

Application of glass according to technical standards

To ensure the safety of attendees, the glass used in the booths must be applied in accordance with that determined in the **ABNT NBR 7199 standard — Glass in civil construction - Design, execution, and applications.**

Safety glass

Laminated, tempered, and wired glass are types of safety glass "whose manufacturing process reduces the risk of injury in the event of breakage", as defined by the Brazilian Association of Technical Standards (ABNT).

Laminated safety glass

It is composed of two or more glass blades strongly interconnected by one or more intermediate layers. Safety: in case of breakage, its shards remain attached to the middle layer, preventing the opening of the gap and thus reducing the risk of accidents, in addition to keeping the area closed and safe until the glass is replaced.

Tempered safety glass

It is glass that has received thermal treatment (it is heated and cooled quickly), which gives it mechanical resistance (up to five times more than ordinary glass) and makes it resistant to thermal shocks. Due to its higher mechanical strength, it can be used in self-supporting installations (which dispenses with the use of frameworks).

Safety: in case it breaks it shatters into small, less sharp-edged fragments.

Wired safety glass

Translucent printed glass that has a checkered metallic mesh incorporated into its mass.

Safety: In case of breakage, the metal mesh holds the glass shards, reducing the risk of injury and keeping the area closed and safe until the glass is replaced.

Rule

Vertical windows installed below 1.1 m in relation to the floor, whether internal or external, on any floor, must be made of safety glass.

For each application, it is necessary to check the types of safety glass (tempered, laminated or wired) required according to the *ABNT NBR 7199* standard, because in some applications, only laminated and wired glass are allowed.

Doors, showcases and partitions (vertical glass susceptible to human impact)

Below the dimension of 1.1m in relation to the floor, the windows must be made of safety glass, regardless of the floor on which they are installed.

The type of glass allowed is:

- **Temperate**
- **Laminated**
- **Wired**
- **Insulated** (composite of types of glass above)

Above the dimension of 1.1m in relation to the floor, besides the safety glass mentioned, the float or printed types can be applied, provided they are boxed or glued along the perimeter.

Railings

The main function of railings is to provide security, both of the people around you (against the risk of accidental falls), and of those who are on the threshold below where they are installed. The type of glass allowed for this important application is:

- **Laminated**
- **Wired**
- **Insulated** (composite of types of glass above)

In installations that require greater mechanical strength of the glass, such as self-supporting applications, the laminated type must be composed of tempered glass.

In addition to using only the allowed glass, listed above, the railings must meet *ABNT NBR 14718 — railings for buildings*, which specifies the minimum conditions of resistance and safety for the system.

Facades (vertical glass)

Below the 1.1m quota relative to the floor

From the first floor (including it) and on the ground floor dividing environments with a difference in level of more than 1.5m, only the following types of glass are allowed:

- **Laminated**
- **Wired**
- **Insulated** (composite of types of glass above)

On the ground floor, when the difference in level is not more than 1.5m, in addition to the laminated and wired safety glass, tempered glass can also be used.

Above the dimension of 1.1m in relation to the floor, in addition to the security glasses mentioned, float or printed glass can also be used, provided that it is boxed or glued along the perimeter.

Roofs, balconies, skylights, and sloping facades (non-vertical glass)

The types of glass allowed are:

- **Laminated**
- **Wired**
- **Insulated** (in its composition, the inner part must be laminated or wired)

Mobile design glazing

In installations with movable frames that protrude outwards, only the following types of glass are allowed:

- **Laminated**
- **Wired**
- **Insulated** (in its composition, the inner part must be laminated or wired)
- Temperate — with the following restrictions:
 - On the ground floor and on the first floor: self-supporting or fully boxed
 - Above the first floor: fully boxed and with maximum projection limited to 250 mm from the side of the facade or the protection flap.
- **Float or printed** — with the following restrictions:
 - On the ground floor and on the first floor: fully boxed or glued along the perimeter
 - Above the first floor: fully boxed or glued along the perimeter and with maximum projection limited to 250 mm from the side of the facade or the protection flap.
 - In all cases: the glass area must not exceed 0.64 m².

Special installations

Special installations are considered: floors, steps, swimming pool and aquarium screens, as well as glass structures. For these applications, the required glass is:

- **Laminated**

Balcony glazing

According to ABNT NBR 16259 — *Balcony glazing systems*, the permitted glass is:

- **Temperate**
- **Laminated**

Bathroom boxes

According to ABNT NBR 14207 — *Bathroom boxes made of safety glass*; the types of glass allowed are:

- **Temperate**
- **Laminated**
- **Tempered with safety film**

Important: ABNT NBR 14207 determines that, in case it breaks, the tempered glass box with a safety film must allow at least one movement to open and close the door and the glass fragments must remain attached to the structure for at least two hours after it breaks.