



IV. BRANDS AND PRODUCTS

4. FIRE-RESISTANT GLASSES

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FIRE-RESISTANT GLAZINGS – INTRODUCTION

▼ GENERAL

Fire-resistant properties in a glass construction element determine how far that element can limit the spread of fire by restricting it to a specific area.

The fire resistance of a glass construction element is measured against a number of criteria:

- > Stability: the glass does not break
- > Integrity in flames, hot gases and smoke: the glass prevents flames, smoke and hot gases (but not heat) from passing through. The fire remains contained.
- > Limiting radiation: the glass restricts the amount of heat passing through it to the side which is to be protected
- > Thermal insulation: the average temperature of the glass on the protected side remains below 140°C which eliminates the risk of self-combustion either due to radiation or convection of exposed materials and means that buildings can be evacuated safely and calmly.

The new European classification standards for glass use the following system:

- > R: Stability
- > E: Flame integrity – the time during which the flames do not pass from the unexposed side of the wall
- > W: Radiation limitation: time during which the radiation does not exceed a specific level on the opposite side to the fire
- > I: Thermal insulation – time during which the temperature does not rise above a certain thermal threshold on the unexposed side.

Classification of the glass construction element	Integrity E	Reduction in heat transfer EW	Thermal insulation EI
Flame-retardant	✓		
Flame-retardant (limited radiation)	✓	✓	
Fire-resistant	✓	✓	✓

The fire resistance of each element is determined by the time (in minutes) during which the element has simultaneously met one or more of the relevant criteria.

Therefore, for example, a door which remains fire-resistant for half an hour will be classified as E30 and a wall which is fire-resistant for one hour as EI60.

The fire-resistance rating applies to the entire construction element, not just a part thereof.

▼ BRANDS OF FIRE-RESISTANT GLASS

AGC offers a range of both thermally toughened and thermally toughened coated products (Pyrostar*) as well as laminated glass with an intumescent interlayer (Pyrobelite and Pyrobel) covering the various performance levels of fire-resistant glass. The table below shows details of the available range.

	Thermally-toughened and thermally-toughened coated glass	Laminated glass with an intumescent interlayer
E	Pyrostar*	
EW	Pyrostar*	Pyrobelite
EI		Pyrobel

* Availability depending on market.

▼ INSTALLING PRODUCTS

In all cases, fire-resistance test reports pertain to construction elements as a whole and not to individual glasses. Projects should be conducted in accordance with all aspects of the test report. No components may be altered without first obtaining an extension, a site report or similar documentation from an official laboratory.

The desired level of classification will only be achieved if the limits regarding size and installation indicated in reports and other official documents are adhered to.

PYROBEL and PYROBELITE

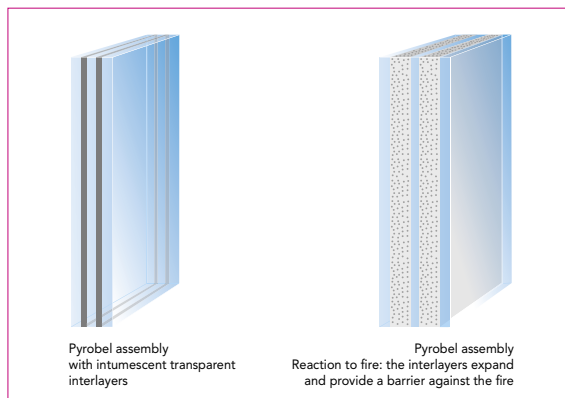
▼ DESCRIPTION

Made of clear Planibel glasses and transparent interlayers, in the event of fire these glasses transform into opaque screens which keep out flames and reduce or arrest heat transmission:

- > Pyrobelite EW glasses – Limited integrity and radiation – limit heat radiation through the glazing for 30 or 60 minutes
- > Pyrobel EI glasses – Integrity and Insulation – arrest heat radiation for 30, 45, 60, 90 or 120 minutes.

The choice depends on:

- > the level of fire resistance required under national regulations
- > the type of application
- > the typed approvals available for frames and sizes in each country.



▼ RANGE

The Pyrobel and Pyrobelite range

Pyrobel and Pyrobelite	Fire resistance
Pyrobelite 7	EW30
Pyrobelite 12	EI20/EW60
Pyrobel 8	EI15/EW30
Pyrobel 16	EI30/EW60
Pyrobel 17	EI45
Pyrobel 21	EI45/EW60
Pyrobel 21 EG	EI45/EW60
Pyrobel 25	EI60
Pyrobel 35	EI90
Pyrobel 53	EI120
Pyrobelite 7 EG	EW30
Pyrobelite 12 EG	EI20/EW60
Pyrobel 8 EG	EI15/EW30
Pyrobel 16 EG	EI30/EW60
Pyrobel 17 EG	EI45
Pyrobel 25 EG	EI60
Pyrobel 35 EG	EI90
Pyrobel 53 EG	EI120
Pyrobel 19	EI30
Pyrobel 23	EI45
Pyrobel 28	EI60

▼ BENEFITS

> Transparency

- No metallic mesh
- Light transmission equivalent to that of float glass of the same thickness.

> Safety

- Meets safety tests depending on standards in force
- Can be reinforced and made anti-bandit or bullet-proof
- It is possible to combine Pyrobel with accident prevention, anti-burglar and fire-protection functions.

