News Release

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Intertek-sponsored Session at FGIA Summer Conference Reviews Natural Disaster Codes, Test Standards

SCHAUMBURG, IL – Participants at the Fenestration and Glazing Industry Alliance (FGIA) heard about the definitions, measurements, codes and testing standards for several natural disasters though an [Intertek](https://www.intertek.com/)-sponsored session, “Natural Disaster Standards and Testing.” Led by Tanya Dolby, Engineering Manager of Engineering Services at Intertek, this session covered those aspects of hurricanes, tornadoes, earthquakes and floods.

“I am very passionate about this topic and have been involved in it for many years,” said Dolby. “This [presentation] will shed light on catastrophic events and provide insights into their impact, highlighting strategies that can save lives and protect products.”

**Hurricanes**

“Building codes have come a long way since Hurricane Andrew in 1992,” said Dolby. “That was a wakeup call for the industry and started the process of establishing standards and codes for hurricane impact.” Hurricanes are measured into five categories with different definitions for different types of damage. “Four and five are considered major hurricanes,” said Dolby. “The types of damage vary by category.”

Florida Building Code, 2023, 8th edition, defines wind zones for hurricanes, said Dolby. Several standards and specifications for hurricane testing exist, including:

* ASTM E1886-19, *Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials*
* ASTM E1996-20, *Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes*
* ANSI/DASMA 115, *Standard Method for Testing Sectional Doors, Rolling Doors, and Flexible Doors: Determination of Structural Performance under Missile Impact and Cyclic Wind Pressure, Door and Access Systems Manufacturers Association International*, 2017
* CAN/CSA A123.21, *Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane Roofing Systems, CSA Group*, 2014
* AAMA 506, *Specifications for Impact and Cycle Testing of Fenestration Products*, an FGIA document

“Projectiles for impact testing range from a BB to a nine-pound two-by-four,” said Dolby. “These are shot at different distances and speeds.”

**Tornadoes**

“Unlike hurricanes, tornadoes can strike very suddenly,” said Dolby. “They are unpredictable and therefore dangerous. They can leave communities with very little time to prepare.” Tornadoes are measured using the original Fujita Tornado Damage Scale, on which F5 is the most damaging. But in the Enhanced F Scale for Tornado Damage, there is a set of wind estimates, not measurements, that are based on the damage after a tornado passes. “The EF number is assigned at that time,” said Dolby.

Tornado maps can be reviewed within ASCE/SEI 7-22, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. Two-thirds of the U.S. is considered to be a tornado-prone region. Several tornado standards exist, many of which are available online:

* FEMA P-361, *Safe Rooms for Tornadoes and Hurricanes, Guidance for Community and Residential Safe Rooms*, April 2021 Fourth Edition
* FEMA P-320, *Taking Shelter from the Storm Building or Installing a Safe Room for Your Home*, March 2021 Fifth Edition
* ANSI/ICC 500 ICC/NSSA, *Standard for the Design and Construction of Storm Shelters*, 2023

Tornado codes are in the International Building Code (IBC), and the Florida Building Code (FBC) contains similar content, said Dolby. Within 2020 ICC 500 ICC/NSSA, *Standard for the Design and Construction of Storm Shelters*, both tornado missile and hurricane missile specifications are defined. Structural test and missile impact test is also defined.

**Earthquakes**

The Richter Scale measures earthquakes by using the event’s magnitude, said Dolby.

These FGIA documents cover seismic testing:

* AAMA 501.4-18, *Recommended Static Test Method for Evaluating Window Wall, Curtain Wall and Storefront Systems Subjected to Seismic and Wind-Induced Inter-Story Drift*
* AAMA 501.6-18, *Recommended Dynamic Test Method for Determining the Seismic Drift Causing Glass Fallout from Window Wall, Curtain Wall and Storefront Systems*
* AAMA 501.7-17, *Recommended Static Test Method for Evaluating Windows, Window Wall, Curtain Wall and Storefront Systems Subjected to Vertical Inter-Story Movements*

Dolby also mentioned that shake table testing has been conducted recently, which can be customized to simulate seismic activity on a reduced scale model of a building or on a full structure. “It was a full-scale shake table, programmed to simulate historic seismic events. The data from the NHERI TallWood Project was published last year, which was programmed to mimic an actual earthquake that had occurred in history.”

**Floods**

Chapter 5 of ASCE/SEI 7-22 addresses flood loads. Other relevant flood standards (the first of which was replaced by the second listed) are provided below:

* FEMA TB 3-93, *Non-Residential Floodproofing — Requirements and Certification for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program*
* NFIP Technical Bulletin 3, January 2021, *Requirements for the Design and Certification of Dry Floodproofed Non-Residential and Mixed-Use Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program*
* ANSI 2510-2020, *American National Standard for Flood Mitigation Equipment*

NFIP Technical Bulletin 3 shares a practical test for fenestration products:

1. Install the product into the test chamber.
2. Flood the chamber to the required height.
3. Capture and measure the water seepage.
4. This requires a maximum of four inches over 24 hours.

“It is a very simple test to perform,” said Dolby. “The important thing is the vertical depth of the testing chamber.”

For more information about FGIA and its activities, visit [FGIAonline.org](https://fgiaonline.org/).

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