

**Issue:** DS 2016-058. The petitioner Matthew Spiak, RSD Market Manager of Sprint Corporation seeks a declaratory statement on determination of whether design wind speeds for telecommunications towers be determined by converting the FBC ultimate wind speeds to a nominal wind speed or the design wind speeds in TIA-222-G be used and for communication towers supporting essential communications equipment, should the FBC Risk Category III/IV converted nominal wind speed be used in conjunction with TIA-222-G Structure Class II (I=1.0) for towers of this nature.

**Question:**

1. Should the design wind speeds for telecommunications towers be determined by converting the FBC ultimate wind speeds to a nominal wind speed or should the design wind speeds indicated in TIA-222-G be used?
2. For telecommunication towers supporting essential communications equipment, should the FBC risk Category III/IV converted nominal wind speed be used in conjunction with TIA-222-G Structure Class II (I=1.0) for towers of this nature.

**Background:**

Sprint Corporation (Sprint) is one of the nation's largest personal wireless communication providers. While maintaining and improving their network, Sprint wishes to upgrade their antenna equipment on several towers throughout south Florida which currently support their equipment. Several of these towers also support government communications equipment.

The tower in question is classified as a Structure Class III structure in accordance with TIA-222-G, which is also classified as a Risk Category IV per the Florida Building Code. As a leader in the personal wireless communication industry, Sprint is seeking clarification on certain sections of the Florida Building Code – Building, 5th Edition (2014) (FBC), to ensure that their consulting engineers, whom are performing the proposed tower analyses, are doing so in compliance with the intent of the FBC, and, furthermore, to seek a uniform interpretation of the design criteria for tower analyses being performed by all licensed consulting engineers. Petitioner seeks clarification regarding conflicting information between the FBC and TIA-222-G *Structural Standard for Antenna Supporting Structures and Antennas*. Specifically, the determination of design wind speeds and the use of Risk Category/Structure Class.

***Florida Statutes***

Section 553.73(14), Florida Statutes

(14) The general provisions of the Florida Building Code for buildings and other structures shall not apply to commercial wireless communication towers when such general provisions are inconsistent with the provisions of the code controlling radio and television towers. This subsection is intended to be remedial in nature and to clarify existing law.

***5<sup>th</sup> Edition (2014) Florida Building Code***

**1609.1.1 Determination of wind loads.** Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7 or provisions of the alternate all-heights method in Section 1609.6. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

**Exceptions:**

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AF&PA WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment. Design using this standard shall be permitted for communication tower and steel antenna support structures.

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**3108 – Telecommunication and Broadcast Towers**

**3108.1 General.** Towers shall be designed and constructed in accordance with the provisions of TIA-222. Towers shall be designed for seismic loads; exceptions related to seismic design listed in Section 2.7.3 of TIA-222 shall not apply. In Section 2.6.6.2 of TIA 222, the horizontal extent of Topographic Category 2, escarpments, shall be 16 times the height of the escarpment.

**Exception:** Single free-standing poles used to support antennas not greater than 75 feet (22 860 mm), measured from the top of the pole to grade, shall not be required to be noncombustible.

**3108.2 Location and access.** Towers shall be located such that guy wires and other accessories shall not cross or encroach upon any street or other public space, or over above-ground electric utility lines, or encroach upon any privately owned property without the written consent of the owner of the encroached-upon property, space or aboveground electric utility lines. Towers shall be equipped with climbing and working facilities in compliance with TIA-222. Access to the tower sites shall be limited as required by applicable OSHA, FCC and EPA regulations.

**FBC 1604.5 – Risk Category**

Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein.

**TABLE 1604.5  
RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES**

Risk	Nature of Occupancy
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Category	
<b>I</b>	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: <ul style="list-style-type: none"> <li>• Agricultural facilities.</li> <li>• Certain temporary facilities.</li> <li>• Minor storage facilities.</li> <li>• Screen enclosures.</li> </ul>
<b>II</b>	Buildings and other structures except those listed in Risk Categories I, III and IV
<b>III</b>	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: <ul style="list-style-type: none"> <li>• Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300.</li> <li>• Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250.</li> <li>• Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500.</li> <li>• Group I-2 occupancies with an occupant load of 50 or more resident care recipients but not having surgery or emergency treatment facilities.</li> <li>• Group I-3 occupancies.</li> <li>• Any other occupancy with an occupant load greater than 5,000a.</li> <li>• Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Risk Category IV.</li> <li>• Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: <ul style="list-style-type: none"> <li>Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the <i>Florida Fire Prevention Code</i>; and</li> <li>Are sufficient to pose a threat to the public if released b.</li> </ul> </li> </ul>
<b>IV</b>	Buildings and other structures designated as essential facilities, including but not limited to: <ul style="list-style-type: none"> <li>• Group I-2 occupancies having surgery or emergency treatment facilities.</li> <li>• Fire, rescue, ambulance and police stations and emergency vehicle garages.</li> <li>• Designated earthquake, hurricane or other emergency shelters.</li> <li>• Designated emergency preparedness, communications and operations centers and other facilities required for emergency response.</li> <li>• Power-generating stations and other public utility facilities required as</li> </ul>

