

Fire-rated Glass

Pyroguard

Wired Glass



Oldcastle Glass®

Where glass becomes architecture™

Fire-Rated Glass

Introduction

Oldcastle Glass® stocks nonwired Pyroguard laminated safety glass and polished wired glass for commercial, industrial and residential fire-rated applications.

Most codes were originally written around wired glass, because for many years, it was the only glass product that could pass the fire tests. Building code and fire department officials have been able to instantly recognize the wire mesh as a sign that the glass was fire-rated.

Nonwired Pyroguard laminated safety glass (which meets CPSC 16 CFR 1201, Category I) and polished wired glass have both passed the UL and the ITS Warnock Hersey fire-rated glazing tests, and are accepted as fire-rated glazing by fire authorities and building code officials.

The International Building Code and the NFPA 5000 building code now require the following:

- (i) fire-rated glass in hazardous locations (doors, sidelites, etc.) in educational facilities in grades K to 12, must comply with the Federal Consumer Products Safety Commission's safety standard, 16 CFR 1201, Category I and II, depending on size limitations, and
- (ii) all glazing, regardless of size, whether fire-rated or not, used anywhere in athletic facilities, must comply with the Federal Consumer Products Safety Commission's safety standard, 16 CFR 1201, Category II.

Previously, fire-rated wired glass was exempt from having to meet the CPSC standard in hazardous locations, as long as it was a fire-rated location and it could pass the ANSI Z97.1 standard. The current 1984 ANSI Z97.1 standard includes a 12" drop height, 100 ft-lb impact energy level test that standard 1/4" polished wired glass could meet. The minimum impact energy level in the CPSC standard is an 18" drop height, 150 ft-lb impact test, which standard 1/4" wired glass does not meet.

Thus, any jurisdiction that adopts the 2003 edition of the IBC or NFPA 5000 can no longer use standard 1/4" wired glass in hazardous locations in elementary and high schools, or anywhere in athletic facilities. Only fire-rated glasses that meet the CPSC 16 CFR 1201 (Category I or II, depending on size limitations) may be used in hazardous locations in schools, and only Category II glass will be permitted anywhere in athletic facilities.

Description

Pyroguard fire-rated safety glass is available as a (nominal) 5/16" clear annealed laminated glass product. It is made of two lites of 1/8" (3 mm) annealed clear float glass filled with a proprietary fire-resisting resin that provides fire and safety features without the use of wires. It is considered to have the same bending strength of annealed monolithic glass of the same size and thickness.

Polished wired glass is manufactured by joining two layers of molten glass and "sandwiching" electrically welded steel wire mesh in one

continuous rolling process. In the event of fire, wired glass acts as an effective barrier to flame, smoke and hot gases. The wire mesh also helps keep the glass from falling out of the frame if it becomes fractured.

Polished wired glass is commercially available as a (nominal) 1/4" clear glass product with two different mesh configurations: a diamond mesh (also called "Misco") and a square mesh (also called "Georgian" or "Baroque").

(continued on back)

Fire-Rated Glass

Capabilities

Pyroguard fire-rated safety glass can be used in 20-minute (no hose stream), fire-rated applications, up to the maximum sizes indicated in Table 1.

Polished wired glass can be used in 20- to 90-minute, fire-rated applications, up to the maximum sizes indicated in Table 1.

In safety glazing applications, Pyroguard fire-rated

safety glass can be used in sizes up to 9 square feet (16 CFR 1201, Category I). Polished wired glass does not meet the safety glazing requirements of 16 CFR 1201.

Pyroguard and polished wired glass are stocked at various Oldcastle Glass® facilities. They can be supplied cut-to-size from stock sheets and are readily available on short notice.

Table 1. Fire-Rated Glass: Maximum Exposed Dimensions Based on Test Results

Important Notes: The design professional is responsible for specifying fire-rated and safety glazing products that meet the project's fire and building code requirements. The maximum size allowed per code may be less than the actual test sizes listed below.

Product	Application	Framing	Glazing System	Stop Height inches	Maximum			Rating minutes
					Area in ²	Width inches	Height inches	
5/16" Pyroguard clear fire-rated safety glass	Door (single or multiple lite)	HM	C	3/4	1288	28	46	20 (NH)
	Door (single or multiple lite)	W	C	3/4	1288	28	46	20 (NH)
	Sidelite, transom lite, borrowed lite	HM	C	3/4	1288	28	46	20 (NH)
1/4" clear polished wired glass	Door	HM	A	1/4	3289	35-3/4	92	20 (NH)
	Door (single or multiple lite)	W	B	9/16	2856	34	84	20
	Door (sidelite, transom lite)	HM	A	3/8	1296	54	54	20, 45
	Door (single or multiple lite)	HM	B	9/16	2856	34	84	20, 45
	Sidelite, transom lite	HM	C	3/8	4704	106	106	20, 45
	Door (single lite)	W	B	9/16	960	12	80	45, 60
	Door (multiple lite)	W	B	9/16	1920	12	80	45, 60
	Door (single lite)	HM	B	9/16	1008	12	84	45
	Door (multiple lite)	HM	B	9/16	2016	12	84	45
	Door (single lite)	HM	B	9/16	552	12	46	90
	Door (multiple lite)	HM	B	9/16	2208	12	46	90

A—Standard fire glazing system; **B**—PEMCO FG3000 Fireglaze with PEMKO doorlite kit; **C**—PEMCO FG3000 Fireglaze; **HM**—hollow metal framing; **W**—wood framing; **NH**—no hose stream test.



