

American National Standard

*Testing and Rating of
Severe Windstorm Resistant Components
for Swinging Door Assemblies*



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Builders Hardware Manufacturers' Association**

Approved September 10, 2003



ANSI A250.13-2003

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Foreword (This Foreword is not part of American National Standard A250.13-2003)

In the aftermath of hurricane Andrew in 1993 and other major windstorms, building codes and standards were developed with the goal of improving structures so that they would better resist damage associated with high wind speeds. A primary focus was to include requirements for protective opening systems that would decrease the potential for the building envelope to be breached due to impact from wind-borne debris and high fluctuating wind pressures. As a result, the new building codes included specific test requirements for windows and doors in hurricane-prone areas. These tests were designed to evaluate a complete assembly (door, mounting and latching hardware, door frame and the attachment of the assembly to the surrounding wall) however, few entry door systems, particularly commercial, are marketed as complete assemblies. Thus, there was a problem in defining and providing test results that applied to assemblies when the components to be installed came from multiple sources and included a substantial number of interchangeable elements.

In the fall of 1998 members of the Steel Door Institute (SDI) and members of the Builders Hardware Manufacturers' Association (BHMA) agreed to develop a national standard for a component-based approach to testing and certification for windstorm resistance of swinging door assemblies. The test procedures used in this standard represented the most severe requirements found in all the windstorm resistance standards currently in use in US building codes. However, the procedures are designed to isolate, as much as possible, the loads and conditions that a particular component is subjected to in the full assembly test and duplicate these specific conditions. Using a combination of worst-case assembly design and safety factors, this process was designed to provide a component rating that related directly to the component's ability to withstand the conditions that occur in a full assembly test.

Prior to releasing the proposed standard for consideration, the BHMA/SDI task group conducted validation testing where components were expected to be rated at three design-load target values. Those components were tested to establish their ratings by the proposed procedure. Following this process, complete assemblies were tested in accordance with the ASTM E1886 test method. The results of this process confirmed that assemblies made up of rated components would perform as expected. In addition, the validation test showed that where a component was identified as the weakest element of an assembly, based the component tests, the same component would fail in a similar manner when tested as part of an assembly to levels exceeding the component's rated capacity.

It is the intent of the BHMA/SDI task group to propose A250.13 *Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies* for formal recognition by the Florida Building Code, International Building Code and International Residential Code. Products that have been evaluated and rated under this procedure will be listed and labeled by nationally recognized certification bodies, and will carry identifying certification marks, as well as labels that provide basic rating information. Where applicable, component manufacturers will provide installation instructions and rating data information needed to verify code compliance. Building designers will generally use the data supplied to conduct an opening-by-opening design analysis, verify code compliance, and submit

the results through the normal plan review process. Code Authorities will thus need only to verify that the design load and compliance analysis has been correctly carried out and that the specified components are actually installed during construction in accordance with the manufacturer's instructions and project specifications.

There are three appendices in this standard. Appendices A and C are informative and are not considered part of this standard. Appendix B is normative and is considered part of this standard.

Suggestions for improvement of this standard will be welcome, and should be sent to the Steel Door Institute, 30200 Detroit Road, Cleveland, Ohio 44145-1967.

The organizations that have approved this standard are as follows:

American Institute of Architects
American Iron and Steel Institute
Builders Hardware Manufacturers' Association
Canadian Steel Door Manufacturers' Association
Door and Hardware Institute
Factory Mutual Research Corporation
General Services Administration
Hollow Metal Manufacturers' Association / Division of National Association of Architectural Metal Manufacturers' Association
Insulated Steel Door Institute
International Conference of Building Officials
Intertek Testing Services
Manufactured Housing Institute
National Association of Home Builders
Steel Door Institute
Underwriters Laboratories Inc.
Window and Door Manufacturers' Association

The Accredited Standards Committee A250 TC-1 developed this standard and had the following personnel at the time of approval:

