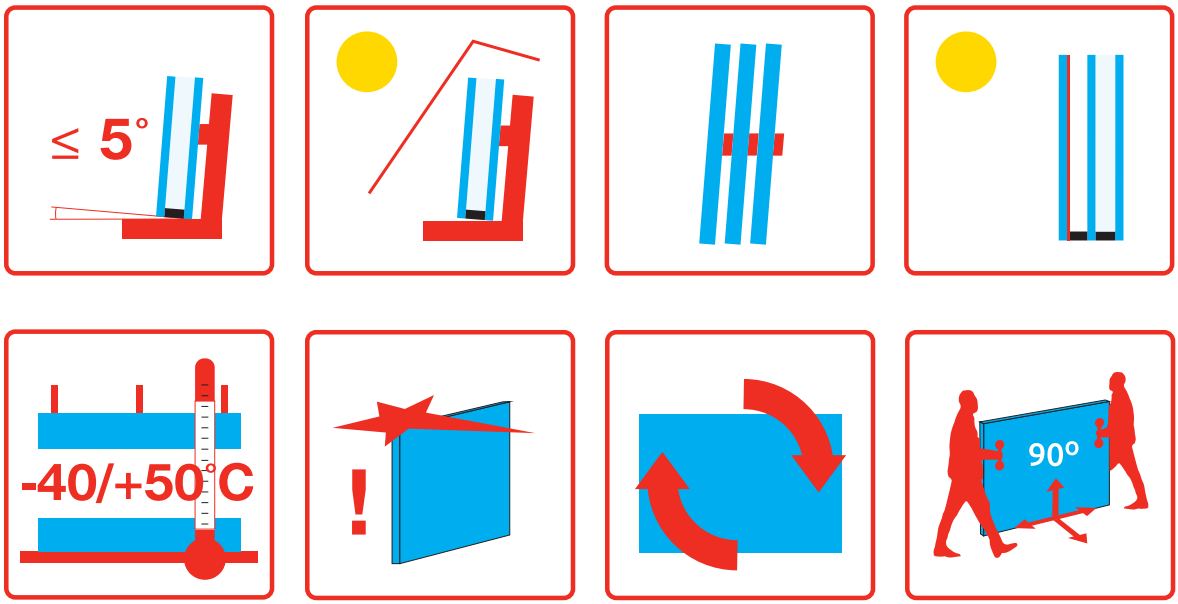
POLFLAM®
FIRE RESISTANT GLASS

GLAZING AND HANDLING GUIDELINE FOR POLFLAM EI & POLFLAM EW FIRE-RESISTANT GLASS



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1. General

POLFLAM EI and POLFLAM EW are fire-resistant glasses designed for use in buildings and construction works for fire resistance classes EI 15 to EI 180 and EW 30 to EW 120 according with EN 13501-2 and all products are CE-compliant construction products in accordance with EU Construction Products Regulation (CPR), no. 305/2011.

POLFLAM fire-resistant glass is in accordance with EN 14449 for internal applications and as insulating glass in accordance with EN 1279- 5 for internal as well as external applications. The products are suitable for vertical, sloped or horizontal application.

This Glazing and Handling Guideline is applicable for fully framed fire-resistant glass only!

Shapes order from cutouts

Due to conversion of handmade shaped glass templates into electronic format, the maximum dimensional deviation may be +/- 4 mm. To streamline the process and save time and resources, we kindly request that you submit future drawings in DXF format.

If necessary handmade shaped glass templates are to be delivered in HDF plates only.

Fig. 1. Top: Unacceptable cutouts – irregular and unsuitable for digitization. Bottom: Acceptable cutouts – clean shapes in HDF, ready for accurate processing.

2. Transport, storage and handling

2.1 Transport

For transport and storage, only the racks, boxes or individual glass packaging provided by POLFLAM must be used. The glass supplied on racks is secured with transport straps (Fig.3). In case of other transport and storage systems the panes must be appropriately secured and the individual panes must be separated by means of intermediate layers (e. g. self-adhesive cork pads) to avoid direct contact of the glass surfaces. In the event that the straps have come loose, please check all glass panes.

