**TEST PROTOCOLS FOR HIGH-VELOCITY HURRICANE ZONES, 5th Edition (2014)**

**ICC EDIT VERSION**

**[NOTE: The base document is the 2010 Florida Building Code, Test Protocols for High-Velocity Hurricane Zones]**

**PREFACE**

**History**

The State of Florida first mandated statewide building codes during the 1970s at the beginning of the modern construction boom. The first law required all municipalities and counties to adopt and enforce one of the four state-recognized model codes known as the “state minimum building codes.” During the early 1990s a series of natural disasters, together with the increasing complexity of building construction regulation in vastly changed markets, led to a comprehensive review of the state building code system. The study revealed that building code adoption and enforcement was inconsistent throughout the state and those local codes thought to be the strongest proved inadequate when tested by major hurricane events. The consequences of the building codes system failure were devastation to lives and economies and a statewide property insurance crisis. The response was a reform of the state building construction regulatory system that placed emphasis on uniformity and accountability.

The 1998 Florida Legislature amended Chapter 553, *Florida Statutes* (FS), Building Construction Standards, to create a single state building code that is enforced by local governments. As of March 1, 2002, the *Florida Building Code*, which is developed and maintained by the Florida Building Commission, supersedes all local building codes. The *Florida Building Code* is updated every three years and may be amended annually to incorporate interpretations and clarifications.

**Scope**

The *Florida Building Code* is based on national model building codes and national consensus standards which are amended where necessary for Florida’s specific needs. However, code requirements that address snow loads and earthquake protection are pervasive; they are left in place but should not be utilized or enforced because Florida has no snow load or earthquake threat. The code incorporates all building construction-related regulations for public and private buildings in the State of Florida other than those specifically exempted by Section 553.73, *Florida Statutes*. It has been harmonized with the *Florida Fire Prevention Code*, which is developed and maintained by the Department of Financial Services, Office of the State Fire Marshal, to establish unified and consistent standards.

The base codes for the Fifth edition (2014) of the *Florida Building Code* include: the International Building Code®, 2012 edition; the International Plumbing Code®, 2012 edition; the International Mechanical Code®, 2012 edition; the International Fuel Gas Code®, 2012 edition; the International Residential Code®, 2012 edition; the International Existing Building Code®, 2012 edition; the International Energy Conservation Code, 2012; the National Electrical Code, 2011 edition; substantive criteria from the American Society of Heating, Refrigerating and Air-conditioning Engineers’ (ASHRAE) Standard 90.1-2010. State and local codes adopted and incorporated into the code include the *Florida Building Code, Accessibility,* and special hurricane protection standards for the High-Velocity Hurricane Zone.

The code is composed of nine main volumes: the *Florida Building Code, Building*, which also includes state regulations for licensed facilities; the *Florida Building Code, Plumbing*; the *Florida Building Code, Mechanical;* the *Florida Building Code, Fuel Gas*; the *Florida Building Code, Existing Building*; the *Florida Building Code, Residential;* the *Florida Building Code, Energy Conservation*; the *Florida Building Code, Accessibility* and the *Florida Building Code, Test Protocols for High-Velocity Hurricane Zones*. Chapter 27 of the *Florida Building Code, Building*, adopts the *National Electrical Code*, NFPA 70, by reference.

Under certain strictly defined conditions, local governments may amend requirements to be more stringent than the code. All local amendments to the *Florida Building Code* must be adopted by local ordinance and reported to the Florida Building Commission then posted on [www.floridabuilding.org](http://www.floridabuilding.org) in Legislative format for a month before being enforced. Local amendments to the *Florida Building Code* and the *Florida Fire Prevention Code* may be obtained from the Florida Building Commission web site, or from the Florida Department of Business and Professional Regulation or the Florida Department of Financial Services, Office of the State Fire Marshal, respectively.

**Adoption and Maintenance**

The *Florida Building Code* is adopted and updated with new editions triennially by the Florida Building Commission. It is amended annually to incorporate interpretations, clarifications and to update standards. Minimum requirements for permitting, plans review and inspections are established by the code, and local jurisdictions may adopt additional administrative requirements that are more stringent. Local technical amendments are subject to strict criteria established by Section 553.73, *F.S.* They are subject to Commission review and adoption into the code or repeal when the code is updated triennially and are subject to appeal to the Commission according to the procedures established by Section 553.73, *F.S*.

