

Seven Questions Away Specifying, installing and inspecting the correct fire-rated glazing

By Jerry Razwick

No one would deny that the recent boom in fire-rated glass choices has been a positive development. Although wired glass performed admirably for decades as the only option on the market, the newer materials have opened a tremendous array of possibilities. Safety has increased, design flexibility has multiplied, and the combination of performance characteristics in a single piece of glass is astounding. Testing is constantly underway, with more change always on the horizon.

The opportunities are exciting. At the same time, moving from an industry with a single choice in glass to one with dozens has meant something else: It's hard to keep up. Designers, contract glaziers and inspection safety professionals have their hands full trying to stay current with the latest developments. Given the critical nature of fire protection, the stakes are high for getting it right.

As intimidating as the task may seem, it is possible to confidently specify, select or approve/inspect fire-rated glazing systems. By stopping to ask a few key questions regarding each application, designers, specifiers, contractors and inspectors can avoid costly mistakes and ensure a safer building by selecting the appropriate fire resistance rated glazing system for the application.

1. What is the Fire Rating Required?

Fire ratings are given in time increments, from 20 minutes to three hours. They vary by application and are generally determined by the length of time needed for occupants to evacuate a building. For example, you might have a lower fire rating for a one-story office building than you would for the 4th floor of a hospital with bed-ridden patients.

Not all fire-rated glass carries the same fire ratings. If you're glazing a two-hour corridor, you can eliminate some fire-rated materials immediately (such as specially-tempered glass) because it hasn't earned an adequate rating.

2. What is the Size of the Opening?

A product's fire rating is closely tied to the size in which it was tested. Most industry professionals are aware that traditional wired glass carries a fire rating of 45 minutes. However, many people do not realize that that rating is only valid when the glass is no larger than 1,296 sq. in. (9 sq. ft.). How many times have you seen a large window or door opening filled with wired glass? Chances are good that either the glazier or the architect only saw a fire-rated label and didn't check to see what size was allowed.

What's important to realize is that not all products with the same fire rating have the same size limitations. It pays to shop around. Some of the glass ceramic products with higher

fire ratings than wired glass can be specified in sizes up to 3,325 sq. in. (over 23 sq. ft.), and glass firewalls can offer floor-to-ceiling, wall-to-wall glass. Generally speaking, there's no longer a need to settle for a material that isn't rated for large sizes. Having a clear handle on the project needs will guide you to the products best suited to the opening.

3. Will Heat Transfer be an Issue?

The majority of fire-rated products are designed to stop flames, gases and smoke (since most fire fatalities are caused by smoke inhalation rather than burns). But on some occasions, the additional factor of heat transfer through the glass needs to be taken into consideration.

This is not a matter of interpretation: Codes will tell you specifically if a product that serves as a barrier to heat is needed. For the most part, the application would normally be one that required a solid wall (such as concrete block) that protects occupants. That will limit your choice in glazing materials to those that have actually been tested as a wall using test standards such as ASTM E119.

Glass fire walls are readily identifiable: They are made up of multiple layers of glass with interlayers of clear intumescent or gel in between. During a fire, the interlayers foam up and block heat. You can safely touch one side of the glass while a fire is raging on the opposite side.

Occasionally, more traditional fire-rated glass is marketed as "greatly

reducing heat transfer," even though it is not a wall. But if heat is a concern, the codes are very clear: Nothing less than a glass firewall should be specified.

4. Is Impact Safety a Concern?

Hopefully, fire is a very rare occurrence. For the majority of the time, fire-rated glass isn't stopping fire - it's providing visibility. As such, it may be in a setting that needs more than simply fire protection - it needs impact protection.

Whether it's installed in a door in a busy school corridor or a sidelite in a commercial building, fire-rated glass often does double duty by providing impact safety. However, just because glass is good at stopping fire doesn't mean it is good at stopping humans. That's why wired glass usage has been curtailed so severely, particularly in educational facilities. Too many students were getting injured by putting their hand or foot through a piece of wired glass and getting caught on the broken wires.

As with fire ratings, not all impact ratings are the same. Wired glass meets the lowest impact standard (ANSI Z97.1), which means it can be expected to stop a small child from going through it. Other products, such as glass fire walls, meet CPSC 16CFR1201 (Cat. II), indicating they can withstand the impact of a running adult.

There are plenty of products on the market that offer both high impact safety and high fire ratings. If you're glazing a high traffic area or a "hazardous" location (near the floor, in a door or sidelite, etc.), be sure to select a material that offers impact safety protection.

5. What Does the Product Listing Really Say?

You've reviewed the manufacturer's promotional literature, but have you taken the time to look at the listing from the test lab? It may sound tedious, but it can be eye opening.

One product on the market today is being promoted as carrying ratings up to 60 minutes. But when you look a little closer, you discover some rather disturbing caveats. For example, the product hasn't passed a portion of the REQUIRED testing to earn the 60-minute rating! It endured the furnace test, but it is unable to withstand the hose stream test, which is mandatory in North America. This would be like giving someone a driver's license for passing the written portion of the exam, but not the driving portion.

The product is also directional, meaning it only offers fire protection on one side of the glass. You have to accurately predict on which side of the glass a fire will occur.

Some products may require a local authority to make exceptions so it can be allowed. But again, given the wide range of high-performance products available today, there's no need to risk it. If the local authority improperly allowed a non-conforming product, you may not be off the hook. Potentially, you could spend a lot of time and money defending the use of an improper product.

6. What Additional Performance Requirements are Needed?

At this point, you've probably begun to narrow down your options. Now it's time to see what else you can wrap into the package. There are all kinds of "extras" the newest crop of fire-rated glass has to offer.

For instance, in a post-9/11 world, security is an increasing concern.

Some fire-rated openings may also need to guard against a stray bullet or other form of attack. But most bullet-resistant glasses are made with polycarbonate, which is highly flammable. Now there are glass firewalls that also carry bullet resistance ratings, giving you two products in one.

Maybe the setting requires acoustic control or energy code compliance. Maybe you want to add design features such as beveled edges, sandblasting or etching. Or maybe you'd like to feature a one-way mirror, tinted glass or art glass. All that and more is possible without compromising fire safety.

7. Does the Entire System Offer the Same Rating?

Finally, be sure to check the entire system for proper compliance. The necessary fire rating should apply to the framing and any sealant, in addition to the glass. And just as glazing options have expanded, framing options have multiplied greatly over the last several years. You should have no trouble finding a suitable framing system for your rating requirements.

Fortunately, today there are a number of products available that meet the fire and related requirements. Questions such as these can help designers, specifiers, contractors and inspectors navigate to the best choices and ensure that the project will have reliable fire protection for years to come. 🔥

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