Fig. 2. The ready-packed and secured POLFLAM fire-resistant glass wrapped with stretch foil.

Fig. 3. POLFLAM fire-resistant secured with edge protectors and transport straps.

2.2 Glass inspection upon delivery

To ensure product integrity, inspect the delivery immediately upon arrival and confirm receipt on the delivery documents.

Inspection steps:

1. Lift the white protective foil covering the rack.
2. Check for any visible breakage or damage of the toughened safety glass.
3. An observed transport damage should be reported directly in the delivery document at the handover of the products.

Please note that complaints regarding transport damage cannot be accepted after 3 working days. Reporting immediately ensures a faster resolution.

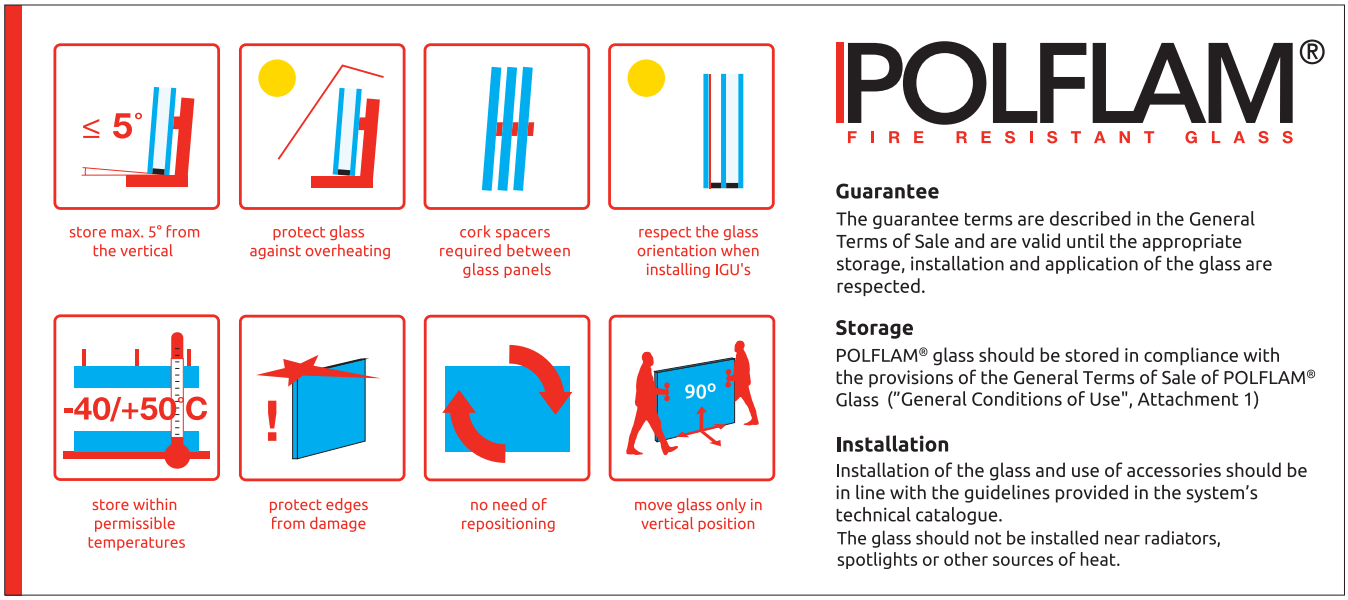
2.3 Storage

Due to the specificity of fire-resistant glass structure, it is recommended that POLFLAM fire-resistant glass to be stored in covered, dry and airy rooms and on rigid racks, ensuring linear stability of the entire surface and the edges of the glass. The rack's base should be made of wood, hard rubber or plastic. Too soft base causes that secondary sealant gets pressed into the space between glass panes, which can lead to unsealing. The glass must be stored in a position inclined up to 5º from the vertical and must be interlaced with cork pads (do not rest the glass edge against another glass!). When storing glass, in any case, remember to protect the glass from direct sunlight due to the possibility of overheating above 50 ºC resulting in changes in the glass structure. If glass is stored in a place where higher temperature fluctuations can occur, the straps should be loosened to avoid possible damage to the glass.

