

IBC Code Requirements for Fire Rated Glass

Important Changes in 2012 IBC Code Requirements for Fire Rated Glass

The 2012 IBC code requirements for fire rated glass (FRG) can be found in Chapter 7. Over the years, this chapter has been revised to make it easier for designers, code officials, and installers to clearly categorize and apply fire protective and fire resistive glazing. Chapter 7 of the IBC addresses glazing performance characteristics, allowed applications and most importantly, its limitations.

Three Tables Modified to Clarify FRG Requirements and Limits

In 2009, The ICC (International Code Council) recognized that the FRG provisions of the IBC were confusing, so it appointed an ad hoc committee comprised of fire and building officials, test agencies, and industry representatives to study the glazing labeling provisions and make recommended code changes. As the result of the ad hoc committee's extensive work over the course of several months, three tables in the 2012 IBC were revised. This new model building code will be published in April 2011. These are not new code requirements, but rather a clarification of the 2006 and 2009 editions of the IBC.

Even though the new tables will not be adopted locally until jurisdictions accept the 2012 IBC, they are useful today in understanding the 2006 and 2009 IBC glazing requirements. The requirements contained in the new tables have been in effect since the 2006 IBC, and conform to what NFPA 80 provided in the 1999 and 2007 NFPA 80 editions, which are incorporated by reference in the 2012 IBC.

New 2012 IBC Table 716.3 – Marking Fire Rated Glazing Assemblies

Table 716.3 clarifies recent glazing labeling marking requirements, which mandate that FRG be marked with a letter designation corresponding to the test standard to which the product was tested.

| Fire Test Standard | Marking | Definition of Marking |
|------------------------------|-------------|---|
| ASTM E119 or UL 263 | W | Meets wall assembly criteria. |
| NFPA 257 or UL 9 | OH | Meets fire window assembly criteria including the hose stream test. |
| NFPA 252 or UL 10B or UL 10C | D H T | Meets fire door assembly criteria. Meets fire door assembly "Hose Stream" test. Meets 450° F temperature rise criteria for 30 minutes |
| | XXX | The time in minutes of the fire resistance or fire protection rating of the glazing assembly |

- "W" means that the glazing has been tested to the fire wall test standard (ASTM E-119/NFPA 251/UL 263) and thus classified as fire resistive.
- Glazing products that are marked "D" means that the product has been tested to the fire door test standard, NFPA 252, and the marking "H" means that it passes the hose stream procedure. The marking "T" means that the glazing meets the temperature rise limits required for doors used in exit enclosures and passageways.
- Glazing products that are marked "OH" means that the glazing has been tested to the fire window test standard, NFPA 257, and meets both the fire endurance and hose stream requirements of the test standard.

Note that some products have been tested to more than one standard, and will have multiple markings. For example, when a fire resistance glazing product has been tested to the wall fire test, and has also been tested in a fire door assembly, it will carry a dual marking of "W" and "D H T." This product can be used in large vision panel sizes in 60 and 90 minute doors, where a fire protection rated product, such as safety wired glass or safety ceramic, and marked only DH, would be limited to a 100 square inches.

New 2012 IBC Table 716.5 (Revised 715.4) – Opening Fire Protection Assemblies, Ratings and Markings

In reviewing the glazing provisions of the code, the ad hoc committee recommended significant changes to the door assembly rating table, 716.5. For the first time, the code lays out, in table form, the vision

panel size limits and adds a column that specifies the sidelite and transom rating requirements. Importantly, the table distinguishes between the use of fire “protection” rated products, and fire “resistance” rated products, and makes it easy for the end user to: identify appropriate size limits affecting fire protective glazing; where fire resistance rated products must be used if glazing is desired in larger sizes; and, where the code would not otherwise allow FRG. Below is an EXCERPT from Table 716.5.

| TYPE OF ASSEMBLY | REQUIRED WALL ASSEMBLY RATING (HRS.) | MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (HRS.) | DOOR VISION PANEL SIZE | FIRE RATED GLAZING MARKING DOOR VISION PANEL* | MINIMUM SIDELITE/TRANSOM ASSEMBLY RATING (HRS.) | | FIRE RATED GLAZING MARKING SIDELITE/TRANSOM PANEL | |
|--|--------------------------------------|---|----------------------------|---|---|-----------------|---|-----------------|
| | | | | | Fire Protection | Fire Resistance | Fire Protection | Fire Resistance |
| Shaft, exit enclosures and exit passageway walls | 2 | 1-1/2 | 100 sq. in. ^{c,d} | <=100 sq. in. = D-H-90 >100 sq. in. = D-H-T-90 or D-H-T-W-90 | Not Permitted | 2 | Not Permitted | W-120 |
| | 1 | 1 | 100 sq. in. ^{c,d} | <=100 sq. in. = D-H-60 >100 sq. in. = D-H-T-60 or D-H-T-W-60 | Not Permitted | 1 | Not Permitted | W-60 |
| Fire Partitions / Corridor Walls | 1 | 1/3 ^a | Maximum Size Tested | D-20 | 3/4 ^b | N/A | D-H-OH-45 | N/A |
| | 0.5 | 1/3 ^a | Maximum Size Tested | D-20 | 1/3 | N/A | D-H-OH-20 | N/A |
| Other Fire Partitions | 1 | 3/4 | Maximum Size Tested | D-H-45 | 3/4 | N/A | D-H-45 | N/A |
| | 0.5 | 1/3 | Maximum Size Tested | D-H-20 | 1/3 | N/A | D-H-20 | N/A |

Note that 90-minute (1-1/2 hour) doors require 120-minute fire resistive sidelites/transoms. Fire protective sidelites and transoms are NOT permitted.

