 of ASTM E 1996 shall be substituted as follows:

6.2.2 Unless otherwise specified, select the wind zone based on the ultimate design wind speed, V_{ult} , as follows:

6.2.2.1 Wind Zone 1–130 mph \leq ultimate design wind speed, $V_{ult} < 140$ mph.

6.2.2.2 Wind Zone 2–140 mph \leq ultimate design wind speed, $V_{ult} < 150$ mph at greater than 1 mile (1.6 km) from the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.3 Wind Zone 3–150 mph (58 m/s) \leq ultimate design wind speed, $V_{ult} \leq 170$ mph (76 m/s), or 140 mph (54 m/s) \leq ultimate design wind speed, $V_{ult} \leq 170$ mph (76 m/s) and within 1 mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.4 Wind Zone 4—ultimate design wind speed, $V_{ult} > 170$ mph (76 m/s).

TABLE R301.2.1.2
WINDBORNE DEBRIS PROTECTION FASTENING SCHEDULE FOR WOOD STRUCTURAL PANELS^{a, b, c, d}

FASTENER TYPE	FASTENER SPACING (inches) ^{a, b}		
	Panel span \leq 4 feet	4 feet < panel span \leq 6 feet	6 feet < panel span \leq 8 feet
No. 8 wood screw based anchor with 2-inch embedment length	16	10	8
No. 10 wood screw based anchor with 2-inch embedment length	16	12	9
1/4-inch lag screw based anchor with 2-inch embedment length	16	16	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N, 1 mile per hour = 0.447 m/s.

- a. This table is based on 180 mph ultimate design wind speeds, V_{ult} , and a 33-foot mean roof height.
- b. Fasteners shall be installed at opposing ends of the wood structural panel. Fasteners shall be located not less than 1 inch from the edge of the panel.
- c. Anchors shall penetrate through the exterior wall covering with an embedment length of not less than 2 inches into the building frame. Fasteners shall be located not less than 2 1/2 inches from the edge of concrete block or concrete.
- d. Panels attached to masonry or masonry/stucco shall be attached using vibration-resistant anchors having an ultimate withdrawal capacity of not less than 1,500 pounds.