Eleven Technical Advisory Committees (TACs), which are constituted consistent with American National Standards Institute (ANSI) Guidelines, review proposed code changes and clarifications of the code and make recommendations to the Commission. These TACs whose membership is constituted consistent with American National Standards Institute (ANSI) Guidelines include: Accessibility; Joint Building Fire (a joint committee of the Commission and the State Fire Marshal); Building Structural; Code Administration/ Enforcement; Electrical; Energy; Mechanical; Plumbing and Fuel Gas; Roofing; Swimming Pool; and Special Occupancy (state agency construction and facility licensing regulations).

The Commission may only issue official code clarifications using procedures of Chapter 120, *Florida Statutes*. To obtain such a clarification, a request for a Declaratory Statement (DEC) must be made to the Florida Building Commission in a manner that establishes a clear set of facts and circumstances and identifies the section of the code in question. Requests are analyzed by staff, reviewed by the appropriate Technical Advisory Committee, and sent to the Florida Building Commission for action. These interpretations establish precedents for situations having similar facts and circumstances and are typically incorporated into the code in the next code amendment cycle. Non-binding opinions are available from the Building Officials Association of Florida’s web site (www.BOAF.net) and a Binding Opinion process is available online at www.floridabuilding.org.

**Marginal Markings**

Dotted vertical lines in the margins within the body of the Florida Test Protocols for High-Velocity Hurricane Zones indicate a change from the requirements of the base codes to the Florida Test Protocols for High-Velocity Hurricane Zones, 5th Edition (2014), effective December 31, 2014.

Sections deleted from the base code are designated “Reserved”.

**Acknowledgments**

The *Florida Building Code* is produced through the efforts and contributions of building designers, contractors, product manufacturers, regulators and other interested parties who participate in the Florida Building Commission’s consensus processes, Commission staff and the participants in the national model code development processes.

**ROOFING APPLICATION STANDARD (RAS) No. 137**

**STANDARD REQUIREMENTS FOR MECHANICAL ATTACHMENT OF SINGLE-PLY ROOF COVERINGS TO VARIOUS SUBSTRATES**

**1. Scope**

*Revise Section 1.1 to read as follows:*

1.1 The standards set forth herein provide a means of determining the mechanical attachment of single-ply roof covers to insulated or uninsulated roof decks in compliance with the requirements set forth in Chapter 16 (High-Velocity Hurricane Zones) of the Florida Building Code, Building; specifically Section 16~~19~~20 covering wind loads. For the mechanical attachment or bonding of insulation panels, refer to RAS 117.

**TESTING APPLICATION STANDARD (TAS) No. 105-11**

**TEST PROCEDURE FOR FIELD WITHDRAWAL RESISTANCE TESTING**

***Revise Section 6 to read as follows:***

6.1.2 Hydraulic or mechanical dynamometers shall be operated by a screw or pump handle or shall be automatically rising at 2 in. (50 mm) + 0.1 in. per minute for steel and wood decks and 1/2 in. (12.5 mm) + 0.1 in. per minute for concrete, gypsum and cementitious wood fiber decks.

6.3 ~~Hydraulic~~ ~~d~~Dynamometers (“pull-testers”) shall be calibrated within three (3) months prior to conducting the test procedures outlined in this TAS. Facsimiles of the calibration shall be kept with the tester for examination by the authority having jurisdiction, upon request. A copy of the calibration certificate shall be attached to each test report. Calibration shall be in compliance with ASTM E 74, Grade B.

**TESTING APPLICATION STANDARD (TAS) No. 110-2000**

**TESTING REQUIREMENTS FOR PHYSICAL PROPERTIES OF ROOF**

**MEMBRANES, INSULATION, COATINGS AND OTHER ROOFING COMPONENTS**

***Revise Section 15 to read as follows:***

**15. Metal Panel Roof Assemblies:**

15.1 All structural and nonstructural metal panel roof assemblies, and the roofing components therein, shall be tested in compliance with the following requirements, as applicable.