> Sound insulation

Higher level than that of traditional double glazing.

> Sizes

Large sizes available.

> Installation

Easy to install in approved wooden or steel frames.

▼ PERFORMANCE

Products	Nominal thickness (nm)	Thickness tolerance	Weight (kg/m ²)	Resistance to fire EN 13501-2	Impact resistance EN 12600	Acoustic EN 12758: R _w (C;C _v) (dB)	U _g (W/m ² .K) EN 673	TL-EN 410 τ _v /ρ _v (%)	FS-EN 410 τ _e /ρ _e (%)
Internal grade									
Pyrobelite 7	7.9	+/-0,9	17	EW30	3B3	34 (0;-3)	5.7	89/8	73/7
Pyrobelite 12	12.3	+/-1	27	EI 20/EW60	2B2	36 (-1;-3)	5.6	86/8	65/7
Pyrobel 8	9.3	+/-1	20	EI 15/EW30	NPD	34 (-1;-3)	5.6	88/8	70/7
Pyrobel 16	17.3	+/-1	40	EI 30/EW60	2B2	39 (-1;-3)	5.4	84/8	60/6
Pyrobel 17	17.4	+/-1,5	40	EI 45	2B2	37 (-1;-3)	5.4	84/8	61/6
Pyrobel 21	21.6	+/-2	47	EI 45/EW60	1B1	38 (0;-3)	5.3	82/7/7	59/6/6
Pyrobel 25	26.6	+/-2	60	EI 60	1B1	40 (-1;-3)	5.2	81/7	53/6
Pyrobel 35	34.7	+/-2	81	EI 90	1B1	41 (-1;-4)	4.9	79/7	49/6
Pyrobel 53	52.5	+/-3	122	EI 120	1B1	45 (-1;-4)	4.5	72/7	40/5
External grade									
Pyrobelite 7 EG	11.3	+/-1	25	EW30	1B1	35 (-1;-2)	5.5	87/8	65/7
Pyrobelite 12 EG	16.1	+/-1	35	EI 20/EW60	1B1	38 (-1;-3)	5.4	85/8	58/6
Pyrobel 8 EG	13.1	+/-1,3	28	EI 15/EW30	1B1	36 (-1;-3)	5.4	86/8	62/6

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Pyrobel 16 EG	21.1	+/-1,5	48	EI 30/EW60	1B1	39 (-1;-3)	5.2	83/7	54/6
Pyrobel 17 EG	21.2	+/-2	48	EI 45	1B1	38 (0;-3)	5.2	84/8	56/6
Pyrobel 21 EG	25.4	+/-2	55	EI 45/EW60	1B1	40 (-1;-3)	5.1	81/7/7	54/6/6
Pyrobel 25 EG	30.4	+/-2	68	EI 60	1B1	43 (-1;-4)	5.0	80/7	48/6
Pyrobel 35 EG	38.5	+/-2	89	EI 90	1B1	42 (-1;-4)	4.8	77/7	46/6
Pyrobel 53 EG	56.2	+/-3	130	EI 120	1B1	46 (-2;-5)	4.3	71/7	38/5
Horizontal grade									
Pyrobel 19	19.1	+/-1,5	43	EI 30	1B1	38 (-1;-3)	5.2	81/7	53/6
Pyrobel 23	23.7	+/-1,8	54	EI 45	1B1	39 (0;-3)	5.0	80/7	49/6
Pyrobel 28	28.4	+/-2	63	EI 60	1B1	41 (0;-3)	4.9	78/7	47/6

Light properties in accordance with EN 410:

τ_v: light transmissionρ_v: light reflectance

Solar energy properties in accordance with EN 410:

τ_g: solar direct transmittanceρ_g: solar direct reflectance

▼ USES

Monolithic glass	Yes
Insulating glazing	Yes

▼ APPLICATIONS

Interior	Yes
Exterior	No

▼ INSTALLATION INSTRUCTIONS

> General instructions

- Pyrobel glasses are supplied in ready-to-mount units and cannot be cut or processed
- The outer edge of the glass is protected and this protection should not be damaged or removed
- The glass should not be exposed to temperatures above 40°C for long periods or to localised heat sources
- The edges of the glass should not come into contact with water
- AGC's installation instructions, which are based on information contained in the test reports, should be followed.

> Instructions for external applications

- When exposed to solar radiation, installed Pyrobel glass should be of the "external" type with an anti-UV filter (0.76 mm PVB film). This type of glass should be fitted correctly, with the PVB side facing the radiation source. The indelible marking generally appears on the non-PVB side
- The glass should be fitted in a drained and ventilated frame to prevent any water entering the rebates

- Pyrobel glass fitted in a façade should not be exposed to temperatures above 40°C for any length of time. The location of the building and the direction it faces should therefore be taken into consideration. Incorporating a solar-control glass into the Pyrobel glazing will allow it to remain cooler
- Pyrobel and Pyrobelite glasses must be installed in a frame which has also been approved. All details concerning application included in the test reports (type of project, direction and size of the glazings, characteristics of the seals, compliance with lateral- and edge-clearance requirements, height of mechanical edge cover, etc.) must be respected.

Please do not hesitate to contact us for further details.