2.4 Handling

Fire-resistant glass needs to be carefully manipulated, especially heavy units and inserted into the framing system without tilting or slipping. All activities related to the installation of fire-resistant glass should be carried out in compliance with the rules of occupational health and safety! In practice, it has been proven that glass lifters should be used with one cup per square metre. It is important to ensure that the fire-resistant glass pane is not bent during manipulation.

All racks are labelled with the following handling instructions. Please observe the following basic principles related to storage, manipulation and installation:



2.5 Applying of decorative films

POLFLAM fire-resistant glass can be covered with film and does not lose its fire-resistant properties when it is covered with PVC or PET film in whole or in part, on one or both sides, regardless of the surface of the covering provided that the thickness of the film does not exceed 2 mm. The films used do not adversely affect the declared properties of fire-resistant glass, but its temporary use may cause a difference in the shade of the glass.

Changing the shade of fire-resistant glass due to the use of the film is not covered by the quality guarantee or warranty. Due to the increased absorption of thermal energy of the film, the glass covered with the film can only be used inside the building and it must not be exposed to overheating (e.g. by using coloured films on the sunny side or near the source of heat).

3. Installation

3.1 General

Before installation all POLFLAM fire-resistant glass must be checked for visible defects or damages (see Guideline for qualitative evaluation of POLFLAM fire-resistant glass). Defective glasses must not be installed. Further instructions on stickers must be followed carefully. It is not allowed in any way to further process POLFLAM fire-resistant glass after leaving the production facility without the explicit authorization of POLFLAM. In case of non-approved materials, POLFLAM accepts no liability for any incompatibility between the edge sealant system or other glazing components. Other materials needs to be validated by POLFLAM before being used.

Only use fire retardant or neutral silicones for glazing POLFLAM fire-resistant glass. Do not use silicones based on acetic acid, which can react with the secondary sealant and butyl, used in the sealing of POLFLAM fire-resistant glass. When mounted, POLFLAM fire-resistant glass should be protected against temperatures lower than -40 ºC and higher than +50 ºC. Do not install the glass near radiators or spotlights, as the temperature between the layers can reach a temperature higher than +50 °C. The glass should be placed on an even surface and free from any elements that could damage the sealing system.

During installation, the following pressure forces on the edge sealant system must not be exceeded; for monolithic glass units 20 N/cm edge length and for insulating glass units 15 N/cm edge length.

Generally, water accumulation for a longer period must be avoided for glass and all other surfaces. Especially the glass rebates must be kept dry by adequate draining or ventilation openings. Thermal bridges causing condensation on any surface must be avoided.

3.2 Preparation

First of all, clean all glass edges from excess material to finally obtain an unobstructed glass channel to ensure ventilation after the installation of the glass unit.

In case of excessive outer sealant on the floor glass, You can carefully cut off the sealing alongside the edge of the glass (see Fig. 4).

Fig. 4. Fire-resistant glass with excess material

3.3 Installation procedure

1) **Intumescent tapes** – if the glazing system requires the use of intumescent tapes, it should be placed on the ground of the profile according to the documentation of the system manufacturer.

Fig. 5. Intumescent tape placed on the ground of the profile

2) Cut out of the intumescent tape for the placing the setting blocks. They should have at least the same width as the total glass unit. The pictures below show the installation locations for the setting blocks. In order to determine the correct distance, place two setting blocks of the same length on the bottom edge of the glass and then leave the one further away from the edge on which the glass will be placed. Repeat the process on the other side of the glass. The setting blocks must consist of a material which is fire-resistant and resistant to moisture and to humidity. They must be also compatible with the adjacent glazing materials.

