



## Weathering the Storm

### The Tests and Standards to Get You There

BY KEN BRENDEN

**A**s if this spring's outbreak of destructive and deadly tornadoes wasn't enough, we now move into the 2011 hurricane season (June – November), which some predict will be more severe than normal with strong odds of at least one major (Category 3, 4, or 5) hurricane hitting a U.S. coastline.

For our industry's part, we are well aware of the threat. Special attention to window hurricane hazards began in earnest after the legendary Hurricane Andrew in 1992. Stronger codes and test methods for assessing structural resistance to high wind pressures and resistance to impact from windborne debris ensued, such as ASTM E 1886 and E 1996, AAMA 506-08, *Voluntary Specifications for Impact and Cycle Testing of Fenestration Products*, and Miami-Dade TAS-201 and TAS-203.

Attention more recently has focused on water leakage driven by high wind.

Following the destructive 2004 hurricane season, the Florida Building Commission sought out AAMA's Southeast Region organization to assess current test methods and develop a standard for testing windows' ability to mitigate water penetration damage under hurricane conditions. AAMA conducted a 12-month review and evaluation of existing test protocols and their ability to address the cyclical nature of indoor-outdoor pressure differentials and turbulent flow characteristics of real-world hurricane winds. The effort culminated in the development of AAMA 520-09, *Voluntary Specification for Rating the Severe Wind-Driven Rain Resistance of Windows, Doors and Unit Skylights*.

AAMA 520 provides an optional rating scheme for the ability of fenestration products to resist severe wind-driven rain, based on ASTM E 2268-04, *Standard Test Method for Water Penetration of Exterior Windows, Skylights and Doors by Rapid Pulsed Air Pressure Difference*. Under this test method, water is sprayed uniformly across the whole surface of the test specimen at the rate of five gallons/square-foot/hour, impelled by simulated wind pressure pulses that vary in rapid cycles for a total duration of 300 cycles. As the maximum applied pressure behind the spray increases from 5 to 14 psf, defining the ten performance level ratings, the total accumulated leakage cannot exceed 15 ml per meter of sill width.

AAMA 520 continues to evolve based on ongoing research efforts. For example, the AAMA Southeast technical committee is developing an addendum intended to provide guidance to laboratories regarding water collection and measurement techniques and potential rounding discrepancies between measured and calculated values.

#### Research Continues

Beyond writing its own standards, AAMA also has been a long-time supporter of the work being led by Dr. Forrest Masters at the University of Florida, including the 130 mph hurricane simulator at the University's Wind Engineering Lab in Gainesville. The simulator is capable of mimicking the actual pressure pulses and lateral turbulence of a hurricane while dousing the test subject with the equivalent of an 8-inch-per-hour rainfall.

Another facility working on analyzing the effects of hurricane-force storms is the Institute for Business and Home Safety's (IBHS) laboratory near Charlotte, N.C. This facility can test and compare two full-size houses built to different code requirements simultaneously by simulating up to 140 mph winds and rain.

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#### Tornadoes: A Former Gap

AAMA just released AAMA 512-11, *Voluntary Specifications for Tornado Hazard Mitigating Fenestration Products*, which provides a system for rating the ability of windows to withstand tornadic impact, pressure cycling and water penetration effects associated with a designed event. And, we will continue to work collaboratively in researching and developing standards relating to product performance under severe storm conditions. |

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