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Fire-Rated Glazing & Framing

Outline

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

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

Fire-Rated Glazing Types

Wired Glass

Glass Ceramics

Transparent Walls

Fire-Rated Glazing

Key Purposes of Fire-Rated Glass

- Compartmentation
- Prevents fire from spreading
- Allows visibility into a space

Fire-Rated Glazing

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.

Fire Test

Click on video to play

Hose Stream Test

Click on video to play

Safety Glazing

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 in^2

ANSI Z97.1 (Traditional Wired Glass Only)

- 100 ft. lbs. Pressure
- Permitted up to 1,296 in^2

Impact Safety Test

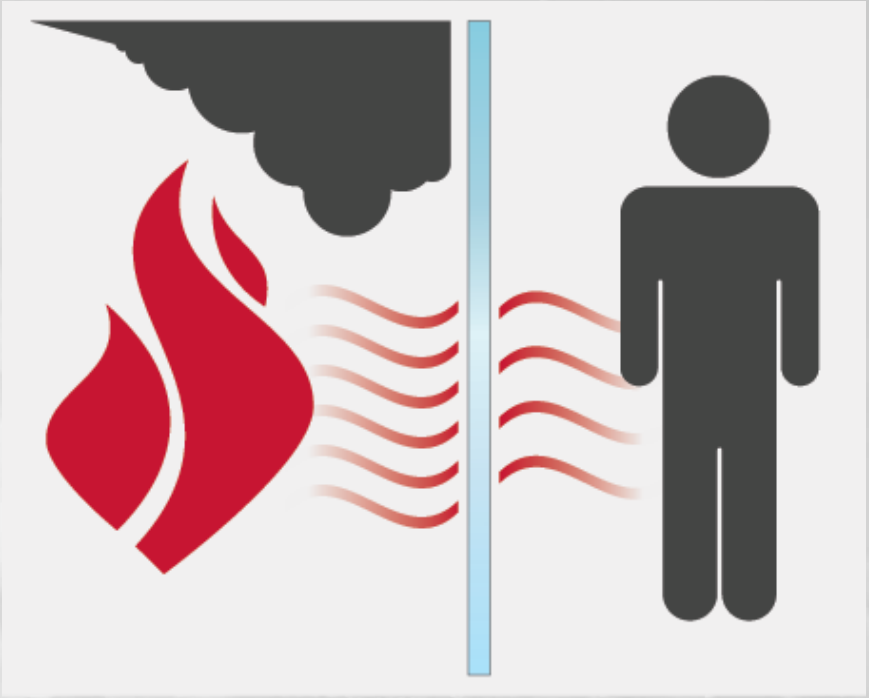
Click on video to play

Types of Fire-Rated Glazing

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 ft^2
- May not exceed manufacturers tested sizes

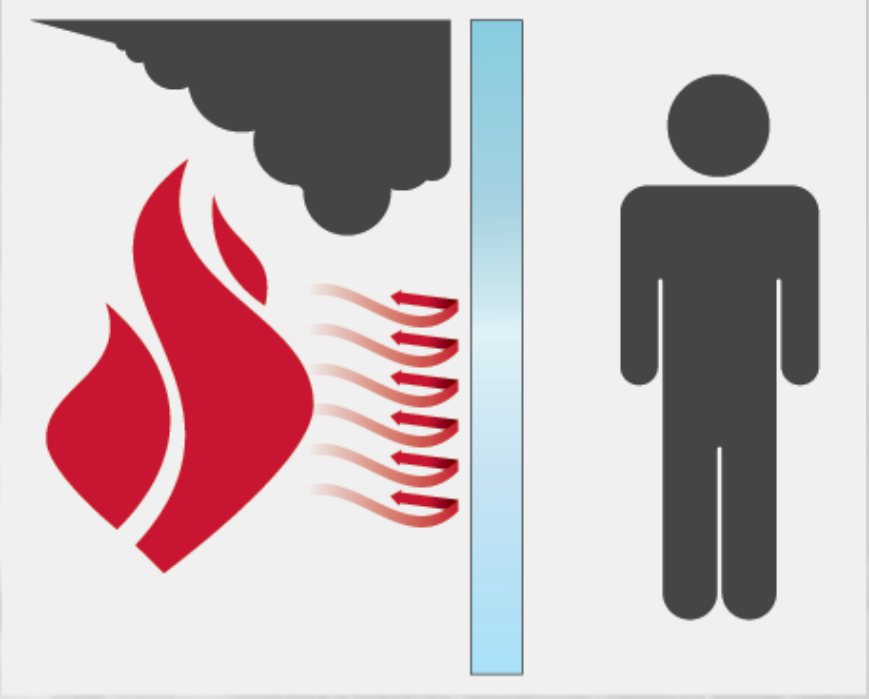
NOTE: All products rated more than 20 min. have to pass hose stream test.



