

## **Cross Training for Glazing** **Fire-rated products fill many purposes**

**By Jerry Razwick, Technical Glass Products**

Back in the early 1990's, sports fans watched a phenomenon named Bo Jackson become the first athlete to compete in All Star games for both professional football and professional baseball. His ability to do so well in two sports was unprecedented. He became the definition of a "cross-trainer," and was equally at home in two different arenas. The well-known "Bo Knows" ad campaign for Nike played up Jackson's mastery of multiple sports and introduced a new kind of shoe that could be worn for more than one type of activity.

A significant amount of "cross-training" has also been taking place in the glass industry, particularly in products related to life safety. Materials that were once categorized as fire-rated only have now crossed over to perform equally well in other areas. That means that a single product can now pull double duty, giving greater design freedom than ever before.

So just what is possible today? Continuing with the cross-training analogy, if Bo knows his sports, what does today's fire glass "know" that is changing the industry?

### **Fire glass knows impact.**

It is somewhat ironic that the vast majority of glass installed in America to provide fire protection offers little protection against human impact. Traditional polished wired glass performs very well in a fire but cannot withstand much physical abuse.

This posed a real dilemma for years, since wired glass was the only glazing product available that could offer any degree of fire protection. In hazardous locations such as doors and sidelights, something had to be compromised. Either a true impact safety product had to be installed that couldn't offer fire safety, or vice versa.

Building standards were written to accommodate the shortcomings of wired glass. Since fire was deemed a greater threat than injury due to broken glass, the decision was made to exempt wired glass from meeting impact safety requirements. In that way, wired glass could still be used in openings where fire protection was critical. The exemption was originally intended to be a stop-gap measure until a better solution could be found.

At issue was the fact that not only was wired glass fairly easy to break - but when broken, the wires created additional dangers, since they tend to snag and cause further injuries.

Clearly, there was a need for a cross-trained product - something that could offer both a fire rating and a high impact safety rating. Manufacturers responded to the need by developing several products.

Now there are many alternatives to wired glass that can meet the highest standard for safety glass - CPSC 16 CFR 1201 (Category II). Generally speaking, these wireless alternatives also offer higher fire ratings than wired glass and can be specified in much larger sizes. For example, laminated ceramic products carry fire ratings up to 90 minutes in some applications and can be installed in sizes up to

2,627 square inches at that rating. That's more than twice the size allowed for wired glass rated for just 45 minutes.

### **Fire glass knows security.**

Since September 11, much attention has been devoted to enhancing building security. Protective glazing is a prominent topic, whether the discussion is about bullets or bomb blasts.

What hasn't attracted much attention is the fact that the typical glazing materials used to offer those types of protection can be highly flammable. As with wired glass, it is possible to take care of one problem only to create another.

A test was conducted at an independent laboratory to determine how glass clad polycarbonate would react in a fire, since it is one of the primary choices for bullet resistant glazing. Within minutes, the glass burst into flames and vacated the opening. It was a telling demonstration of the need for cross training in yet another category of glass.

Fortunately, glass fire walls have now been tested for bullet resistance. Current products have earned a Level 3 bullet resistance rating (able to stop a .44 Magnum bullet). That rating can be increased to Level 8 (7.62mm rifle) when the glass fire wall is in an insulated glass unit (IGU).

### **Fire glass knows heat transfer resistance.**

All fire-rated glass has a tremendous ability to tolerate high temperatures. The testing procedure requires glass to experience temperatures in excess of 1600° F. By way of comparison, standard float glass cannot withstand heat above 250° F.

That can lead to the misunderstanding that all fire-rated glass acts as a barrier to heat transfer, which is not correct. Most fire-rated glass is intended to contain flames, smoke and gases, yet heat will pass from one side to the other.

In some applications, such as stairwells or computer rooms, heat poses a significant danger. Even if a fire can be kept out, heat can quickly make a stairwell unlivable. In tall buildings where people could be trapped in a stairwell for an extended period of time, the risks posed by heat become great.

Again, an opportunity for a cross-trained solution presented itself. A new breed of product emerged known as a "glass fire wall". Some of the most advanced technology available has gone into the development of these products.

Interlayers composed of clear, intumescent materials are sandwiched between layers of glass. In a fire situation, the interlayers foam up, blocking heat. A fire could be raging on one side of a window and someone could still touch the opposite surface without being burned.

These specialized glass products are classified as walls and are tested to ASTM E119 in the same way a solid barrier wall would be. Unlike thinner fire-rated glazing materials, use of these products is not restricted to a certain percentage of a wall, and therefore glass fire walls can be specified from floor-to-ceiling and wall-to-wall.

### **Fire glass knows exteriors.**

In 1988, Los Angeles fire fighters battled one of the most devastating high rise fires in American history, in the 62 story First Interstate Bank building. The fire began on the twelfth floor, then spread to five floors above, causing enormous damage before it was able to be contained.

What surprised many people was the manner in which the fire spread upward. With the fire on the interior of the building, the flames burst through the exterior windows and climbed the outer envelope of the building, penetrating behind the spandrel panels and sneaking around the end of the floor panels.

The tragic event brought into focus the need to consider fire safety in exterior applications. Normally, fire-rated glazing is thought of as an interior product. It is there to keep a fire from jumping room to room. By and large, there has not been much call for stopping a fire at the perimeter of a building and limiting its spread from floor to floor.

However, when construction is close to property lines and large multi-story projects are being built, there is an increasing need for exterior fire-rated products. This requires a different set of performance capabilities, since it introduces the need for energy code compliance, etc.

In this case, both fire-rated glass and fire-rated framing have been cross-trained. Fire-rated IGU products are able to meet energy codes and can combine fire-rated glazing with tinted or mirrored glass as an application demands. What's more, steel fire-rated framing is now available as a curtainwall rated up to 2 hours. Large pieces of glass can be used to span multiple stories without compromising fire safety.

### **Fire glass knows fire.**

With all the additional features now being offered, it's easy to forget just how extraordinary the fire protection offered by fire-rated glass really is. There is a disturbing trend in some building codes that undervalues the role of fire-rated glazing.

Increasingly, model codes across the country are allowing sprinkler trade-offs. Where architects would normally be required to specify fire-rated construction materials, they are at times being allowed to use specialty deluge sprinklers instead.

Yet statistics show that sprinklers fail to operate approximately 16 percent of the time. Even when they do function properly, if the glass near them is not fire-rated, the sprinklers may cause the glass to fail (due to thermal shock), creating an opening for the fire to spread.

Experts outside the glass industry agree. After serving as a team leader for the WTC Building Performance Study, Dr. W. Gene Corley came to the conclusion that sprinklers by themselves are not enough. He stated, "Buildings for which sprinklers are appropriate should also have fire-resistant construction for better fire protection. Anything less puts occupants and emergency responders at risk and is unacceptable."

With more to offer than ever before, fire-rated glazing continues to play a critical part in building construction. As market demands and codes keep evolving, we can anticipate the need for cross-trained products will only grow.

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