Robert M. Berhinig, Chairman
J. Jeffery Wherry, Managing Director

<i>Organization Represented</i>	<i>Name of Representative</i>
American Institute of Architects	Christopher Bushnell
American Iron & Steel Institute	Robert Wills
Amweld Building Products LLC	Allan Ashachik
Benchmark Commercial Doors	Randall Barber
Builders Hardware Manufacturers' Association	Mike Tierney
Canadian Steel Door Manufacturers' Association	Bud Bulley
Ceco Door Products.....	Thomas R. Janicak
Curries Company	Stan L. Horsfall
Deansteel Manufacturing Company.....	Claus D. Heide
Door and Hardware Institute	John Geniesse
Factory Mutual Research Corporation	Mark Tyrol
General Services Administration	Donald McGaha
Hollow Metal Manufacturers' Association / Division of National Association of Architectural Metal Manufacturers	Russell Tauscher
Ingersoll-Rand	Kurt Roeper
International Conference of Building Officials.....	Paul Armstrong
Insulated Steel Door Institute.....	Steve Jaspersen
Intertek Testing Services	Nancy Kokesh
The Kewanee Corporation	Jason Lisewski
Magnatrax Corporation	Craig J. Ordmandy
Manufactured Housing Institute	Mark Nunn
Mesker Door Company	Stephen C. Frates
National Association of Home Builders.....	Jeff Inks
Pioneer Industries.....	Kamal Sheikh
Security Metal Products Corporation.....	Daniel Buffenbarger
Steel Door Institute.....	J. Jeffery Wherry
Underwriters Laboratories Inc.....	Daniel Kaiser
Window & Door Manufacturers' Association	Rick Perry

American National Standard

Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies

1 Scope

1.1 This standard provides procedures for testing and establishing load ratings (design load in pounds per square foot or pounds force) for components of exterior swinging door assemblies for purposes of protection of openings during severe windstorm conditions, such as a hurricane, that produces sustained wind speeds or gusts in a range of 110 to 150 miles per hour as defined by ASCE 7-02. It is not intended to simulate wind forces generated by tornadoes.

1.2 The procedures cover all components normally assembled to form an exterior swinging door system. This includes door frames, hardware mullions, thresholds, frame anchorage, hinges, locksets, latches and bolts, doors, sidelights and transoms and glazing systems. This procedure applies to both single swing and pair assemblies and also includes procedures for testing and rating components for both in-swing and out-swing installations.

1.3 The evaluations required by this standard are based on the structural performance tests specified in ASTM E1886, ASTM E1996 and ASTM E330.

1.4 Evaluations under this procedure are designed to determine the ability of exterior doors to remain closed under conditions present in severe windstorms, including high, fluctuating wind speeds and the presence of wind-born debris. Assemblies meeting these requirements are less likely to open during a storm, preventing potentially large pressure differentials which may cause or contribute to major structural damage. This procedure does not consider it necessary for the door assembly to be capable of preventing water intrusion as a result of severe windstorm exposure conditions.

It is recognized that products and assemblies meeting these requirements will not necessarily prevent all forms of damage associated with hurricanes and other severe windstorms. It is also assumed that these assemblies themselves might be damaged in a severe windstorm to an extent that would require repair or replacement after such an event.

2 Definitions

Severe Windstorm: A weather event such as a hurricane that produces sustained wind speeds or gusts in a range of 110 to 150 miles per hour.

Labeled: Identified by the application of a label bearing the certification mark of a recognized certification agency, the manufacturer's name or identifying symbol and any applicable rating(s).

Label: An identification applied on a product by the manufacturer that contains the name of the manufacturer and the function and performance characteristics of the product or material.

Operable: Capable of being opened by the application of ordinary levels of hand applied force to the latch operator and door assembly.

Note: Door assemblies that have been subjected to the severe conditions of the tests involved in this method are not expected to be undamaged and thus will normally not operate with the low force levels generally required for undamaged assemblies. The goal is to provide an assembly that will remain closed during the windstorm, but not be damaged to the extent that it requires the use of tools to be opened after the event.

Stiffness Classification: A measure of a door's overall resistance to bending as determined by a twist test under a prescribed