Fire-Rated Glass

Applications

Pyroguard glass is ideal for applications in 20-minute (no hose stream) fire-rated openings that are subject to safety and impact resistance requirements.

Pyroguard glass applications include door lites, sidelites and transom lites requiring fire-rated safety glazing material.

Polished wired glass is ideal for applications in fire-rated openings that are exempt (by code) from certain safety and impact resistance requirements.

Polished wired glass applications include door lites, sidelites and transom lites requiring fire-rated glazing material.

The design professional is responsible for specifying fire-rated and safety glazing products that meet the project's fire and building code requirements.

Characteristics

Glass products must undergo rigorous testing at an independent laboratory (such as Underwriters Laboratories) in order to be classified as fire-rated. The testing consists of two parts.

In the first phase, large pieces of the glass are installed in a test furnace. Heat in the furnace is steadily raised above 1,600°F, following a specific time/temperature curve. Flames are directed onto the glass surface to simulate actual fire conditions in a building. The furnace burns for a set duration of time, which is then used to determine the rating the glass will achieve. Various glass products have achieved fire ratings ranging from 20 minutes to 3 hours.

To achieve a fire rating of 45 minutes or greater, the glass must pass the fire "hose stream test." This test demonstrates how the glass withstands the thermal shock associated with being hit with water during fire suppression efforts. Compartmentation would be lost if water from a sprinkler or a fire hose were to cause the glass to vacate an opening during a fire.

Pyroguard fire-rated safety glass meets the requirements of ANSI Z97.1-1984 as well as the impact requirements of CPSC 16 CFR 1201, Category I. Pyroguard glass cannot be heat-treated, curved or bent. It is considered to have the same bending strength as annealed monolithic glass of the same size and thickness.

Polished wired glass meets the requirements of ANSI Z97.1-1984, but not the impact requirements of CPSC 16 CFR 1201. Polished wired glass cannot be heat-treated, but may be curved or bent. It is considered to have half the bending strength of annealed monolithic glass of the same size and thickness.

Both Pyroguard and polished wired glass are classified as fire-resistant glazing materials by Underwriters Laboratories.

See Table 2 for additional information.

(continued on back)

Fire-Rated Glass

Table 2. Fire-Rated Glass Product Information

Product Characteristics

	Weight (lb/ft ²)	Stock Size (inches)	Mesh Size (inches)	% Visible Light Transmittance	USA ASTM C1036-01 Classification	Canada CAN/CGSB 12.11-M.90
5/16" Pyroguard clear fire-rated safety glass	3.3	98 x 62	NA ⁽¹⁾	86	Type I, Class I, Quality q3	NA
1/4" clear polished (diamond) wired glass	3.4	130 x 78	3/4	80	Type II, Class I, Form I, Quality q3, Mesh M1	Type I, Style I
1/4" clear polished (square) wired glass	3.4	130 x 78	1/2	80	Type II, Class I, Form I, Quality q3, Mesh M2	Type I, Style 3

USA Impact Test Information

	Test Lab	Report Number	Test Size (in)	Impact Height (in)	ANSI Safety Glazing Standard	CPSC Safety Glazing Standard
5/16" Pyroguard clear fire-rated safety glass	ITS	3031239-02	34 x 76	18	ANSI Z97.1-1984	NA
	ITS	3009496-231-02	34 x 76	18	N/A	CPSC 16 CFR 1201, Category I
1/4" clear polished (square) wired glass	ATI	ATI-18183-1	34 x 76	12	ANSI Z97.1-1984	None
1/4" clear polished (square) wired glass	ATI	ATI-18183-1	34 x 76	12	ANSI Z97.1-1984	None

Canada Impact Test Information

	Test Lab	Report Number	Test Size (mm)	Impact Height (mm)	Canada Safety Glazing Standard
5/16" Pyroguard clear fire-rated safety glass	NA	NA	NA	NA	NA
1/4" clear polished (square) wired glass	ATI	ATI-19401-1	(865 x 1930)	(300)	CAN/CGSB-12.11-M90
1/4" clear polished (square) wired glass	ATI	ATI-19401-1	(865 x 1930)	(300)	CAN/CGSB-12.11-M90

(1) **NA**—Not Applicable

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Fire-Rated Glass

Table 2. Fire-Rated Glass Product Information (continued)

Fire-Resistance Listings

		Underwriters⁽¹⁾ Laboratories Test	Warnock⁽¹⁾ Hersey Test
5/16" Pyroguard clear fire-rated safety glass	USA Canada	R 2098 NA ⁽²⁾	3010340 NA ⁽²⁾
1/4" clear polished (diamond) wired glass	USA Canada	UL17Y9 23018	NA NA
1/4" clear polished (square) wired glass	USA Canada	UL17Y9 23018	NA NA

(1) Listed for Positive Pressure

(2) **NA**—Not Applicable

Additional Important Information

Design Criteria:

Details on the following important topics can be found in the Black Design Criteria Tab: Glazing Instructions, Thermal Stress, Deflection, Glass Design Loads, Glass Thickness Selection, Spontaneous Breakage of Tempered Glass, Roller Wave Distortion in Heat-treated Glass, Mock-ups and Warranties.

Specifications:

A sample Section 08800 Specification for North America can be found in the Black Specifications Tab. Information specific to Fire-rated Glass can be found in Part 2 Products, 2.02 Materials.

Contact Us

For any additional information, including details, technical data, specifications, technical assistance and samples, or to speak with an architectural specialist, call 1-866-OLDCASTLE(653-2278).

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