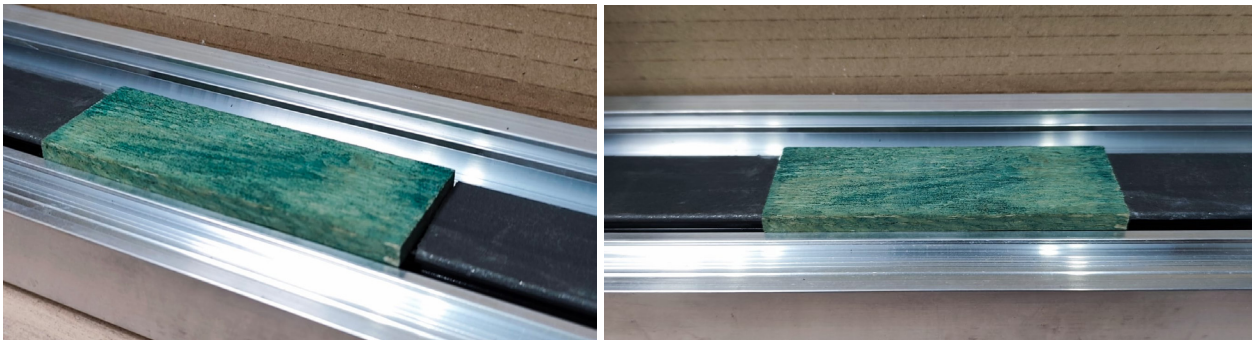


Fig. 6. Cut out of intumescent tape and location of the setting block

3) Measure the width and height of the glass and choose the right thickness of the setting block on this basis. An uniform circumferential gap between the frame and the edge of the glass of around 5mm has proven to be effective. There are different thicknesses of the setting blocks available.

4) Install the glass unit in the frame which was previously equipped with intumescent tape and setting blocks. Secure the glass unit in an upright position using pneumatic devices or human force.

5) The distance between the surface of the frame and the edge of the glass must be the same on both sides and depends on the system used (Fig. 7).

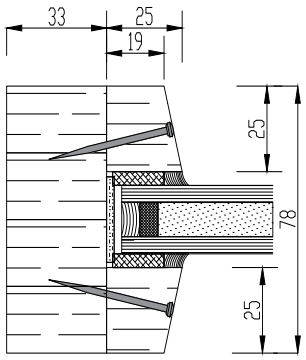


Fig. 7. Section drawing of POLFLAM EW 60 in timber system

6) Maintain the vertical position of the glass until the safety devices are fitted on both sides (the type of safety device depends on the glazing system).

3.4 Curtain walls and façade systems

In the preliminary stage of glazing, it is recommended to fasten the glass with system (mounting) pressure strips using system gaskets. The lengths of the mounting strips and the seals used should correspond to the catalogue number of the system supplier, which the designer selected for the particular system and the thickness of the glass unit.

All mounting accessories, the use of tightening torque in Nm, are determined in the installation catalogues of the system used. Any deviations and use of substitute materials may cause cracks in the added panes of the unit installed. In order to avoid any unsealing of the glass under installation, the glass should be pressed directly to the internal gasket of the system, and only after that rest the bottom edge of the glass on the setting blocks. Other mounting details are described in the documents provided by the system manufacturer or supplier.

3.5 Partition and door systems

To avoid any unsealing or cracking of the added glass, it is absolutely necessary to use appropriate setting blocks (e.g. hardwood with at least the minimal width of the fire-resistant glass unit). The setting blocks must consists of a material which is fire-resistant and resistant to moisture and to humidity. While displacing, make sure that the sealing of the glass unit is not damaged when inserting the setting blocks. It is absolutely necessary to observe the principle that the setting block is placed under the entire fire-resistant glass. Do not allow the added glass to be displaced. Other mounting details are described in the documents provided by the system manufacturer or supplier.

