

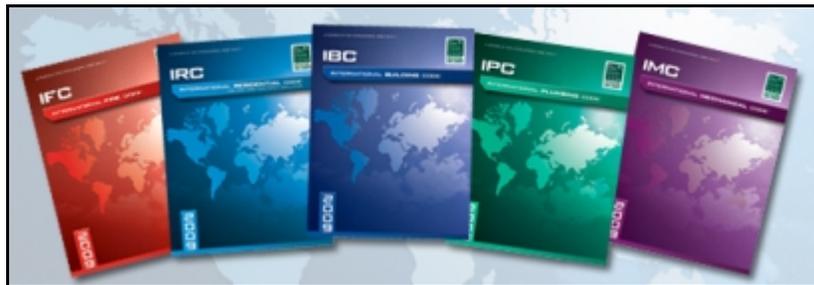


Architectural Testing For the Record

Informational Bulletin

Bulletin #47

Building Code Requirements for Windows and Doors



This Informational Bulletin provides a summary of U.S. building codes that are current for windows and doors. It is important to understand that local and state adoption of the current codes are dependent on review cycles and not all states and local jurisdictions have adopted the most recent versions of the codes cited. In any case it is important to be aware of the updated code requirements in this very competitive environment.

Scope of Summary

The codes are categorized into two broad groups - Residential and Commercial:

Residential:

- *2003 International Residential Code for One- and Two-Family Dwellings.* International Code Council 2003.
- *2006 International Residential Code for One- and Two-Family Dwellings.* International Code Council 2006.
- *2007 Florida Building Code, Residential.* International Code Council, 2008.

- *Fortified...for Safer Living Builder's Guide, 2008 Edition.* IBHS, 2007.

Commercial:

- *2003 International Building Code.* International Code Council, 2003.
- *2006 International Building Code.* International Code Council, 2006.
- *Florida Building Code, Building.* International Code Council, 2008.



Building Code Requirements (AWS)

The current building codes require that windows and doors be tested and labeled for air infiltration, water penetration resistance and structural performance (AWS) in accordance to a particular version of an AAMA/WDMA/CSA standard specification. There have been many changes over the years to both the codes and standard specifications, therefore the applicable code will reference a specific version of the specification.

Air/water/structural testing is required for all fenestration products, whether they be...

- ✓ for products that are not intended for use in wind-borne debris regions;
- ✓ for products intended for use in wind-borne debris regions, but protected by an approved protection device; or
- ✓ for impact-resistant products intended for use in wind-borne debris regions.

The 2003 version of the I codes require that windows and doors be tested to AAMA/NWDA 101/I.S.2-97. The 2006 version of the codes require that windows and doors be tested to AAMA/WDMA/CSA 101/I.S.2/A440-05.

There are a few special cases to be aware of as it relates to specific state requirements. The special cases include the Texas Department of Insurance which requires that windows be tested to AAMA/WDMA/CSA 101/I.S.2/A440-05, and the Florida codes which allow for either the 97 or 05 version of the standards as well as TAS-202.

All of the International Codes and the Texas Department of Insurance require independent certification and labeling for approval. The 2007 Florida codes require DCA product approval. Additionally, for areas in High Velocity Hurricane Zones (HVHZ), products must comply with the TAS protocols.

Building Code Requirements (Impact)

In addition to AWS testing, windows used in wind-borne debris regions are required to protect against wind-borne debris. While certification and labeling are not a requirement in all cases, the specific requirements cited are as follows:

The 2003 version of the codes require that windows and doors be tested to ASTM E 1996-01. The 2006 version of the codes require that windows and doors be tested and labeled to ASTM E 1996-04 or AAMA 506-00, which in turn requires testing to ASTM E 1996-04.

The special cases again are the Texas Department of Insurance which requires that windows and doors be tested and labeled to AAMA 506-06, which requires testing to ASTM E 1996-02 or ASTM E 1996-05. The 2007 Florida codes require testing to ASTM E 1996-02 or 05, or to the AAMA 506-06, while locations in HVHZ must be tested to the TAS-201/TAS-202 protocols.