***Note: The first part of the requirements remain unchanged.***

|  |  |  |
| --- | --- | --- |
| **Product** | **Test** | **Test Standard** |
| Structural and Non-Structural Metal PanelRoof Assembly | StandardRequirements  |  TAS 125  |
| Structural and Non-Structural Metal PanelRoof Assembly | FireResistance  |  E 108(min. Class “B”) |
| Structural and Non-Structural Metal PanelContinuous RoofAssembly | AcceleratedWeathering  |  G ~~23~~ 152 or G ~~26~~ 155(2000 hours)  |
| Structural or Non-Structural MetalPanels | Salt Spray  | B 117(1000 hours)  |
| Insulated Metal Panels | Thermal Value | C 518 (report) |

**TESTING APPLICATION STANDARD (TAS) No. 112-95**

**STANDARD REQUIREMENTS FOR CONCRETE ROOF TILES**

**3. Terminology & Units:**

*Revise “Nose lugs” to read as follows:*

Nose lugs:

A projecting on the underside of the nose of each tile, contoured to fit into the main water courses of the tiles immediately below, inhibiting the entry of wind driven rain~~ch~~.

**TESTING APPLICATION STANDARD (TAS) 114**

**TEST PROCEDURES FOR ROOF SYSTEM ASSEMBLIES**

**IN THE HIGH-VELOCITY HURRICANE ZONE JURISDICTION**

***Revise Section 2 to read as follows:***

**2. Referenced Documents:**

2.1 – 2.6 [No change]

2.7          ASTM Standards:

A 90       Standard Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles

A 641     Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

B 117     Standard Test Method for Salt Spray (Fog) Testing

D 638     Standard Test Method for Tensile Properties of Plastics

D 751     Standard Test Methods for Coated Fabrics

D 1781   Standard Test Method for Climbing Drum Peel for Adhesives

E 70        Standard Test Method for pH of Aqueous Solutions With the Glass Electrode

E 108      Standard Test Methods for Fire Tests of Roof Coverings

E 380      Excerpts from the Standard Practice for Use of the International System of Units (SI) (the Modernized Metric System)

G ~~23~~152Standard Practice for Operating Open Flame Carbon Arc Light~~-Exposure~~ Apparatus ~~(Carbon-Arc Type) With and Without Water~~ for Exposure of Nonmetallic Materials

G ~~26~~155Standard Practice for Operating Xenon Arc Light~~-Exposure~~ Apparatus ~~(Xenon- Arc Type) With and Without Water~~ for Exposure of Nonmetallic Materials

G ~~53~~154Standard Practice for Operating Fluorescent Light~~- and Water-Exposure~~ Apparatus ~~(Fluorescent UV-Condensation Type)~~ for UV Exposure of Nonmetallic Materials

G 85 Standard Practices for Modified Salt Spray (Fog) Testing

2.8 – 2.11 [No change]

***Revise Section 8 to read as follows:***

**8. Performance Requirements and Tests:**

8.1 – 8.6 [No change]

8.7          Accelerated weathering:

8.7.1      Accelerated weathering testing shall be in strict compliance with ASTM G ~~23~~152 or G ~~26~~155.

8.8 -8.9 [No change]

**TESTING APPLICATION STANDARD (TAS) 124-11**

**TEST PROCEDURE FOR FIELD UPLIFT RESISTANCE OF EXISTING**

**MEMBRANE ROOF SYSTEMS AND IN SITU TESTING FOR REROOF AND NEW**

**CONSTRUCTION APPLICATIONS**

***1. Scope:***

Revise Section 1.3 to read as follows:

1.3 The test procedures outlined herein are intended to determine whether the uplift resistance performance of a newly installed Roof System Assembly meets the design pressure requirements of ASCE 7, as required in Section 160~~6~~9 of the Florida Building Code, Building. The design pressure requirements for the building in question are listed on Section II of the Uniform Building Permit.

**9. Procedure:**

Revise Section 9.1.8 to read as follows:

9.1.8 At the end of the first one minute interval, increase the pressure within the chamber in increments of 15 + 0.5 lbf/ft2 (720 + 20 Pa), holding each pressure level for a period of one minute, until:

· the roof system assembly fails, as noted in Section 10.1; or,

· the pressure within the chamber is held at the design pressure for the particular roof area (i.e., field, perimeter or corner area) for a period of one minute. These design pressures are determined in compliance with ASCE 7~~-98~~, as specified in Section 160~~6~~9 of the Florida Building Code, Building and are listed on Section II of the Uniform Building Permit.