Also, 20-minute (1/3 hour) doors in a 1-hour exit corridor require 45-minute rated sidelites/transoms.

New 2012 Table 716.6 – Fire Window Assembly Fire Protection Ratings

The ad hoc committee recommended an expansion of the information in Table 716.6, a table specifying required fire-window ratings. As in Table 716.5, Table 716.6 now clarifies where fire protection rated products are allowed, where fire resistance rated glazing must be used (e.g., in 2-hour interior walls), and where fire protection rated windows are not permitted. Table 715.5 in 2012 IBC further clarifies that fire windows are not permitted in 1-hour fire barriers used as exit enclosures or passageways, but are permitted in fire barriers used as incidental use areas and mixed occupancies.

| TYPE OF WALL ASSEMBLY | REQUIRED WALL ASSEMBLY RATING (hours) | MINIMUM FIRE WINDOW ASSEMBLY RATING (hours) | FIRE RATED GLAZING MARKING |
|---|---------------------------------------|---|-----------------------------|
| Interior walls | | | |
| Fire walls | All | NP ^a | W-xxx ^b |
| Fire barriers | >1 | NP ^a | W-xxx ^b |
| | 1 | NP ^a | W-xxx ^b |
| Incidental use areas (707.3.6), Mixed occupancy separations (707.3.8) | 1 | 3/4 | OH-45 or W-60 |
| Fire partitions | 1 | 3/4 | OH-45 or W-60 |
| | 0.5 | 1/3 | OH-20 or W-30 |
| Smoke barriers | 1 | 3/4 | OH-45 or W-60 |
| Exterior walls | >1 | 1-1/2 | OH-90 or W-XXX ^b |
| | 1 | 3/4 | OH-45 or W-60 |
| | 0.5 | 1/3 | OH-20 or W-30 |
| Party wall | All | NP | Not Applicable |

“NP” stands for not permitted. However, there is an exception. **Fire resistive glazing assemblies tested to ASTM E-119 are allowed.** “XXX” is a place holder for the fire rating duration in minutes, which is equal to the fire resistive rating required for the wall assembly.

Code Change Removes Sprinkler Tradeoff for Doors in Exit Enclosures and Passageways

To repeat, nearly all of the modifications to Tables 716.3, 716.5 and 716.6 in the 2012 IBC are intended to clarify requirements and limitations on FRG in effect since the 2006 IBC. These 2012 IBC tables do, however, include one important code change. Previous editions of the code provided for an exception that allowed larger fire protective vision panels in fire doors used in exit enclosures and passageways when the building was fully sprinklered. The new 2012 IBC removes that sprinkler exception and will now read as follows:

716.5.5.1 Glazing In doors. Fire protection rated glazing in excess of 100 sq inches (0.065m²) is not permitted. Fire resistance rated glazing in excess of 100 sq inches (0.065m²) shall be permitted in fire door assemblies when tested as components of the door assemblies, and not as glass lights, and shall have the maximum end temperature rise of 450 degrees F (250 degrees C) in accordance with 716.5.5.

Section 716.5.5.1 makes it very clear that fire protective glazing cannot exceed 100 square inches. It further states that fire resistive glazing is allowed in excess of 100 sq. in. as long as it limits the temperature rise to 450 degrees F above ambient after 30 min. of fire exposure. There is no question that fire resistive glazing meets this requirement.

Note that no fire protective glazing product can meet the 450 degrees F above ambient after 30 min. of fire exposure. Therefore, the code makes it clear that it is limited to 100 sq. in. regardless if the building is fully sprinklered.

The ICC made this change in recognition of the hazards of radiant heat transmission, because sprinklers in a building fail to eliminate the life safety and fire spread hazards posed by the unrestricted transmission of radiant heat through large sizes of fire protective glazing panels in 60 and 90 minute doors, especially when those doors are protecting exit enclosures and exit passageways deemed essential for occupant life safety.

The 2012 IBC tables also clarify that sidelites and transoms around 60 and 90 minute exit enclosure and passageway doors must be fire resistive and rated equal to the wall. These exit enclosures and passageways are integral to life safety, and occupants need to be protected from dangerous radiant heat levels transmitted through fully glazed exit enclosure doors, sidelights and transoms. It is comforting to note that the cost of fire resistive glazing can be more economical than inappropriately specified fire protective ceramic products.