Fire-Rated Glazing & Framing
Presentation Overview

• Advancements in the materials and systems used for glazing in areas that require fire ratings
• Testing Methodologies
  • Furnace Test
  • Hose Stream Test
  • Impact Test
• Fire Protective vs. Fire Resistive
• Labeling - New Labeling System for Fire-Rated Glass
• Non-Code Compliant Products
Fire-Rated Glazing Definition

Specialized glass designed to prevent the spread of flames, gasses and smoke.

- Glass earns fire ratings through rigorous testing processes at independent laboratories such as Underwriters Laboratories, Inc.® (UL)
- Fire-rated glazing for door and window assemblies are rated from 20 minutes to 3 hours
- The rating reflects the amount of time the material has been tested to remain in place to help stop the spread of fire, smoke and gas
- In addition to remaining in place, in most cases the glass must also pass a hose stream test, and may also be required to provide an impact rating for safety
Fire-Rated Glazing Types

Wired Glass  Glass Ceramics  Transparent Walls
Key Purposes of Fire-Rated Glass

- Compartmentation
- Prevents fire from spreading
- Allows visibility into a space
Key Testing Components for Fire and Human Impact Safety

Fire Furnace Test - Measures the amount of time, in minutes or hours, that fire rated glazing and framing can withstand fire exposure in a furnace.

Hose Stream Test - Heated glass and frames are subjected to water from a fire hose. The cooling, impact and erosion created by the hose stream tests the integrity of the glass and frames and eliminates inadequate materials.

Impact Safety Test - Measures the ability of glass to withstand impact. Ratings are given in levels based on the amount of force the glass can resist. Typically defined by CPSC Category 1 or 2 rating.
Click on video to play
Hose Stream Test

Click on video to play
Safety Glazing Classifications

CPSC 16 CFR 1201 (Category II)
- 400 ft. lbs. pressure
- Tempered Glass, typical laminated glass, filmed glass

CPSC 16 CFR 1201 (Category I)
- 150 ft. lbs. pressure
- Permitted up to 1,296 in²

ANSI Z97.1 (Traditional Wired Glass Only)
- 100 ft. lbs. Pressure
- Permitted up to 1,296 in²
Impact Safety Test

Click on video to play
FIRE PROTECTIVE

- Stop flames & smoke
- “Openings”
- “Thin” glazing
- Traditional fire-rated material (wired glass, glass ceramic, hollow metal steel frames, etc.)
- Fire Windows: 45-90 Minutes
- Fire Doors: 20 minutes – 3 hrs
- May not exceed 25% of the area of a common wall
- May not exceed 156 ft²
- May not exceed manufacturers tested sizes

NOTE: All products rated more than 20 min. have to pass hose stream test.
FIRE RESISTIVE

- Stop flames, smoke, **AND** radiant heat (Both glass and frames)
- “Thick” glazing
- Subjected to Furnace and Hose Stream test, as well as impact
- Classified as a “wall” rather than an opening (window)
- Both glass and frames must block passage of radiant heat
- Classified as Wall Construction, and may be used in multi story spans or floor to ceiling sizes
Labeling Requirements

Why is Fire-Rated Glazing Labeled?

- Enables code officials to accurately inspect glazing
- Owner, architect, facility manager and installer can confirm they received correct product, and reject any materials that are not part of the tested and listed system, which would result in a non-compliant installation
- Fire Officials can plan safe evacuation methods
- Firefighters will understand the type of glass present in a building
- Ensure proper fire-rated glazing is installed in renovated spaces
Labeling Requirements

Fire-Rated Glass Manufacturer Label

2” wide x .75” tall
Labeling Requirements

- “W” indicates that the glass passes ASTM E119
  - This is the wall standard which includes temperature rise and hose stream
- “D” indicates that the glass passed NFPA 252
  - Door standard
- “O” indicates that the glass passed NFPA 257
  - Opening standard
- “H” indicates that the glass passed hose stream test

### TABLE 716.3
MARKING FIRE-RATED GLAZING ASSEMBLIES

<table>
<thead>
<tr>
<th>FIRE TEST STANDARD</th>
<th>MARKING</th>
<th>DEFINITION OF MARKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM E 119 or UL 263</td>
<td>W</td>
<td>Meets wall assembly criteria.</td>
</tr>
<tr>
<td>NFPA 257 or UL 9</td>
<td>OH</td>
<td>Meets fire window assembly criteria including the hose stream test.</td>
</tr>
<tr>
<td>NFPA 252 or UL 10B or UL 10C</td>
<td>D</td>
<td>Meets fire door assembly criteria.</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Meets fire door assembly “Hose Stream” test.</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td>Meets 450°F temperature rise criteria for 30 minutes</td>
</tr>
<tr>
<td></td>
<td>XXX</td>
<td>The time in minutes of the fire resistance or fire protection rating of the glazing assembly</td>
</tr>
</tbody>
</table>

For SI: °C = [°F - 32] / 1.8.
Labeling Requirements

Fire-Rated Frame Manufacturer Label

Installers should not remove or paint over frame labels
UL Online Certifications Directory

• Available online at database.ul.com
• Search for UL File Number found on label for more information on listing
### Search results

You may choose to [Refine Your Search](#).

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Category Name</th>
<th>Link to File</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECHNICAL GLASS PRODUCTS</td>
<td>Fire-protection-rated Glazing Materials</td>
<td>KCMZ.R13377</td>
</tr>
<tr>
<td>TECHNICAL GLASS PRODUCTS</td>
<td>Fire-protection-rated Glazing Materials Certified for Canada</td>
<td>KCMZ7.R13377</td>
</tr>
</tbody>
</table>

Model number information is not published for all product categories. If you require information about a specific model number, please contact [Customer Service](#) for further assistance.

### Listed System Example

- [Search Tips](#)
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- [iQ Family of Databases](#)

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Installation of Fire-rated assemblies

- Framing similar to typical storefront systems
- Any qualified glazing subcontractor can install
- Must follow manufacturer’s installation guidelines, as well as tested and listed design from UL
Non-Code Compliance

Non-Code Compliant Situations

- Non-tested assemblies
  - All components must have a complete laboratory listing
  - Fire-rated skylights (systems tested vertically but installed sloped)

- Assemblies must be installed EXACTLY as tested
  - Film on fire-rated glazing must be tested and approved
  - Wood trim or other combustibles on a fire-rated frame

- Improperly tested products
  - Non-accredited testing lab
  - Partial testing of a product…i.e. non hose stream over 20 minutes
  - Products that only provide impact or fire rating in one direction
Questions:

• What is the required fire-rating for the application?
• Does the glazing system need to block the transfer of radiant heat?
• Does the glazing meet impact safety standards?
• Should I select performance films or laminates?
• Are there any acoustic or thermal performance needs?
• Is the glazing being installed into the proper framing assembly (matched fire-ratings)?
• Once the glazing has been selected, did you confirm the material has been tested by a testing agency such as UL and can be validated through that testing agency?
Project: University Hospitals, Seidman Cancer Center
Location: Cleveland, OH
Architect: Cannon Design
Products: Fireframes® Designer Series steel doors and frames with FireLite Plus® glass ceramic
Case Studies

Project: MultiCare Good Samaritan Hospital, Dally Tower
Location: Puyallup, WA
Architect: Good Sam Design Collaborative, in conjunction with Clark/Kjos Architects and GBJ Architecture
Products: Fireframes® Curtainwall Series with Pilkington Pyrostop® glass firewall
When facing a decision that affects life safety, make sure the systems used meet all code requirements. Not all products are created equal.
Thank you!