Types of Fire-Rated Glazing

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

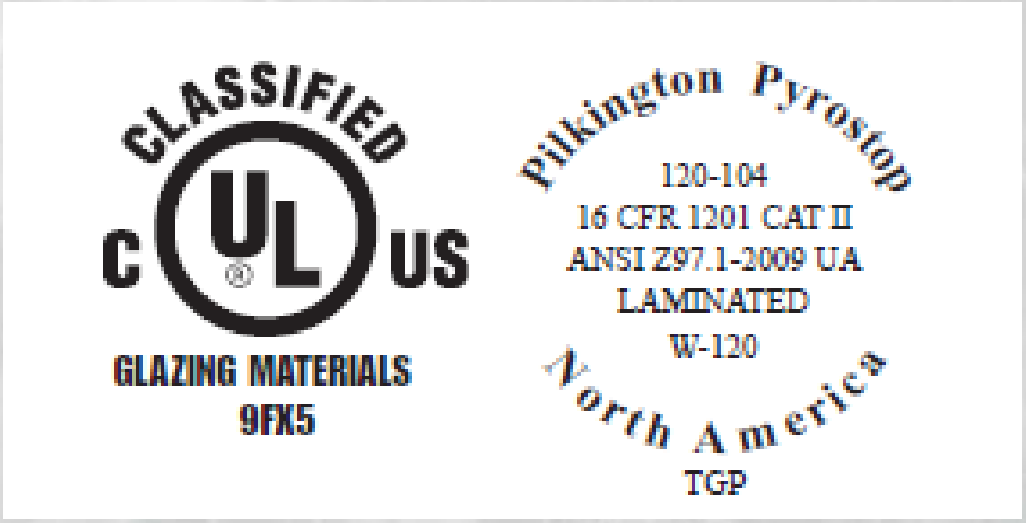
Labeling Requirements

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

Label Standards

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

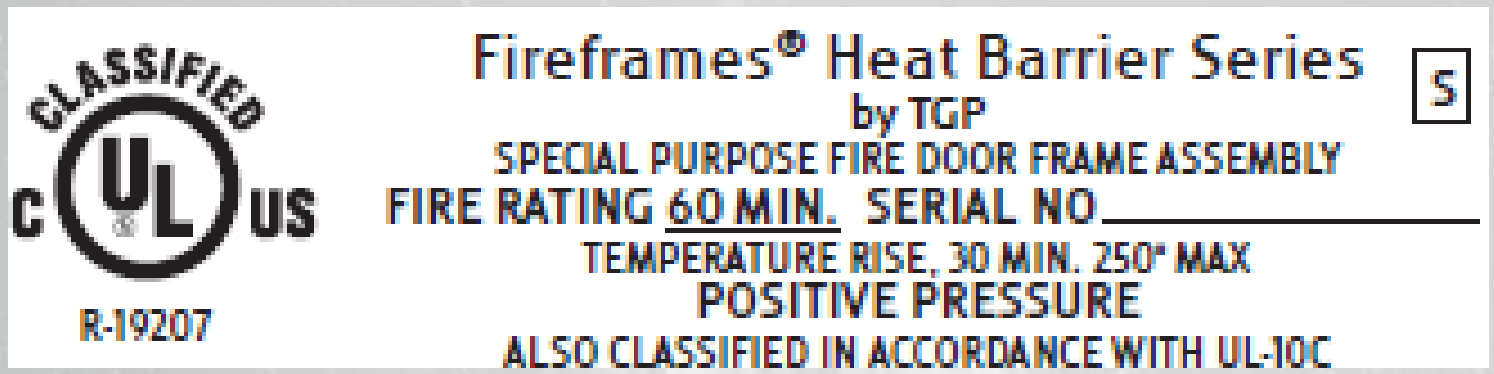
TABLE 716.3
MARKING FIRE-RATED GLAZING ASSEMBLIES