***Revise Section 11 to read as follows:***

**TESTING APPLICATION STANDARD (TAS) 124-11
BELL CHAMBER TEST RESULTS**

**TEST INFORMATION:**

Number of Tests:                                                     n = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
(see Section 7.1 of TAS 124)
(note the locations of all tests on
“Building Information” Detail #2, attached)

Maximum Uplift Pressure:                                      Pmax =  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_psf
(as noted on the roof system manufacturer’s Product Approval)

Date of test:  \_\_\_\_\_\_\_\_\_\_\_\_

Air temperature:  \_\_\_\_\_\_\_\_\_\_\_\_

Roof surface temperature:  \_\_\_\_\_\_\_\_\_\_\_\_

Wind velocity during test:  \_\_\_\_\_\_\_\_\_\_\_\_

**TESTING APPLICATION STANDARD (TAS) 124-11
BONDED PULL TEST RESULTS**

TEST INFORMATION:

Number of Tests:                                                      n = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
(see Section 7.1 of TAS 124)
(note the locations of all tests on
“Building Information” Detail #2, attached)

Maximum Uplift Pressure:                                       Pmax =  \_\_\_\_\_\_\_\_\_\_\_\_psf
(as noted on the roof system manufacturer’s
Product Approval)

Date of test:  \_\_\_\_\_\_\_\_\_\_\_\_

Air temperature:  \_\_\_\_\_\_\_\_\_\_\_\_

Roof surface temperature:  \_\_\_\_\_\_\_\_\_\_\_\_

Wind velocity during test:  \_\_\_\_\_\_\_\_\_\_\_\_

**TESTING APPLICATION STANDARD (TAS) 125-03**

**STANDARD REQUIREMENTS FOR METAL ROOFING SYSTEMS**

**7. Testing Requirements:**

Revise Section 7.2.1 to read as follow:

7.2.1 All structural and non-structural metal roofing systems shall be tested for the physical properties set forth in ~~T125-20~~ Section 15 of TAS 110.

**9.11 Report**

Revise Section 9.11.1.3 to read as follows:

9.11.1.3 Detailed drawings of the specimen and test fixture, showing the dimensions of ~~T125~~ section profiles, purlin location, measurement locations, panel arrangement, installation and spacing of anchorage, sealants, and perimeter construction details. Note any modifications made on the specimen, including reinforcement in accordance with T125-9.10.2.9, to obtain the reported values, on the drawings

**TESTING APPLICATION STANDARD (TAS) No. 131-95**

**STANDARD REQUIREMENTS FOR THERMOPLASTIC OLEFIN**

**ELASTOMER BASED SHEET USED IN SINGLE-PLY ROOF MEMBRANE**

***Revise Section 2 to read as follows:***

**2.            Referenced Documents:**

2.1          ASTM Standards

D 412     Test Method for Rubber Properties in Tension

D 471     Test Method for Rubber Property - Effect of Liquids

D 573     Test method for Rubber-Deterioration in an Air Oven

D 624     Test Method for Rubber Property - Tear Resistance

D 751     Method of Testing Coated Fabrics

D 816     Methods of Testing Rubber Cements

D 1149   Test Method for Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimens)

D 1204   Test Method for Linear Dimensional Changes of Non-rigid Thermoplastic Sheeting or Film at Elevated Temperature

D 2137   Test Method for Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics

G ~~26~~155Standard Practice for Operating Xenon Arc Light~~-Exposure~~ Apparatus for Exposure of Nonmetallic Materials

G ~~53~~154Standard Practice for Operating Fluorescent Light Apparatus for UV-Condensation (QUV) Exposure of Nonmetallic Materials

D 1822   Tensile Impact Testing

E 96        Water Vapor Permeability, Method BW

E 380      Excerpts from Use of the International System of Units (SI) (The Modernized Metric System)

2.2 – 2.3 [No change]

***Revise Section 10 to read as follows:***

**10. Test Methods:**

10.1 – 10.16 [No change]

10.17     Weather Resistance - Practice G ~~26~~155

10.17.1 – 10.172 [No change]

10.18     Weather Resistance - Practice G ~~53~~154

10.18.1 [No change]

10.19 [No change]

**TESTING APPLICATION STANDARD (TAS) No. 138-95**

**STANDARD REQUIREMENTS FOR ALUMINUM PIGMENTED EMULSIFIED**

**ASPHALT USED AS A PROTECTIVE COATING FOR ROOFING**

***Revise Section 2 to read as follows:***

 **2.            Referenced Documents:**

2.1          ASTM Standards

B 209     Specification for Aluminum and Aluminum-Alloy Sheet and Plate

D 16       Terminology Relating to Paint, Varnish, Lacquer and Related Products

D 562     Standard Test Method for Consistency of Paints Using the Stormer Viscometer