3.6 Special internal applications

If glass is used in walls separating spaces of high humidity (e.g. swimming pools), it is absolutely necessary to apply drainage of the structure. Also, it is strictly prohibited to use any silicone or sealants around the perimeter of the built-in glass. Other mounting details are described in the documents provided by the system provider.

4. Cleaning

4.1 Glass cleaning on construction site

During the construction phase, all aggressive contamination shall be avoided. In case of contamination the contaminants must be washed off immediately with non-aggressive agents until free from residue.

Cement dust, plasters and mortars are highly alkaline and cause glass surface etching unless they are immediately rinsed off with plenty of water. Dusty or grainy deposits on the glass surface must be properly removed with clean water, but never dry. Sand blasting or welding work in the area of fire-resistant glass requires full surface protection against welding beads, flying sparks etc.

4.2 Cleaning of glass panes

Cleaning of the glass and removing residues from stickers and dividers should be done with mild cleaning agents. Difficult to remove dirt that cannot be removed with common agents, it should be pre-removed using special cleaning agents. Dirt caused by the action of mortars and other building materials requires immediate removal; otherwise there is a risk of permanent damage to the glass surface.

5. Glass products phenomenon's

5.1 Deflection of glass due to changes in temperature and atmospheric pressure in Insulated Glass Units (IGU's)

Insulated glass unit has a certain volume of gas and air enclosed inside, the state of which is determined by the pressure of the of atmospheric air, the height of the manufacturing site above the zero reference level (NN) and by the air temperature at the time and place of manufacture.

When the insulating glass unit is exposed to deviations in altitudes, temperatures or atmospheric pressure (high and low pressure) it can result in a change of the cavity volume and deflection of the individual glass panes creating optical distortions.

Also, multiple specular reflections can occur on the surfaces of insulating glass. Enhanced specular reflections can be recognized if, for example, the background of the glazing is dark, the panes are coated or the glass unit is built up from multiple glass panes (triple glass).

These phenomenon's are typical physical regularity of insulating glass units and should not be treated as defect.

5.2 Intrinsic colour

Nominally clear float glass actually has a green or blueish green shade. This is caused by the iron oxide in the raw materials (silica) to produce the float glass. The shade of the glass depends on the ratio of the amount of these irons and the source of the raw materials as a result, there may be differences in float glass from one manufacturer to another. This shade of glass is a natural characteristic of float glass.

The colouring of clear glass is also influenced by coatings (layers of metal oxides on the surface of the glass which give it special properties, e.g. a Low-E coating). The visible shade of glass depends on the type of coating, the thickness of the glass, the lighting, the angle at which the glass is viewed.

5.3 Interference phenomena

The phenomenon of light interference, known as Brewster fringes, appears in insulated glazing units when the glass panes are made of very flat glass panes with the same thickness and exposed by white light under a certain angle.

When conditions described above are present, light interference occurs, visible in the form of oily looking wide patches, bands or rings, distributed in various locations on the surface of the glass unit. It cannot be considered a defect and cannot be the subject of a claim.

The risk of light interference can be reduced by using glass panes with uneven thickness or coated glass surface.

5.4 Condensation of the outer surface of Insulated Glass

Condensation forms when moist air is adjacent to surfaces with a correspondingly lower temperature, cools to a point of saturation, followed by the condensation of excess moisture on these surfaces. On insulating glazing, condensation can occur on its external surface (from outside the room).

Condensation on the outer surfaces of insulating glass is a phenomenon determined by the physical properties of the glass itself and the existing atmospheric conditions (low temperature and high air humidity). It is not possible to completely eliminate this phenomenon, due to the fact that the outer pane is subject to varying atmospheric conditions. Condensation on the glass is not a defect, but merely a physical phenomenon.

5.5 Glass breakage

Glass is an amorphous, homogeneous, solid, brittle and rigid material. It has negligible internal stresses, which makes it suitable for cutting and machining. It fractures when exposed to external thermal or mechanical factors.

Such cracks occurring after the glass has been delivered to the customer are not covered by the guarantee and cannot be the basis for a complaint.

