glass system

General Technical Conditions
for laminated glass Glass System Technologies S.A.

1. Purpose and scope of the document

This document specifies the technical requirements, quality assessments and maintenance for laminated glass used in construction – internal glazing and railings.

2. Legal basis and standards

PN-EN 14449: "Glass in building. Laminated and laminated glass."
PN-EN 12600: "Flat glass. Impact resistance test."

Parameter	*Standard/Guideline*	*Permissible tolerances*
Laminated glass thickness	PN-EN ISO 12543-5,6	± 0.2 mm (for thickness ≤ 8 mm) ± 0.3 mm (8–12 mm), ± 0.5 mm (> 12 mm)
Length and width of panes	PN-EN ISO 12543, PN-EN 572	± 3 mm (for sheets ≤ 2000 mm) ± 4 mm (for panes > 2000 mm)
Rectangularity	PN-EN ISO 12543, PN-EN 572	Max. difference in diagonals: 3 mm (for panes ≤ 2000 mm), 4 mm (> 2000 mm)
Laminate layer displacement	PN-EN ISO 12543	Max. 2 mm at the edge
Edge chips	PN-EN 12543	Max. chip depth: 2 mm, max. length: 10 mm

3. Materials: laminated safety glass

Definition and structure

Laminated glass is a type of glass that consists of at least two layers of glass with a layer of film (usually made of plastic, such as polyvinyl butyral - PVB) between them. These layers are permanently bonded together using heat and pressure, which gives laminated glass its special properties.

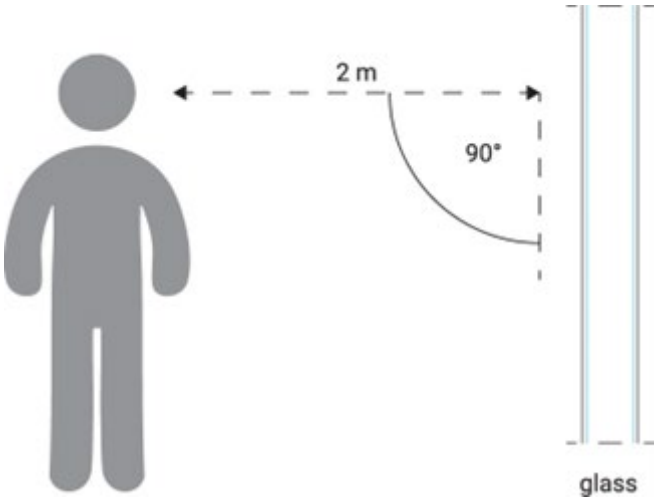
The main advantages of laminated glass are:

- Safety: If the glass breaks, the fragments do not shatter into small, sharp pieces, but remain stuck to the film, reducing the risk of injury.
- Noise protection: The laminate layers have sound-insulating properties, which improves acoustic comfort in rooms.
- UV resistance: The film between the layers of glass often protects against harmful UV radiation, which prevents objects inside rooms from fading.
- Enhanced protection: Laminated glass is more difficult to break than ordinary glass, making it an effective protective element, e.g. in shop windows or burglar-proof windows.

It is used in various places, such as balustrades, doors and other partitions, where increased safety or strength is required.

4. Quality assessment of laminated glass

The visual assessment of the panes is carried out while observing them in a vertical position and parallel to a matt grey screen, from a distance of 2 m (3 m in the case of coated glass), in bright, diffused daylight or equivalent (care should be taken to ensure that the package is not in direct sunlight). Defects must not be marked on the glass.



When performing a visual inspection, you must look through the glass, not at the glass. If a defect is not visible when looking through the glass at a specified distance, then it is considered that such a defect does not distort the image and does not affect the properties of the product, i.e. transparency and sound insulation.

Not every visible defect qualifies the glass for replacement. We look through the glass, not at the glass.

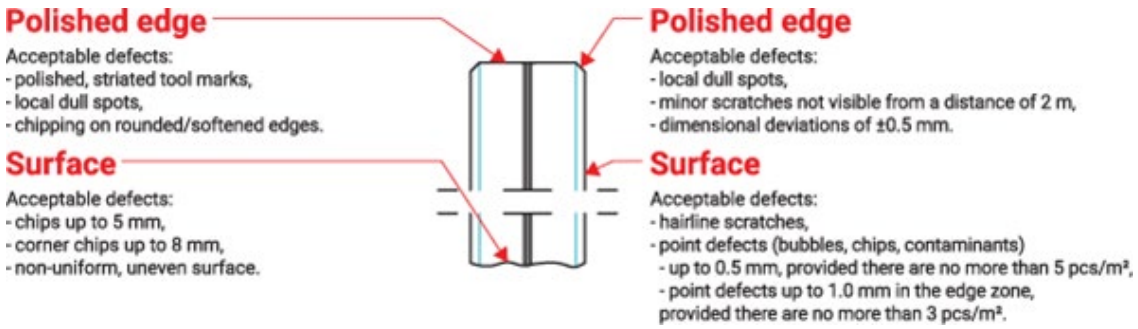
The following factors should be taken into account during visual assessment:

- the size of the defect,
- frequency of defects,
- size of the glass being examined,
- number of sheets comprising the package.