FIRE TEST STANDARD	MARKING	DEFINITION OF MARKING
ASTM E 119 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

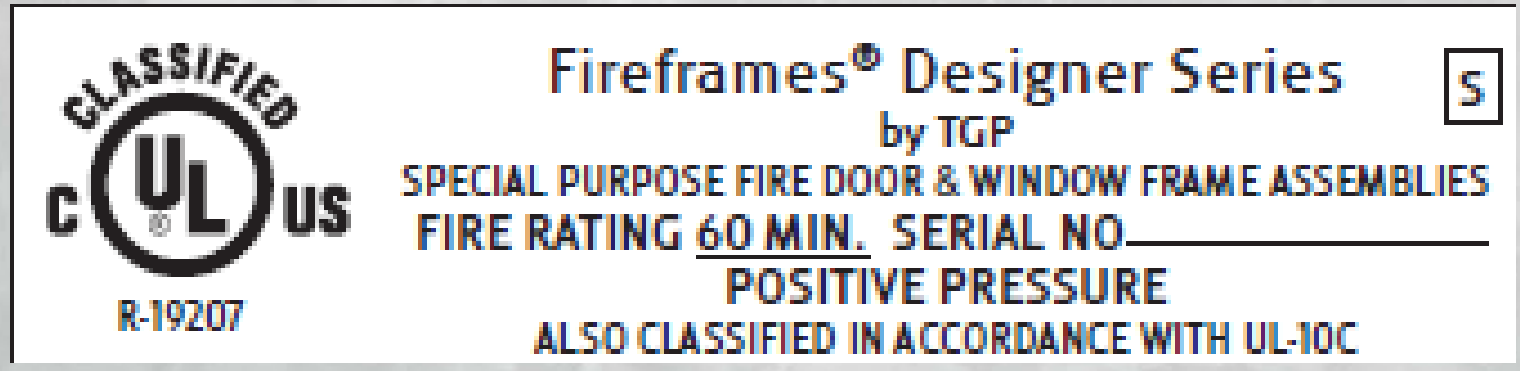
For SI: °C = [(°F) - 32]/1.8.

Labeling Requirements

Fire-Rated Frame Manufacturer Label



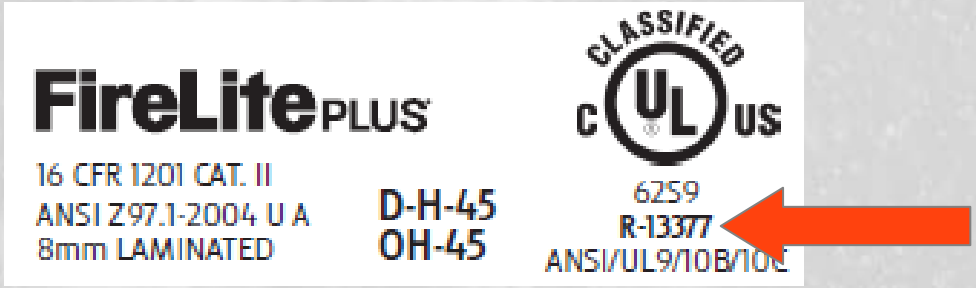
Installers should not remove or paint over frame labels