In order to increase the resistance of the glass to thermal or mechanical stress cracks, the glass used in production of POLFLAM fire-resistant units are subjected to toughening process. For the external panes of insulated glass units the float glass panes can be toughened to increase the mechanical and thermal resistance.

5.6 Anisotropy phenomenon

The thermal toughening process produces areas of different stress in the cross section of the glass. These areas of stress produce a bi-refringent effect in the glass, which is visible in polarized light. When thermally toughened soda lime silicate safety glass is viewed in polarized light, the areas of stress show up as coloured zones, sometimes known as 'leopard spots'. Polarized light occurs in normal daylight. The amount of polarized light depends on the weather and the angle of the sun. The bi-refringent effect is more noticeable either at a glancing angle or through polarized spectacles.

Anisotropy is not a defect but a visible phenomenon of toughened glass and cannot be the subject of a claim.

Fig. 8. Example of anisotropy phenomenon in toughened glass.

5.7 Risk of spontaneous breakage of toughened glass due to nickel sulphide inclusion

Nickel sulphide inclusion is a very rare, but naturally occurring impurity present in all glass that can, in certain circumstances, lead to spontaneous breakage of thermally toughened safety glass. It cannot be considered a defect and cannot be the subject of a claim.

To reduce the risk of toughened glass spontaneously breaking due to the presence of critical nickel sulphide (NiS) inclusions in the glass, it is advisable to put toughened glass through an additional heat treatment known as the heat-soak process (see EN 14179-1).

This is a destructive test which eliminates the majority of the glass that is at risk. While the technique cannot eliminate 100% of the glass which is at risk, the risk of breakage is considerably reduced.

This treatment is recommended for all situations where the stability of the structure and the safety of users may be at risk from breakage of the toughened glass.

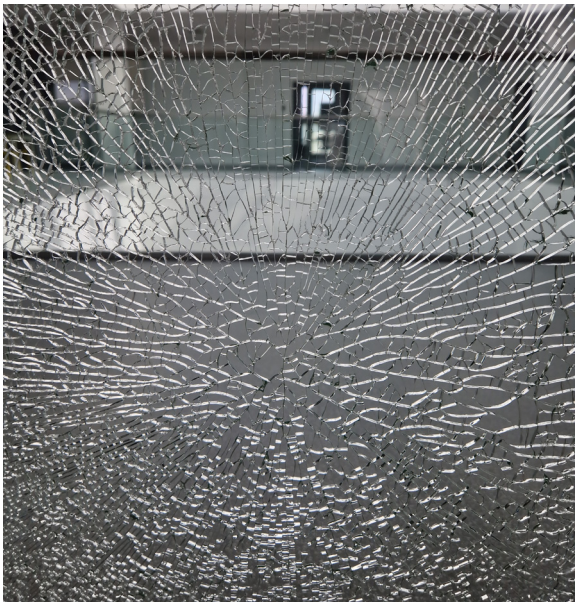


Fig. 9. Thermally toughened soda lime silicate safety glass produced by horizontal toughening.

5.8 Roller waves

'Waviness from rollers' – occur during the toughening of glass in horizontal furnaces.

These are surface distortions caused by the hot glass (temperature close to the softening point) coming into contact with the furnace rollers. This results in deviations in the flatness of the glass. These distortions are increased visible in reflected light. When placing orders for glass for glazing building facades it is recommended for the customer to take into account the *'Roller Waves'* phenomenon and to specify the direction of application of the glass into the furnace if possible.

Roller waves create an optical distortion which is generally noticed in reflection. Glass which is thicker than 8 mm can show signs of small roller imprints in the surface (*'roller pick-up*'). The tolerances for the roller wave is regulated in the harmonized product standard EN 12150-1 for toughened safety glass, but can not be prevented for horizontal produced toughened glass.

5.9 Optical distortion in multi-layered glass

In multi-layered or laminated glass which incorporates one or more thermally treated glass panes optical distortions originating from the thermal treatment process can be visible. Adding more glass layers and/or interlayers can increase this effect.