Perform a visual inspection in accordance with EN1279:2018

During the inspection, do not use magnifying devices or strong light sources (e.g. halogen lamps and torches). The assessment should not be carried out when the pane is exposed to strong sunlight. All defects must first be identified from a distance of at least 2 m from the pane. If a defect is noticed, it must be measured using an appropriate measuring device (millimetre scale or tape measure) and compared with the table below:

Type of defect	*Central zone*	*Edge zone*
Air bubbles	Not acceptable above 0.5 mm in diameter.	Acceptable up to a diameter of 1 mm (max. 3/m²).
Solid inclusions	Not permitted above 0.5 mm in diameter.	Permissible up to a diameter of 1 mm. ± 4 mm (for panes > 2000 mm)
Scratches	Not permitted	Acceptable up to 15 mm.
Contamination	Unacceptable if visible from 2 metres.	Acceptable if they do not affect aesthetics.
Edge chips	Not acceptable	Acceptable up to a depth of 2 mm.
Optical waves	Acceptable if not visible from 2 m.	Acceptable if they do not affect functionality.



Edge straightness:

The PN-EN ISO 12543 (for laminated glass) and PN-EN 572 (for base glass) standards specify the requirements for edge straightness:

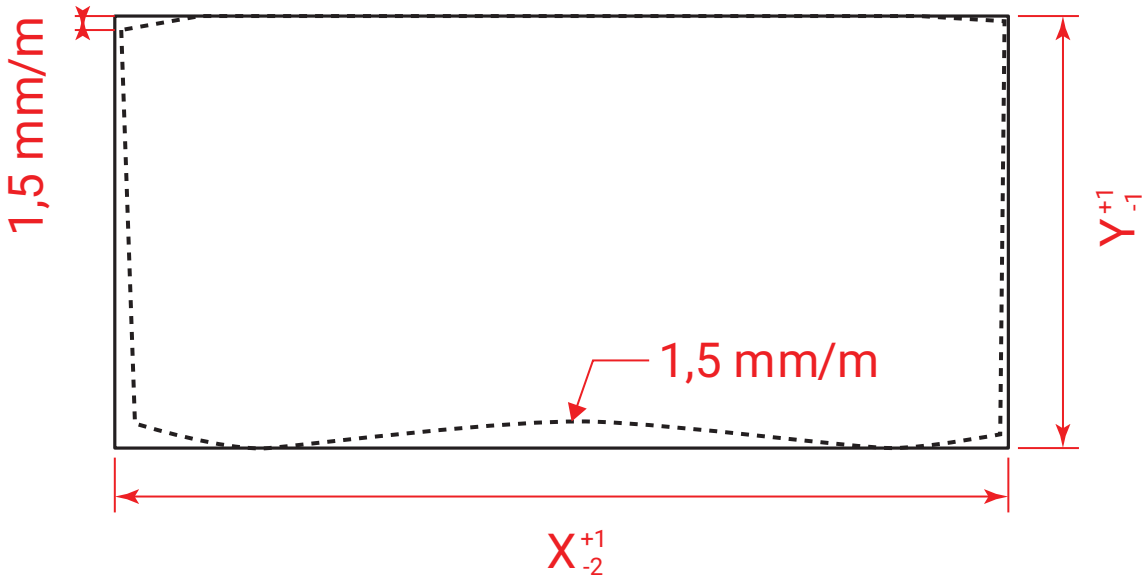
Straightness deviation:

- **±1.5 mm/m of** edge length for glass ≤3 m long.
- Maximum total deviation for panes longer than 3 m: **±3 mm**.

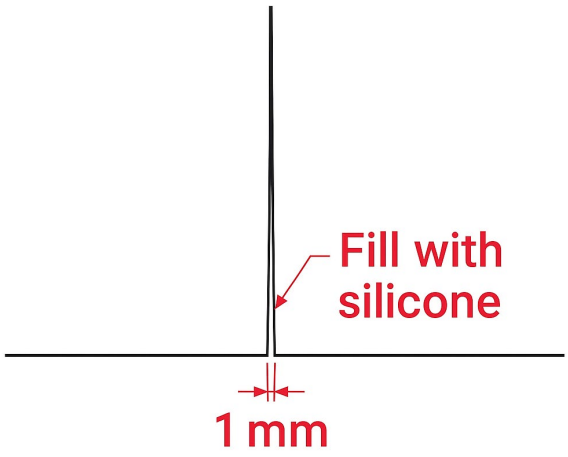
Method for assessing the straightness of laminate edges:

a. *Glass preparation:*
The glass pane should be placed on a flat surface.
b. *Steel or laser ruler:*
A ruler or laser longer than the edge being measured is placed against the edge of the glass.
c. *Deviation measurements:*
The maximum distance between the edge of the glass and the ruler at any point is measured.

The dimensional tolerances of the formats are illustrated in the figure below:



If a gap is found at the joint between adjacent glass panes, it should be filled with silicone:



Cleanliness of the glass surface

1. Glass System Technologies S.A. makes every effort to ensure that the glass supplied is in proper technical and visual condition.
2. As a result of production, storage or transport processes, the glass surface may be contaminated, in particular as a result of atmospheric or environmental factors.
3. Before installing the glass in a structure that prevents or limits subsequent access to its surface (e.g. in system walls, permanent structures, assemblies), **the cleanliness of the glass surface should be checked and, if necessary, cleaned**.
4. Installing glass without first checking and cleaning its surface means acceptance of its surface condition.
5. Once the glass has been installed in a manner that prevents access to its surface, **complaints regarding the cleanliness of the glass will not be considered**, and the manufacturer shall not be liable for any costs associated with the possible dismantling and reinstallation of the product.
6. The above recommendations must be strictly followed during the collection and installation of the glass.

5. Rules for storage and transport.

- During storage, the glass should be protected from external conditions such as UV radiation, precipitation, moisture, dust, mechanical damage, etc.
- Glass should be stored in an upright position on appropriately prepared supports (racks).
- During transport, the edges and surface of the glass panes must be protected against mechanical damage.