Fortified Housing (Fortified Program)

The Fortified program, specifies design, construction and product approval guidelines to increase a new home's resistance to natural, catastrophe-level perils such as high wind and hurricane. It is not a building code, but an insurance industry incentive program that can lead to lower insurance rates for the homeowner.



As it relates to windows, the approach is to specify a higher basic wind speed than required by code and then select products that meet the associated wind pressure and

wind-borne debris requirements. In summary the requirements are:

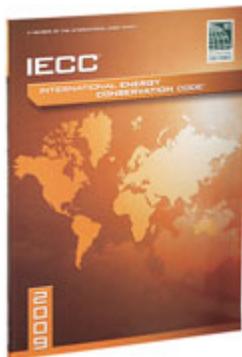
- using the ASCE 7 design wind speed for the site, plus an additional 20 MPH, and
- components and cladding loads are to be determined based on an Exposure C, regardless of the actual building exposure.

Two other notes of importance for the Fortified program are that...

- ✓ windows installed in wind-borne debris regions may be non-impact windows, provided that they are protected by an approved protection device, and
- ✓ the Fortified program has additional special requirements for window installations, relating primarily to flashing and water infiltration.

Energy Codes

Energy performance is mandated by the International Energy Conservation Code (IECC). There are prescriptive methods in the code that may be used to assign a default U-value based on frame construction and glazing type.



Testing to NFRC 100, *Procedure for Determining Fenestration Product U-factors*, is the method by which performance can be proven for products which are not covered by the default values. Manufacturers may also use this option when they want to obtain better U-factor than the default value assigned by the IECC.

Emergency Egress and Fall Protection

While not all windows are required to meet emergency egress or fall protection requirements, it is critical to know when they do as they involve life safety issues.

Typically, windows in sleeping rooms and in basements used as habitable space require at least one window to meet the emergency egress requirements.

For a window to qualify for emergency egress, the unobstructed opening of the window must measure no less than 20" horizontally, 24" vertically and have an opening area of not less than 5.0 ft² for ground floor windows and 5.7 ft² for upper levels.

Fall protection requirements state that windows with openings more than 72" above the finished grade (or surface below) are to have a minimum sill height of 24" above the interior finished floor. In cases where the sill height is less than 24", the window shall not have an opening greater than would allow for a 4" diameter sphere to pass. Where the window opening is greater than the prescribed 4" limitation an approved window guard must be installed.

Installation Requirements

The Commercial building codes say little about installation while the Residential building codes provide some generic installation information including the stipulation that windows are to be installed in accordance with the manufacturer's installation instructions.

Because test procedures do not achieve a factor of safety sufficient to validate a wood or concrete installation, window installations must be engineered. The Florida Product Approval program and Miami-Dade NOA require validation and approved drawings for installation methods. Thus, it is recommended that all installation details and specifications be prepared by a registered design professional.

Summary – Determine Your Test Regime

It is recommended that manufacturers test their products to AAMA/WDMA/CSA 101/I.S.2/A440-05 in order to qualify their products to be acceptable in almost every situation. Older versions of AAMA 101 are being phased out, so it is important to get ahead of the curve.

Testing to AAMA 101-05 won't qualify your products for the impact testing requirements in wind-born debris regions unless they are protected by an approved protection device. With the exception of Florida's High Velocity Hurricane Zone, testing to AAMA 506-06 will qualify your products for wind-borne debris regions as it references the ASTM E 1996 standard which satisfies all but the Florida HVHZ.

For Florida's HVHZ, windows that are not protected by an approved device must be tested for air/water/structural performance to the TAS-202 protocol and to TAS 201 & TAS 203 protocols for impact performance.

Conclusion

Finding your way through the quagmire of protocols, standards and test methods can be overwhelming, but Architectural Testing has a staff of highly skilled and qualified engineers available to answer your questions regarding codes and testing services.

The purpose of this Informational Bulletin is to provide guidance on the relevant codes and standards and to help you establish your testing needs. The information contained herein is not manufacturer or product specific, and is provided as advisory information to our customers.

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