	<p>emergency backup facilities for Risk Category IV structures.</p> <ul style="list-style-type: none"> <li>• Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the <i>Florida Fire Prevention Code</i>; and Are sufficient to pose a threat to the public if released b.</li> <li>• Aviation control towers, air traffic control centers and emergency aircraft hangars.</li> <li>• Buildings and other structures having critical national defense functions.</li> <li>• Water storage facilities and pump structures required to maintain water pressure for fire suppression.</li> </ul>
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**TIA-222-G-1&2 Structural Standard for Antenna Supporting Structures and Antennas**

**TIA-222-G Section 2.6.4 - Basic Wind Speed and Design Ice Thickness**

The basic wind speed without ice, the basic wind speed with ice and the design ice thickness shall be as given in Annex B except as provided in 2.6.4.1. Wind shall be considered to come from any horizontal direction. Ice shall be considered to be glaze ice. Ice may be ignored for structures located in regions where the design ice thickness is less than or equal to 0.25 inches (6 mm).

**TIA-222-G Table 2-1 – Classification of Structures**

Description of Structure	Class
Structures that due to height, use or location represent a low hazard to human life and damage to property in the event of failure and/or used for services that are optional and/or where a delay in returning the services would be acceptable.	I
Structures that due to height, use or location represent a substantial hazard to human life and/or damage to property in the event of failure and/or used for services that may be provided by other means.	II
Structures that due to height, use or location represent a high hazard to human life and/or damage to property in the event of failure and/or used primarily for essential communications.	III

**TIA-222-G Table 2-3 – Importance Factors**

<b>Structure Class</b>	<b>Wind Load Without Ice</b>	<b>Wind Load With Ice</b>	<b>Ice Thickness</b>	<b>Earthquake</b>
I	0.87	N/A	N/A	N/A
II	1.00	1.00	1.00	1.00
III	1.15	1.00	1.25	1.50
Note: Ice and earthquake loads do not apply to Class I structures				