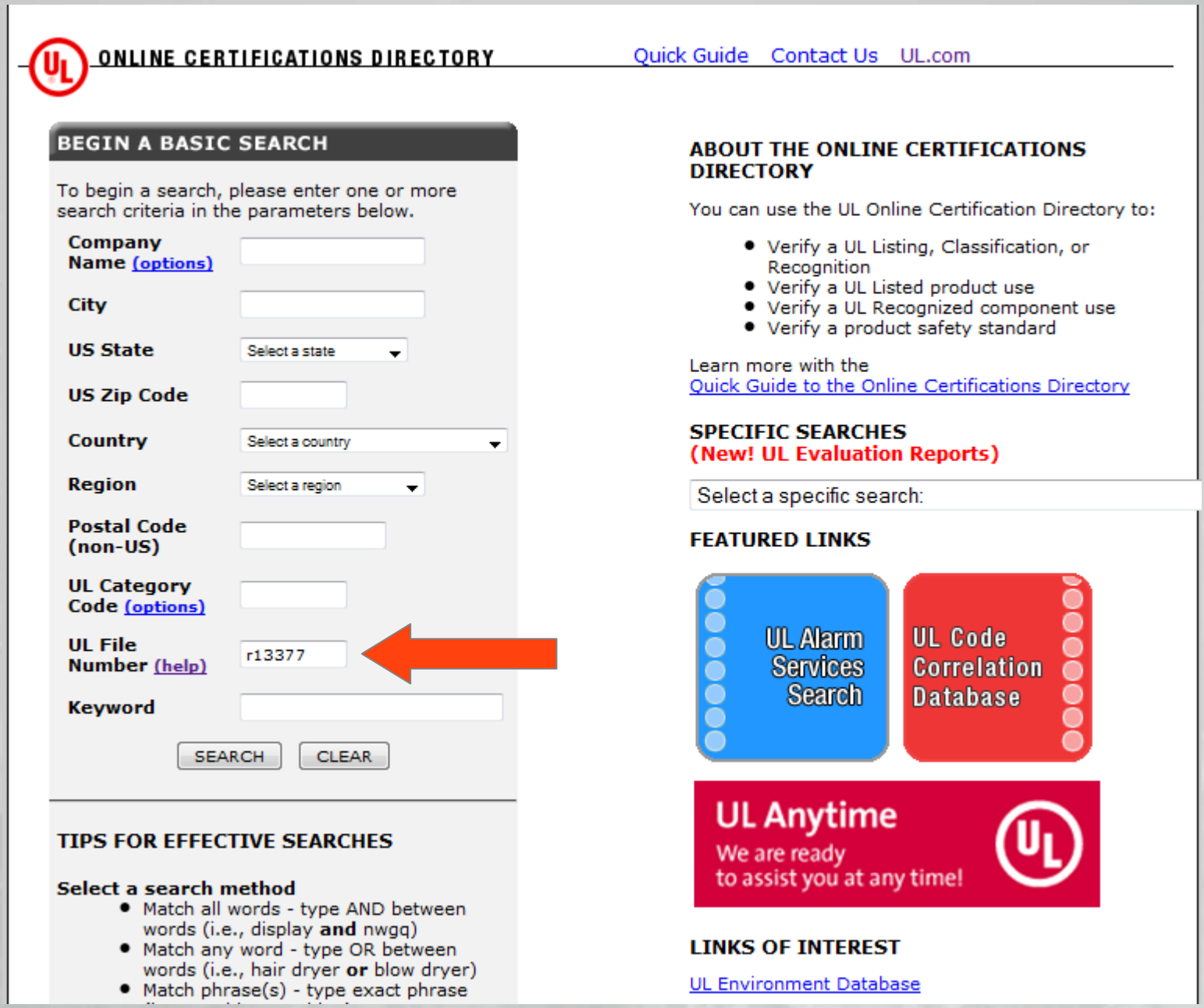
Labeling Requirements

UL Online Certifications Directory

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

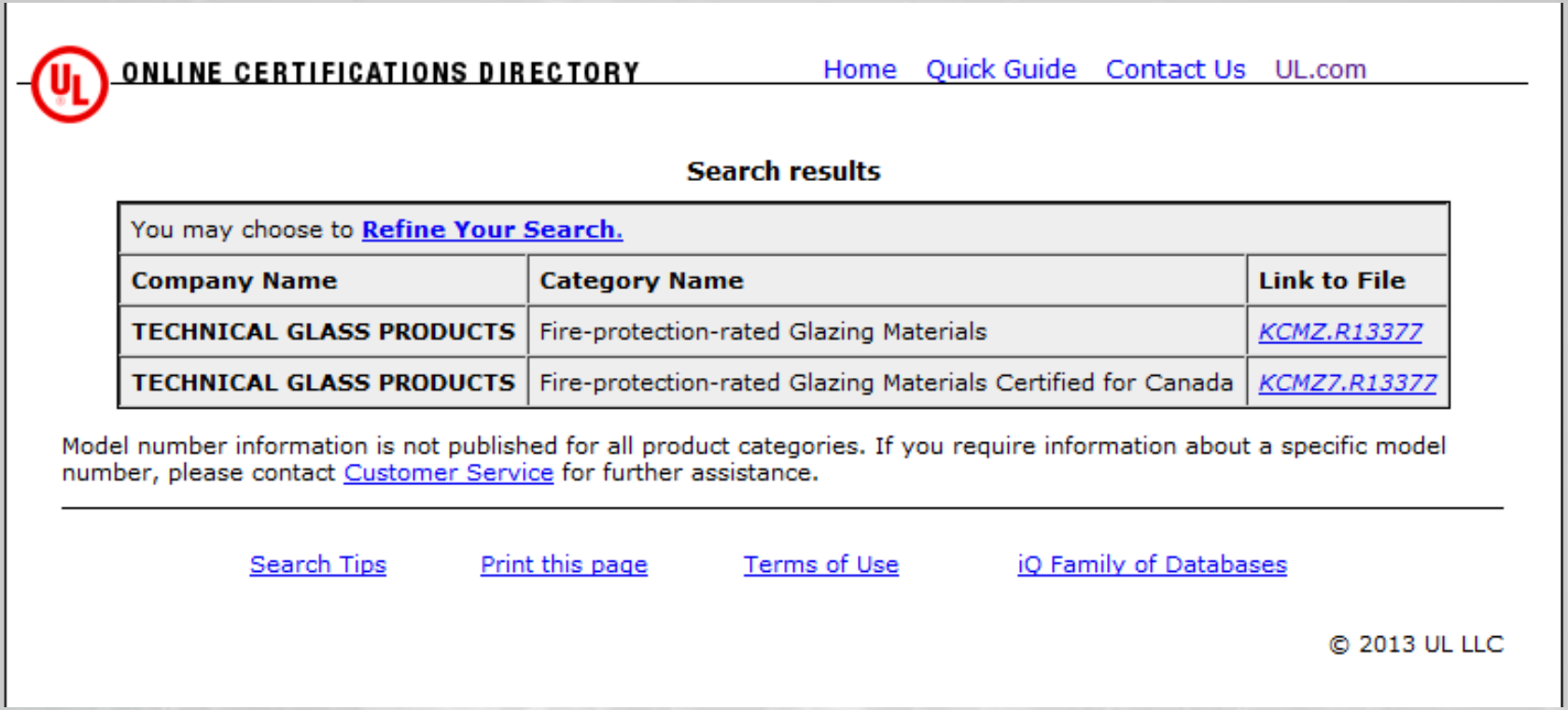


Labeling Requirements



Labeling Requirements

Search results



ONLINE CERTIFICATIONS DIRECTORY

Home Quick Guide Contact Us UL.com

Search results

You may choose to **Refine Your Search.**

Company Name	Category Name	Link to File
TECHNICAL GLASS PRODUCTS	Fire-protection-rated Glazing Materials	KCMZ.R13377
TECHNICAL GLASS PRODUCTS	Fire-protection-rated Glazing Materials Certified for Canada	KCMZ7.R13377

