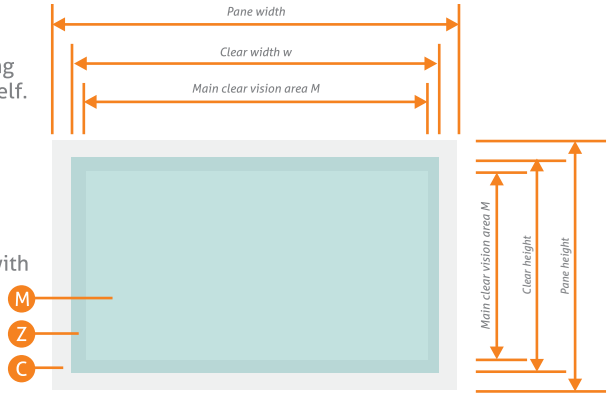
QUALITY GUIDELINE

GLASS LT FIRE
PRIEŠGAISRINIAI STIKLAI

1. VISUAL INSPECTION

The glasses must be examined in diffused light (no direct rays), from 2 meters distance from their surface with the view angle vertical to the pane. While checking the look must be directed to the background behind the glass rather than glass itself. That is why the defects should not be highlighted.



2. ACCEPTABLE VISUAL DEFECTS

The area of glass pane is divided into the following zones:

C – Rebate zone: width 20 mm from the edge of glass (no limits on discrepancies, with the exception of mechanical damage to the edges)
Z – Edge zone: area around edge with width w/10 or h/10 respectively
M – Main zone (most stringent assessment).

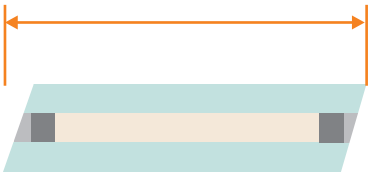
Zone	The following are allowable per unit:
C	External shallow damage to the edge or conchoidal fractures which do not affect the glass strength and which do not project beyond the width of the edge seal.
	Internal conchoidal fractures without loose shards, which are filled by the sealant.
	Unlimited spots or patches of residue or scratches
Z	Inclusions, bubbles, spots, stains, etc.: Optical irregularities subject to manufacturing, as inclusions, streaks, small bubbles <3 mm, tinting and non-homogeneities, as they do not affect the general clear vision.
	Scratches: Total of individual lengths: max. 90mm Individual length: max. 30 mm
	Hair-line scratches: not allowed in higher concentration
M	Inclusions, bubbles, spots, stains, etc.: Pane area ≤ 1 m^2: max. 2 cases, each $\leq$ with diameter of 2 mm 1 m^2 < Pane area ≤ 2 m^2: max. 3 cases, each $\leq$ with diameter of 2 mm 2 m^2 < Pane area < 5 m^2: max. 6 cases, each < with diameter of 3 mm Pane area > 5 m^2: max. 8 cases, each < with diameter of 4 mm
	Scratches: Total of individual lengths: max. 45 mm Individual length: max. 15 mm.
	Hair-line scratches: not allowed in higher concentration
Z+M	Maximum number of allowable discrepancies as in zone Z. Inclusions, bubbles, spots, stains etc. of dimensions 0,5-1,0 mm are allowable without any area-related limitation, except when they appear in higher concentration. „Higher concentration" means that at least 4 inclusions, bubbles, spots, stains etc. are located within a circle with a diameter of ≤ 20 cm.

Remarks:
- Due to the production process, the top of the filling opening might be visible in individual cases.
- Discrepancies of dimensions $\leq 0,5$ mm will not be taken into account. Existing disturbance zones (halos) shall not be larger than 3 mm.
- The quantity allowances of zones Z and M increase by 50% for each laminated glass pane.
- Surface unevenness may occur due to production technology.

3. TOLERANCES OF DIMENSIONS

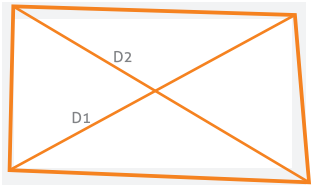
Dimensions and Edge Offset

The dimensional tolerances are ± 2mm. The tolerances include a possible edge offset not exceeding the width and length tolerances as shown in the drawing.



