# Listed & Labeled

## Labeled doors enhance security and safety in schools

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**Walk through any facility and you'll see doors and door frames with labels, either on the hinge edge of the door or jamb edge of the frame.**

### What do these labels mean?

All doors generally look the same. If asked, building occupants usually have no idea what the label on a door or frame means. Not until you question a building maintenance person or someone knowledgeable about doors or door hardware will you usually learn they are fire doors.

But are fire-rated doors and frames the only types of doors that are listed and labeled? All doors form a barrier at the entrance to a building or room. Why are listed and labeled door assemblies necessary? And what does it mean for a door or frame to be listed and labeled? Finally, why must these door assemblies be regularly inspected and maintained to specific requirements?

### Listed and Labeled

When a door assembly (door, frame and/or hardware) is listed and labeled by a certification agency, it means a representative sample of that assembly has undergone testing in a laboratory to demonstrate that the assembly, or its components, meets specific requirements based on product standards published by organizations such as ASTM, NFPA (National Fire Protection Association), UL (Underwriters Laboratories) or FEMA (Federal Emergency Management Administration). Prior to testing, the construction of a door, frame and sometimes the hardware is carefully documented. The components are assembled per a manufacturer's installation instructions and the assembly is tested according to the product standard.

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Once testing is successfully completed, the door, frame, hardware and installation details are carefully described and listed by a certification agency and the details are available on the agency's website. The manufacture and construction of listed door assemblies is reviewed periodically by inspectors from the certification agency to ensure the doors are fabricated the same as the test sample. No alterations may be made to the design without prior approval by the certification agency. Listings provide assurance to the building official that doors, frames and hardware described in the listing meet the building code required standards. The label, authorized by the certification agency and applied to a door, frame, and/or hardware, is the evidence that the unit complies with the listing.

Until the late 1990s, doors, frames and components were certified as fire-rated door components, tested to meet the requirements of standard UL 10B or other code-referenced standards. Today, the UL 10B standard has been superseded for side-hinged swinging doors by UL 10C, commonly known as the "positive pressure" test. Another common requirement for fire-rated doors is a requirement for smoke resistance as outlined in the Standard UL 1784. The requirements outlined in UL 10C and UL 1784 have resulted in significant changes to doors, frames and fire-rated door hardware since they were implemented in the late 1990s.

Fire-rated door assemblies are commonly labeled for 20, 45, 60, 90 or up to 180 minutes. The requirement for duration is a function of where the door is installed. Egress openings in fire-rated walls and shafts must be protected with fire-rated door assemblies. To function properly, these doors must be secured in a closed position at all times. Some jurisdictions, such as OSHPD (Office of Statewide Health Planning and Development) require annual inspections to help ensure the fire door assembly is installed and functioning properly.

Although doors and components are tested, listed and labeled for a fire- rating and/or smoke-rating, other listed and labeled door assemblies are starting to appear in the built environment. With security issues, (especially those related to an active shooter – an important element in some new building designs) doors tested for ballistic or forced entry protection are becoming more common. With the built environment tasked with protecting people in our communities in the event of natural disasters such as hurricanes or tornadoes, doors specifically tested for these conditions are required to be used at the entrance of such shelters.

Let's review some of the security and safety standards that are mandating new types of listed and labeled door assemblies:

- **UL 752 (*Bullet Resisting Equipment*):** This standard describes tests for building materials and assemblies, including glazing, to resist bullet penetration for a variety of different firearms. If a material prevents the penetration of a specific size bullet, it is rated for the applicable level, which includes handguns (Levels 1-3); rifles (Levels 4-9); 0.50 caliber rifle (Level 10) and 12-Gauge shotgun (SG). The test procedure requires shooting the door panel, frame, hardware (if evaluating as part of the assembly) and seam of the product. Failure results when any item, such as a portion of the bullet or part of the specimen, strikes and marks a witness screen located behind the protected side of the material.
- **Test 5-aa10 (*Testing of Standard Wood and HM Doors, Frames, Glass and Hardware*):** This standard, developed by a private security firm and utilized by several leading door, frame and hardware suppliers, tests a door assembly's ability to withstand a lone-wolf ballistic and manual forced-entry attack. Testing consists of 30 rounds shot from an AK-47, plus manual attack using hand tools such as a ball-peen hammer, 3-pound hammer and a baseball bat. Unlike UL 752, failure in this test does not occur if the material is penetrated. Instead, failure occurs if the attacker is able to gain access through a door. In this test, the seam between the door and frame is not subject to ballistic attack.
- **ASTM F3038 (*Standard Test Method for Timed Evaluation of Forced-Entry-Resistant Systems*):** This consensus standard subjects a test door assembly to a simulated mob attack of six men using readily available hand tools. Testing results in a time rating of five,15, 30 or 60 minutes, or a user-specified time. Like the 5-aa10 Test, failure occurs if the mob gains access through the door assembly opening large enough to pass a certain size object through the opening.
- **ASTM F1233 (*Standard Test Method for Security Glazing Materials and Systems*):** Many entry doors and vestibules in modern buildings are constructed of, or contain, large expanses of glazing. This testing standard subjects glazing and glazing systems to a range of ballistic and/or manual physical attack methods. Ballistic ratings are handgun (HG1-HG4); sub-machine gun (SG); rifle (R1-R5) and shotgun (SH1-SH2). In addition to ballistics, forced entry is attempted using a range of hand tools including torches and chemicals in a sequential order. Testing results in a ballistic rating and/or forced entry rating, Class 1-5.