Laminated fire-resistant safety glass panes may exhibit slight visual distortion when viewed under an angle or from a greater distance, this is inherent to the product.

5.10 Corrosion of the outer pane surface

Incorrect storage of glass panes in humid conditions may result in generating an alkaline sediment on the outer surface of the glass (stain looking phenomenon) that will be impossible to remove.

Above defects generated by incorrect storage of POLFLAM product cannot be the subject of a claim.

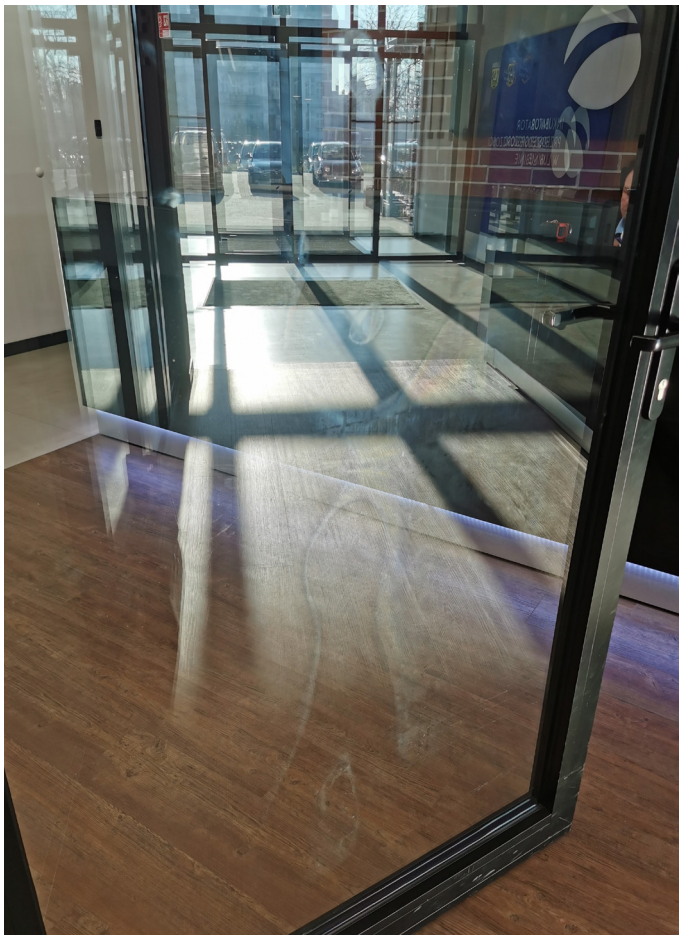


Fig. 10. Corrosion of the outer pane surface

5.11 Overheating of the fire-resistant interlayer

Incorrect installation of insulated glass units (fire-resistant glass pane to the outside and functional glass pane to the inside) or incorrect storage of POLFLAM fire-resistant glass (exposure of fire-resistant glass to high temperatures or direct sunlight) may result in overheating the interlayer of the fire-resistant glass (temperature above 50° Celsius)
and reaction of the interlayer with the appearance of small bubbles/spheres in the interlayer (approx. 2-5 mm diameter).

Above defects generated by incorrect storage or installation of POLFLAM product cannot be the subject of a claim.

Fig. 11. Overheating of fire-resistant glass

6. Document history

Version	Description	Valid until	Approved by
062025INT	Glazing and handling guideline for POLFLAM EI and POLFLAM EW fire-resistant glass		DC – 04.06.2025

PARTITIONS

WINDOWS
AND DOORS

FACADES
AND ROOFS

FLOORS

SMOKE
BARRIERS

CE marking confirms that a product complies
with the relevant harmonised European Norm.

Technical specification of the products are available at www.polflam.com

VERSION 062025 INT

POLFLAM Sp. z o.o.
Jeziorzany, Aleja Krakowska 3
05-555 Tarczyn
Poland

T +48 22 726 92 17
info@polflam.com
www.polflam.com

POLFLAM®
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