**TIA-222-G Annex B [Portion] - U.S. County Listings of Design Criteria (Normative)**

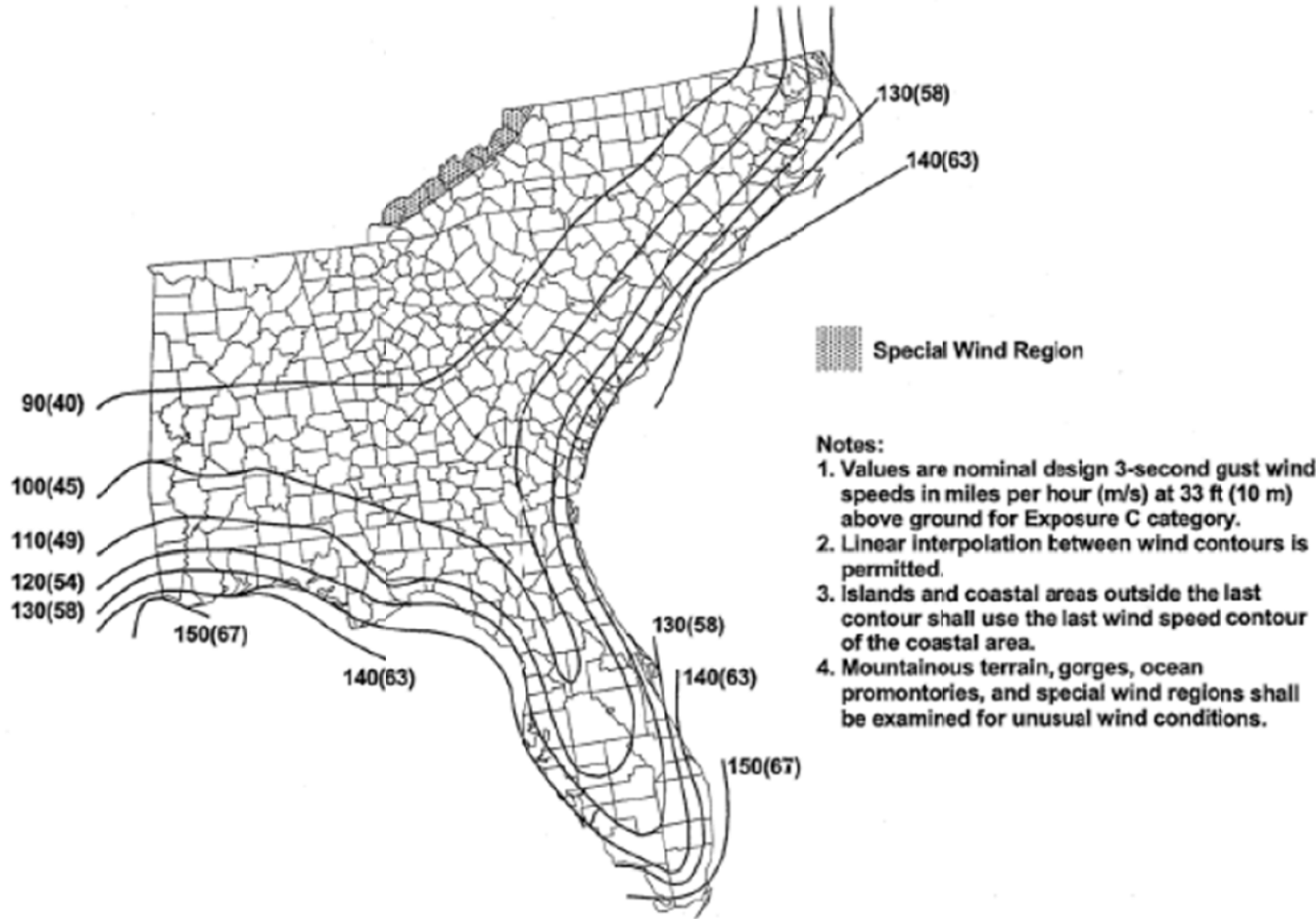
This Annex contains tables listing design criteria for the counties of the United States and its Territories.

Design criteria maps are provided in Appendix 1.

The design criteria for wind, ice, and earthquake loads provided in this Annex, are based on ASCE 7-05 and additional validated data. The minimum frost depth values are based on NAVFAC DM 7.01. The design criteria for sites located on islands and coastal areas or locations not designated as a county shall be equal to the design criteria for the closest location shown on the maps in Appendix 1. Mountainous terrains and gorges shall be examined for unusual wind, wind on ice and ice conditions.

