

Fire Protective vs. Fire Resistive Glazing

Understanding the Difference between Fire Protective and Fire Resistive Glazing

The key to understanding fire rated glazing products and their applications lies in distinguishing between the two fire performance categories in the IBC – fire protective vs. fire resistive. Each category has its own set of performance features, test standards and allowed applications. Simply relying on the fire endurance rating (20, 45, 60, 90, 120 and 180 minutes) or whether a product is “thick” or “thin” can lead to faulty specifications and misapplications of the product. This article discusses the difference between fires protective vs. fire resistive glazing based on NFPA; UL & ASTM test standards and IBC code requirements.

Fire protective glass is designed to compartmentalize smoke and flames and is subject to application, area and size limitations under the IBC. Fire protective glass is typically used in doors and openings up to 45 minutes and cannot exceed 25% of the total wall area because it does not block radiant heat transmission. These products are also subject to the following test standards:

- NFPA 252, Standard Methods of Fire Tests of Door Assemblies
- NFPA 257, Standard on Fire Tests for Window and Glass Block Assemblies
- UL 9, Standard for Safety Fire Tests of Window Assemblies
- UL 10B, Fire Tests of Door Assemblies
- UL 10C, Positive Pressure Fire Tests of Door Assemblies

Fire protective glass products include:

Type	Fire Rating	CPSC Safety Rating	Appearance	Typical Application(s)
Specialty Tempered	20 minutes	CPSC Cat. II	Optically clear. No wires or tints.	Doors up to the max. size tested
Specialty Tempered, Heat Reflective	20-60 minutes AHJ approval is required for 45-60 minute applications.	CPSC Cat. II	Optically clear. No wires or tints.	20-45 min. doors up to the max. size tested / 60 min. doors up to 100 sq. in. / 45 min. sidelites, transoms and windows
Specialty Fire Protective	90 minutes	CPSC Cat. I or Cat. II	Optically clear. No wires or tints.	90 min. doors up to 100 sq. in.
Traditional Wired Glass	20-90 minutes	none	Annealed glass with embedded wires.	45 min. transoms and windows where safety is not a requirement
Safety Wired Glass	20-90 minutes	CPSC Cat. II	Wired glass with surface applied safety film	20-45 min. doors up to the max. size tested / 60-90 min. doors up to 100 sq. in. / 45 min. sidelites, transoms and windows
Ceramic	20-90 minutes	none	Wire-free with amber tints	45 min. transoms and windows where safety is not a requirement
Filmed Safety Ceramic	20-180 minutes	CPSC Cat. II	Ceramic with surface applied safety film. Wire-free with amber tints.	20-45 min. doors up to the max. size tested / 60-180 min. doors up to 100 sq. in. / 45 min. sidelites, transoms and windows
Laminated Safety Ceramic	20-180 minutes	CPSC Cat. II	Laminated ceramic. Wire-free with amber tints.	20-45 min. doors up to the max. size tested / 60-180 min. doors up to 100 sq. in. / 45 min. sidelites, transoms and windows

It is important to note that while there are fire protective products rated from 60 to 180 minutes, their application is limited to door vision panels, and size limitations may apply. For 180 minute doors, fire protective products may be listed for 100 square inches, although the IBC does not permit any vision panel in a 3-hour rated fire door. For 60 and 90 minute doors in exit enclosures and exit passageways,

fire protective products are limited to 100 square inches whether or not the building is fully sprinklered. More information on the code change and the 2012 IBC are discussed in following sections.

In addition, fire protective glass, such as ceramics and wired glass, have limited use in 1-hour walls, and are prohibited altogether as sidelites, transoms and windows in 2-hour interior walls because they cannot block radiant heat. These limitations are recognized in the IBC, and recent revisions to the 2012 IBC give end-users clear guidance in applying those limits.