D 1079   Definitions of Terms Relating to Roofing, Waterproofing, and Bituminous Materials

D 2824   Specification for Aluminum-Pigmented Asphalt Roof Coatings

D 2939   Standard Test Method of Testing Emulsified Bitumens Used as Protective Coatings

D 4798   Standard Test Method for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon - ARC Method)

D 4799   Standard Test Method for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Fluorescent UV and Condensation Method)

E 380      Excerpts from Standard Practice for Use of the International System of Units (SI) (the Modernized Metric System)

G ~~26~~155Standard ~~Test Method for~~ Practice for Operating Xenon Arc Light ~~- Exposure~~ Apparatus ~~(Xenon - ARC Type) With and Without Water~~ for Exposure of Non-metallic Materials

G ~~53~~154Standard ~~Test Method~~ Practice for Operating Fluorescent Light~~- and Water-Exposure~~ Apparatus ~~(Fluorescent UV-Condensation Type)~~ for UV Exposure of Nonmetallic Materials

2.2 – 2.3 [No change]

***Revise Section 8 to read as follows:***

**8. Test Methods:**

8.1 - 8.3 [No change]

8.4          Accelerated Weathering - Test Method G ~~53~~154 or G ~~26~~155 (Test Method A)

8.4.1 – 8.4.6 [No change]

***Revise Section 9 to read as follows:***

**9. Apparatus:**

9.1 Operating light and water exposure apparatus (Fluorescent, UV Condensation Type) for Exposure of Nonmetallic Materials as described in Section 6 of Recommended Practice G ~~53~~154. Unless otherwise specified, the lamps shall be UV-B lamps with a peak emission at 313 nm and a spectral energy distribution as shown in Figure X 1.2 of Recommended Practice G ~~53~~154.

9.2 Calibration and Standardization, G ~~53~~154, Section ~~8~~6.

9.3          Procedure, G ~~53~~154, Section 9.

9.4 [No change]

.5 Xenon-Arc Type as described in Section 6 of Procedure of Practice G ~~26~~155, Test ~~Method A~~ cycle 1.

**TESTING APPLICATION STANDARD (TAS) 143-95**

**STANDARD REQUIREMENTS FOR WHITE ELASTOMERIC ROOF COATINGS USED**

**FOR COATING BUILT-UP ROOFS AND METAL ROOFING SYSTEMS**

***Revise Section 2 to read as follows:***

**2.            Referenced Documents:**

2.1          ASTM Standards

C 661     Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer

C 794     Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants

D 412     Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension

D 471     Test Method for Rubber-Effects of Liquids

D 562     Standard Test Method for Consistency of Paints Using the Stormer Viscometer

D 1079   Standard Definitions of Terms Relating to Roofing, Waterproofing, and Bituminous Materials

D 2196   Standard Test Methods for Rheological Properties of Non-Newtonian Material by Rotational (Brookfield) Viscometer

D 2697   Test Methods for Volume Nonvolatile Matter in Clear or Pigmented Coatings

D 2824   Standard Specification for Aluminum-Pigmented Asphalt Roof Coatings

E 96        Standard Test Methods for Water Vapor Transmission of Materials

E 380      Excerpts from Standard Practice for Use of the International System of Units (SI) (the Modernized Metric System)

G 21       Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

G ~~26~~155Standard Practice for Operating Xenon Arc Light~~-Exposure~~ Apparatus ~~(Xenon-Arc Type) With and Without Water~~ for Exposure of Nonmetallic Materials

2.2 – 2.3 [No change]

***Revise Section 7 to read as follows:***

**7. Test Methods:**

7.1 – 7.10 [No change]

7.11        *Accelerated Weathering* - Test Method G ~~26~~155, except as noted below.

7.11.1 – 7.11.4 [No change]

7.12 – 7.13 [No change]

**TESTING APPLICATION STANDARD (TAS) 203-94**

**CRITERIA FOR TESTING PRODUCTS SUBJECT TO**

**CYCLIC WIND PRESSURE LOADING**

***Revise Section 6 to read as follows:***

**6.5** Assemblies shall be tested with no resultant failure or distress and shall have a recovery of at least 90% over maximum deflection. ~~Test Temperature. The test shall be conducted at a test temperature range of 59 to 95 degrees F (15 to 35 degrees C).~~

**6.6 Test Temperature**. The test shall be conducted at a test temperature range of 59 to 95 degrees F (15 to 35 degrees C).