Rectangularity

The rectangularity of a unit is determined by measuring the diagonals D1 and D2, the absolute difference between which has to be $\leq$2mm.



Thickness

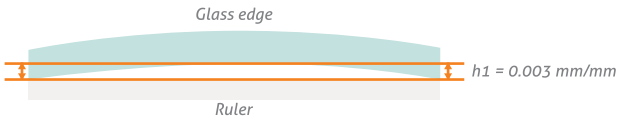
The thickness tolerances are:

Product	Maximum dimensions, mm	Nominal thickness, mm	Tolerance of thickness, mm
FireBlock30	< 1600 x 3000 mm	23	-2 / +3
FireBlock30	< 1600 x 3500 mm	25	-2 / +3
FireBlock60	< 1600 x 2500 mm	29	-2 / +3
FireBlock60	< 1600 x 3500 mm	31	-2 / +3
FireBlock60 structure	< 1600 x 3500 mm	35	-2 / +3
FireBlock90	< 1600 x 2500 mm	39	-2 / +3
FireBlock90	< 1600 x 3500 mm	41	-2 / +3

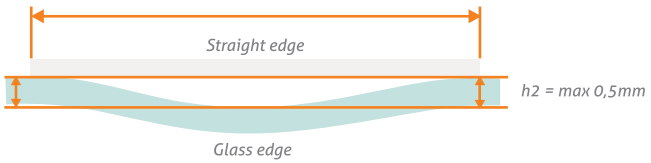
4. OVERALL AND LOCAL BOW

By the very nature of the toughening process, it is not possible to obtain a product as flat as annealed glass. The difference depends on the nominal thickness, the dimensions and the ratio between the dimensions. Therefore a distortion known as overall bow can occur. There are two kinds of bow:
- Overall or general bow
- Local bow

Overall bow, or evenness based on the length of the glass edge
The pane of glass shall be placed in a vertical position and supported on its longer side by two load bearing blocks at the quarter points. The deformation shall be measured along the edges of the glass and along the diagonals, as the maximum distance between a straight metal ruler, or a stretched wire, and the concave surface of the glass.
The value for the bow is then expressed as *the deformation, in millimetres, divided by the measured length of the edge of the glass, or diagonal, in millimetres, as appropriate.*



Local Bow
Local bow can occur over relatively short distances on the edges of the glass. Local bow shall be measured over a limited length of 300 mm by using a straight ruler, or a stretched wire, parallel to the edge at a distance of 25 mm from the edge of the glass.
Local bow is expressed as *millimetres / 300 mm length*.



5. GENERAL REMARKS

The specific characteristics must be considered while evaluating the individual features:
- Material-bound qualities, as different refractory indices of glass and fire protective gel
- Deviations in colour due to different suppliers or batches, as for interlayer
- Colour differences with patterned glass
- Fire resistant glasses show more haze with increasing interlayer thickness.

Physically caused features
Optical features of tempered glass
While the hot glass is in contact with the rollers during the toughening process, a surface distortion is produced by a reduction in surface flatness, known as „roller wave". Roller wave is generally noticed in reflection. Tempering can also cause a chemical and mechanical change in the surface, as dots and roll imprints.
FireBlock glass consists of two tempered glasses. The glass of such composition will have some degree of optical distortion. This distortion may be significantly increased due to the lens effect of having the substrates out of phase or non-parallel surfaces. Distortion of images whether viewed in transmission or reflectance may be accentuated when viewed at angles other than normal (90°) to the surface; often the more acute or obtuse the angle the greater the distortion. This distortion is normal and expected with these high performance impact and fire resistant glazing options.

Anisotropy (iridescence) of tempered glass
The 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 polarised light.
When thermally toughened soda lime silicate safety glass is viewed in polarised light, the areas of stress show up as coloured zones, sometimes known as „leopard spots".
Polarised light occurs in normal daylight. The amount of polarised 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 polarised spectacles.