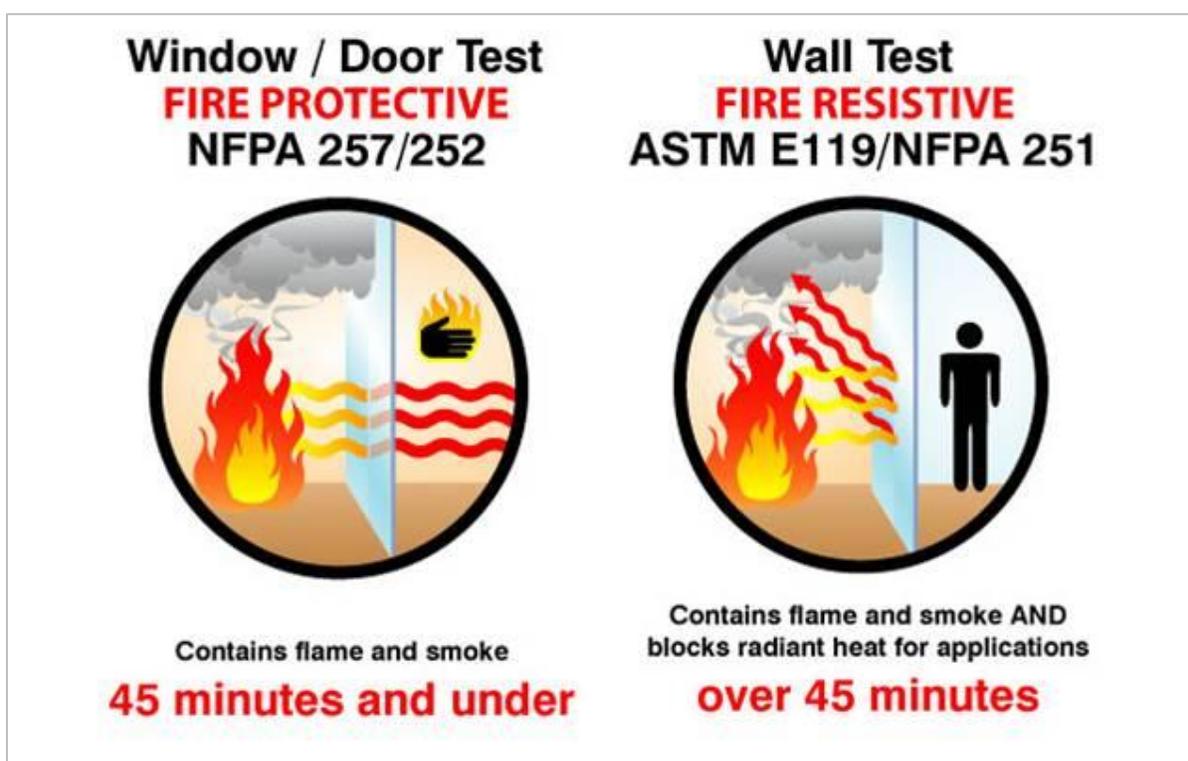
Fire resistive glass is not limited in application or size. This type of FRG compartmentalizes smoke and flames, and blocks the transmission of dangerous levels of radiant heat through the glazing. As a result, it can be used in wall and door applications 60 minutes and above without the size limitations that apply to fire protective glass. The following test standards apply to fire resistive glass:

- ASTM E-119, Standard Methods for Fire Tests of Building Construction and Materials
- NFPA 251, Standard Methods of Tests of Fire Resistance of Building Construction and Materials
- UL 263, Fire Tests of Building Construction and Materials

These standards apply to all fire-resistive wall materials, where the temperature rise on the non-fire side cannot exceed an average of 250 degrees Fahrenheit. The intent is to block the dangerous transmission of radiant heat, which can cause paper, drapes, clothing and other combustible materials within 20 feet to ignite without coming in contact with the actual fire. Imagine the devastating effect unrestricted radiant heat has on building occupants attempting to exit past a large glazed area during a fire. By effectively compartmentalizing smoke, flames and radiant heat, fire resistive glass insures safe egress, no matter how large the glazed area.

Fire resistive glass products include:

Type	Fire Rating	CPSC Safety Rating	Appearance	Typical Application(s)
Fire retardant filled units	Up to 2 hours	CPSC Cat. II	Optically clear. No wires or tints. Comprised of 2 tempered lites with the cavity filled with a clear fire retardant.	1-2 hour walls, 60-90 min. doors and 60-120 min. sidelites and transoms up to the max. size tested
Multilaminates	Up to 2 hours	CPSC Cat. II	Optically clear. No wires or tints. Multiple sheets of annealed glass with an intumescent interlayer.	1-2 hour walls, 60-90 min. doors and 60-120 min. sidelites and transoms up to the max. size tested