Door assemblies are listed and labeled by a certification agency after it meets specific requirements based on product standards.

- **FEMA 361 / ICC 500 (*Standard for the Design and Construction of Storm Shelters*):** The built environment in schools, especially gymnasiums and other large assembly areas, are sometimes tasked with providing community shelter from hurricanes and tornadoes. Hurricane- and tornado-rated door systems are both subjected to testing per ASTM E330 (static pressure test) plus ASTM E1886 (missile impact and cyclic pressure loading). Doors protecting openings into shelter areas are tested, listed and labeled specifically for either a hurricane or a tornado rating.

## Be Wary of Imposters

When reviewing marketing or other literature for any products, look for the listing mark of the certification agency. Be wary of phrases like, "designed in accordance with" or "designed to meet the requirements of." The product may not have been tested or is not listed by anyone and you're taking a chance the product will perform.

## The Devil is in the Detail

Listed and labeled products and assemblies must be approved for use by the Authority Having Jurisdiction, who is responsible for making sure the listing is applicable to the project. It is not just that the product is listed, it must be listed for the appropriate standard.

When reviewing a listed door assembly, attention to detail is paramount. The smallest detail could mean the difference between the door performing as intended – or failing. When reviewing a listed product, be sure the full installation details are understood. Examples include the clearance (gap) between door and frame for fire-rated doors. The allowable gap between a hollow metal (HM) door and HM frame is 1/8 inch +/- 1/16 inch, while the gap between a wood door and HM frame has been 1/8 inch maximum.

Another example is frame anchors. An installer may use common hex head blue masonry screws to install non-rated door frames into concrete, but storm shelter doors typically have specific anchoring requirements that define the specific fastener to be used. Substitute fasteners must be demonstrated to have equivalent performance as those specified in the listing.

## A Note about Door Hardware

Ballistic-rated door assemblies do not typically include door hardware as part of the listed assembly. When installing surface hardware on any ballistic listed and labeled door, thru-bolted hardware should be utilized. This is to ensure the full-door thickness supports the door hardware. Consider a glazing frame installed with fasteners from only the secure side and terminating in the door. A properly positioned bullet, striking the threat-side of a ballistic-rated

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door at just the right location, could penetrate the first skin, strike the end of the fastener, dislodge it and cause it to eject on the secure side, possibly injuring someone.

In addition, consider using mortise or interconnected locksets in ballistic-rated door assemblies. Cylindrical locksets have only one latchbolt securing a closed door. A well-placed shot on a single latchbolt can obliterate the bolt, allowing access through a door assembly. Doors with multi-point locking (such as from the mortise lockset with deadbolt) reduce the chance a single, well-placed shot will allow access through the door assembly by damaging the lockset.

Labeled storm shelter door assemblies often include door hardware as part of the listed door assembly system. This is because these doors are tested with specific hardware identified by the manufacturer. Deviation from specific hardware sets is typically not allowed because doing so requires a re-test of the door assembly.

## Conclusion

Listed and labeled door assemblies are carefully documented and then tested in a laboratory to standardized requirements to ensure the design delivers a desired level of safety and security. Listing information includes specifics about installation requirements and ratings achieved.

Periodic inspections by the certification agency at the door component manufacturing facility, and labels applied under authorization, assure building officials that design details from the tested sample are preserved in production.

Attention to details in the listing during installation and maintenance throughout the life of the assembly is necessary to ensure door assemblies will function as intended.

New standards addressing bullet resistance, forced entry and storm resistance are being listed and labeled by accredited certification agencies to support qualification and acceptance of door assemblies in the areas of safety and security. +

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