State	County	Min. Basic Wind Speed V (mph)	Max. Basic Wind Speed V (mph)	Min. Basic Wind Speed with Ice V <sub>I</sub> (mph)	Max. Basic Wind Speed with Ice V <sub>I</sub> (mph)	Min. Design Ice Thickness t <sub>i</sub> (in.)	Max. Design Ice Thickness t <sub>i</sub> (in.)	Design Frost Depth (in.)	Min. S <sub>s</sub>	Max. S <sub>s</sub>	Notes
FL	CLAY	100	115	30	30	0.00	0.00	0	0.12	0.14	-
FL	COLLIER	120	140	30	30	0.00	0.00	0	0.07	0.09	-
FL	COLUMBIA	100	105	30	30	0.00	0.00	0	0.12	0.15	-
FL	DADE	125	150	30	30	0.00	0.00	0	0.05	0.05	-
FL	DE SOTO	110	115	30	30	0.00	0.00	0	0.08	0.09	-
FL	DIKE	105	120	30	30	0.00	0.00	0	0.09	0.12	-
FL	DUVAL	105	120	30	30	0.00	0.00	0	0.14	0.16	-
FL	ESCAMBIA	120	145	30	30	0.00	0.25	0	0.10	0.13	-
FL	FLAGLER	110	120	30	30	0.00	0.00	0	0.12	0.12	-
FL	FRANKLIN	120	130	30	30	0.00	0.00	0	0.08	0.10	-
FL	GADSDEN	105	110	30	30	0.00	0.00	0	0.11	0.12	-
FL	GILCHRIST	100	110	30	30	0.00	0.00	0	0.11	0.12	-
FL	GLADES	110	115	30	30	0.00	0.00	0	0.09	0.09	-
FL	GULF	120	135	30	30	0.00	0.00	0	0.08	0.10	-
FL	HAMILTON	100	100	30	30	0.00	0.00	0	0.12	0.14	-
FL	HARDEE	105	110	30	30	0.00	0.00	0	0.09	0.10	-
FL	HENDRY	115	120	30	30	0.00	0.00	0	0.08	0.09	-
FL	HERNANDO	100	120	30	30	0.00	0.00	0	0.09	0.11	-
FL	HIGHLANDS	105	115	30	30	0.00	0.00	0	0.09	0.10	-
FL	HILLSBOROUGH	105	120	30	30	0.00	0.00	0	0.07	0.10	-
FL	HOLMES	110	120	30	30	0.00	0.25	0	0.11	0.11	-
FL	INDIAN RIVER	115	140	30	30	0.00	0.00	0	0.08	0.10	-
FL	JACKSON	105	115	30	30	0.00	0.25	0	0.11	0.12	-
FL	JEFFERSON	105	115	30	30	0.00	0.00	0	0.10	0.12	-
FL	LAFAYETTE	105	110	30	30	0.00	0.00	0	0.11	0.12	-
FL	LAKE	100	110	30	30	0.00	0.00	0	0.11	0.12	-
FL	LEE	115	130	30	30	0.00	0.00	0	0.07	0.09	-
FL	LEON	105	110	30	30	0.00	0.00	0	0.11	0.12	-
FL	LEVY	100	125	30	30	0.00	0.00	0	0.09	0.12	-
FL	LIBERTY	110	120	30	30	0.00	0.00	0	0.09	0.11	-
FL	MADISON	100	105	30	30	0.00	0.00	0	0.11	0.13	-
FL	MANATEE	110	130	30	30	0.00	0.00	0	0.07	0.09	-
FL	MARION	100	110	30	30	0.00	0.00	0	0.10	0.12	-
FL	MARTIN	115	140	30	30	0.00	0.00	0	0.07	0.09	-
FL	MIAMI-DADE	125	150	30	30	0.00	0.00	0	0.05	0.08	-
FL	MONROE	130	150	30	30	0.00	0.00	0	0.02	0.07	-
FL	NASSAU	105	120	30	30	0.00	0.00	0	0.14	0.17	-
FL	OKALOOSA	115	135	30	30	0.00	0.25	0	0.09	0.12	-
FL	OKEECHOBEE	110	120	30	30	0.00	0.00	0	0.08	0.10	-
FL	ORANGE	105	120	30	30	0.00	0.00	0	0.10	0.11	-
FL	OSCEOLA	105	120	30	30	0.00	0.00	0	0.09	0.11	-
FL	PALM BEACH	115	140	30	30	0.00	0.00	0	0.07	0.09	-
FL	PASCO	100	125	30	30	0.00	0.00	0	0.08	0.10	-
FL	PINELLAS	120	130	30	30	0.00	0.00	0	0.08	0.08	-
FL	POLK	100	110	30	30	0.00	0.00	0	0.09	0.11	-
FL	PUTNAM	100	115	30	30	0.00	0.00	0	0.12	0.13	-
FL	SAINT JOHN	115	120	30	30	0.00	0.00	0	0.12	0.15	-

TIA-222-G Appendix 1, Figure A1-1d Basic Wind Speed Without Ice, V mph [m/s]



**Staff analysis:**

**Question 1:** Should the design wind speeds for telecommunications towers be determined by converting the FBC ultimate wind speeds to a nominal wind speed or should the design wind speeds indicated in TIA-222-G be used?

**Answer:** As per Section 553.73(14), Florida Statutes, and Section 1609.1.1(Exception 5) of the 5<sup>th</sup> Edition (2014) Florida Building Code, Building “FBC”, the projects in question is permitted to be designed using the wind speed as indicated in TIA-222 – G.

**Question 2:** For telecommunication towers supporting essential communications equipment, should the FBC risk Category III/IV converted nominal wind speed be used in conjunction with TIA-222-G Structure Class II (I=1.0) for towers of this nature.

**Answer: “No”** as per Section 553.73(14), Florida Statutes, and Section 1609.1.1(Exception 5) of the 5<sup>th</sup> Edition (2014) Florida Building Code, Building “FBC”, the projects in question is permitted be designed using TIA-222-G Structure Class II (I=1.0) for towers without using the converted nominal wind speed for risk Category III/IV of the FBC.