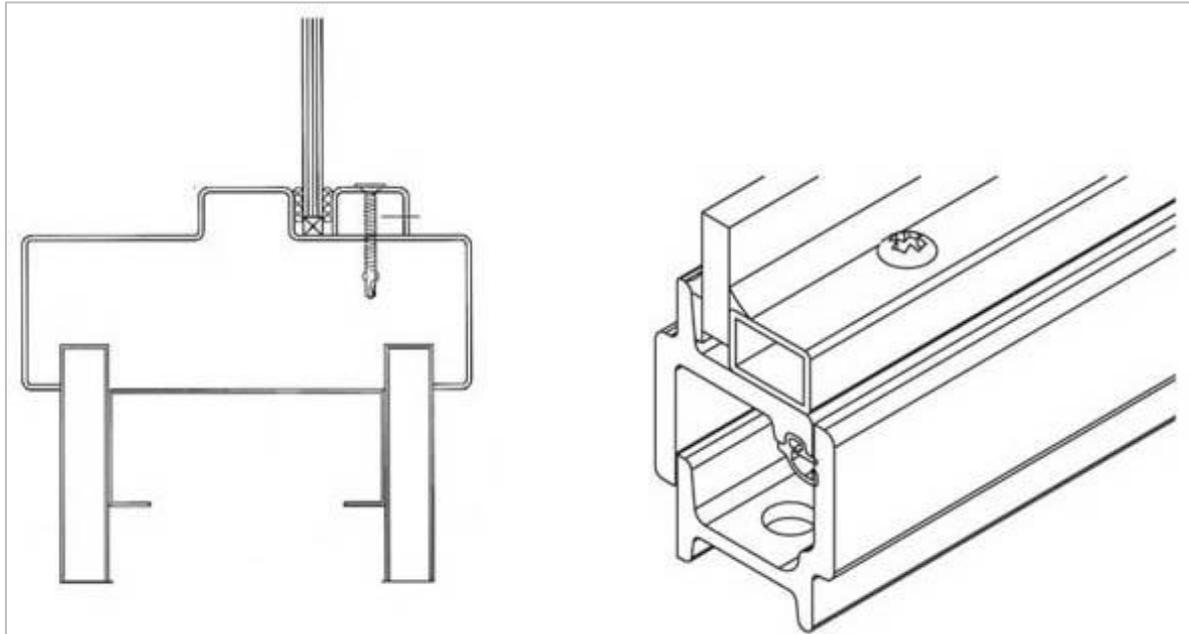


Fire Protective vs. Fire Resistive Glass

Framing Must Match Glazing Requirements

Because fire rated glass is used in door and wall assemblies, code requirements for framing must also be considered. Simply put, the fire rated framing requirements must match the glazing requirements in order for the assembly to fully meet the requirements of the code.

Fire protective framing, like fire protective glazing, has limited use in applications rated over 45 minutes. The most common frame is hollow metal. This type of framing can be used in doors, sidelites, transoms and interior windows up to 45 minutes. Fire protective, hollow metal frames, like fire protective glazing, fail to block the spread of radiant heat.

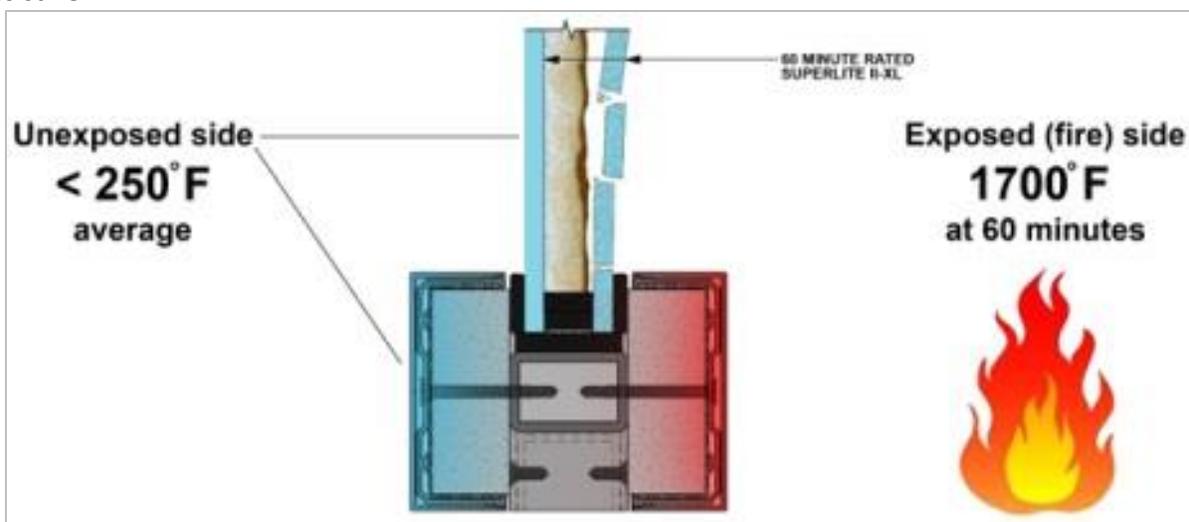


Hollow Metal

Hot Rolled Steel Section

Fire resistive framing has the ability to block the spread of radiant heat. Like fire resistive glazing, this type of framing meets ASTM E-119/NFPA 251/UL 263 requirements. Fire resistive framing can be used in wall and door assemblies (this includes glazing around and over the door, such as sidelites and transoms) rated 60 minutes and above.

Project specifications that configure fire resistive glazing in hollow metal frames in 1 or 2 hour applications fail to meet code, because fire resistive glazing with fire protective framing lowers the overall fire performance rating of the assembly to fire protective. **In 1 or 2 hour applications where meeting ASTM E-119/NFPA 251/UL 263 is required, both the glazing and framing must be fire resistive.**



Fire Resistive Framing with Fire Resistive Glazing