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.

Search Tips Print this page Terms of Use iQ Family of Databases

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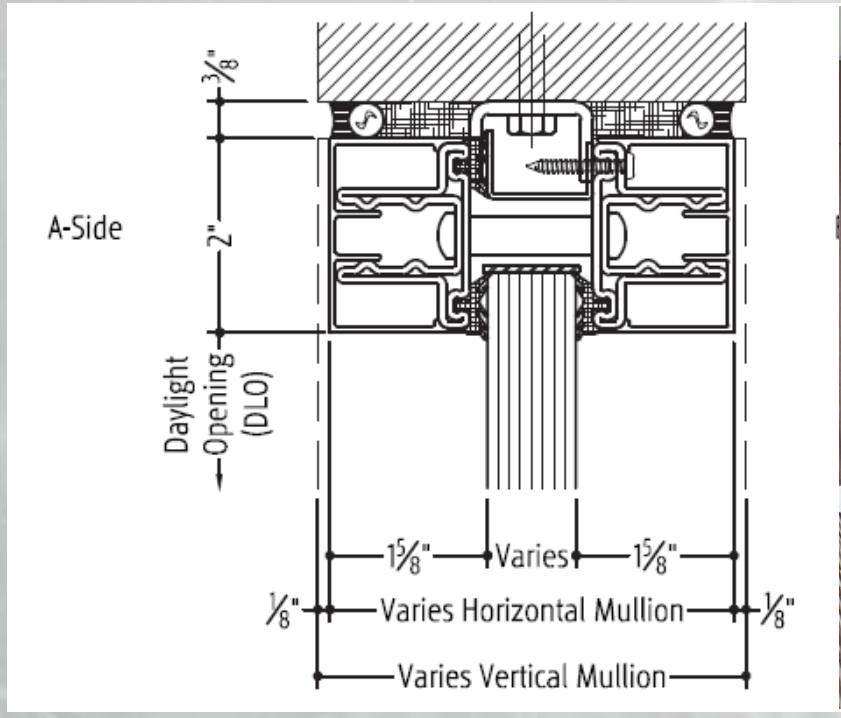
Listed System Example

Installation

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 directions

Selecting Fire-Rated Glazing

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?

Case Studies

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 <u>all</u> code requirements. Not all products are created equal.

Thank you!