

**GLASS IN BUILDING. GUIDELINES ON RECEPTION, HANDLING, STORING, TRANSPORT AND COMPLAINING PROCEDURES AND TERMS OF GUARANTEE OF INSULATING GLASS UNITS****1. GENERAL INFORMATION**

1.1 Glass is a fragile material. We are surrounded by buildings with glass windows and walls. Glass catches our eye several times a day and unfortunately, so do the scratches on them. Therefore, it is important to handle glass with care.

1.2 In order to ensure the functionality of glass through its useful life, it is extremely important to transport, receive, handle, store and install glass in the right way. This is required in the terms of guarantee given by the manufacturer or processor. If the manufacturer's guidelines are not followed, possible defects will not be compensated on grounds of product liability or terms of the guarantee.

1.3 These guidelines on reception, handling and storing of glass shall be complied with by the whole supply chain from the manufacturer to the user.

2. RECEPTION

Upon receipt the whole package shall be carefully visually inspected. All visible defects on the package and on the product shall be written down on the waybill. All defects discovered by the purchaser – as well as those he should have discovered – have to be reported to the seller without delay but not later than seven (7) days from the reception or from the opening of the package. This will simplify the compensation procedures, if needed.

3. TRANSPORT

Glass shall always be transported in a vertical position. Care shall be taken to not scratch the vulnerable glass edges or surfaces. Packages containing glass shall only be lifted by supporting points.

4. STORING

Glass shall always be stored in a vertical position perpendicular to the base. The base support shall be dry and slightly yielding (wood, plastics, rubber etc.). The base shall be mounted off the ground in order to prevent damage caused by moisture. Glass shall at all times be kept away from sunlight, rain, cement dust, welding sparks etc. In long-term storage, the storage area shall be dry and well-ventilated to prevent risks of corrosion.

For short-term storage, glass shall be stored as described above and good ventilation shall be ensured. Glass placed on the racks for transport or storage shall be kept out of direct sunlight to prevent thermal stress breakages. Special glass, e.g. fire-resistant glass and laminated glass shall be stored inside and protected from moisture and cold. Attention

shall be paid to the guidelines given by the manufacturer and processor.

5. HANDLING

As glass is a fragile material, it must be handled with care. For packages including glass, even short exposure to strong sunlight during unpacking or installation may lead to thermal stress breakages. Therefore it is important to protect glass from high temperature rises. Glass shall not be pushed by its edges or rotated on its corners. The most vulnerable parts are the edges. Use suction cups when lifting and carrying glass panes.

When rotating glass panes, suction cups shall be used, or the pane shall be rotated around by the whole length of the side. If the base support is made of flexible material, it shall extend to the whole length of the glass pane. Glass edges shall never get into contact with hard items, e.g. metallic tools. For safety reasons, glass shall not be used with its edge cracked because of the risk of further fracture during and after installation. Guidelines given by the manufacturer or the processor shall also be considered.

6. DAMAGES

Risks:

- Moisture: surface corrosion and damage to fire-resistant glass
- Sunlight: thermal shock (excessive thermal stresses), especially when several glass panes are stacked on top of each on the same pane. Damage to sealing materials of insulating glass units and damage to fire-resistant glass
- Edge damage: fracture propagates during and after installation
- Cement dust: surface corrosion
- Concrete leachates: surface corrosion
- Welding sparks: surface damage
- Grinding sparks: surface damage
- Sudden changes of temperature: thermal shock (excessive thermal stresses)
- Differences in temperature between middle and peripheral areas of glass: thermal shock (excessive thermal stresses)

7. COMPLAINTS

7.1 These guidelines are applicable to glass used in buildings, processed glass products (like thermally toughened glass and laminated safety glass) and insulating glass units. Product quality shall comply with the requirements of current European standards (SFS-EN), RT-files and RYL-publications. In the case of discrepancy and when no relevant European standard exists, the quality of special glass shall be defined by

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an independent third party. Glass shall be examined according to European standards, unless otherwise mentioned, at a distance of 2 m perpendicular to the glass surface in normal daylight. Uniform light in fair weather without direct sunlight is considered as normal daylight.

7.2 Complaints shall be addressed primarily to the seller and secondarily to the manufacturer. Complaints shall be sent within 7 days from the reception of glass.

8. QUALITY ASSESSMENT

8.1 The quality of different glass products and different grades shall be assessed according to valid European standards. Some of the most important aspects are listed below. Further information can be attained from the standards mentioned in relevant clauses.

8.2 Float-glass, SFS-EN 572-2:

Single uncoated float glass shall not show disturbing distortions when examined at a distance of 4,5 m at 45°. Other defects shall be examined at a distance of 2 m perpendicular to the glass surface in normal daylight without reflections (scattered light). Defects in the form of lines and large areas or spot faults of/over \varnothing 3 mm are not allowed. The number of acceptable spot faults depends on the size of glass and the size of fault (\varnothing).

8.3 Thermally toughened safety glass, SFS-EN 12150-1 and 2:

The overall bow of the glass shall be less than 3 mm/1000 mm and the local bow less than 0,5 mm/300 mm. The edges can be treated in many ways, resulting to arrised edge, ground edge or polished edge.

8.4 Laminated glass and laminated safety glass, SFS-EN 12543 and SFS-EN 14449

Laminated glass may have spot faults. The number of acceptable spot faults of \varnothing 0,5 to 1 mm and \varnothing 1 to 3 mm depends on the number of interlayers and the total area of the pane. Faults over \varnothing 3 mm are not accepted. Line faults < 30 mm are allowed. Line faults over 30 mm are allowed when the total area of glass pane is > 5 m². Gaps and wrinkles in interlayers are not allowed in the visible area after installation, but they are acceptable in areas which are not seen.

8.5 Insulating glass units, SFS-EN 1279-1 2018:

According to the revised standard, the insulating glass units shall be observed at a distance of not less than 3 m from the inside to the outside and at a viewing angle as perpendicular to the glass surface as possible for up to one minute per m². Same distance (3 m) from the outside, taking into consideration the usual viewing distance. The viewing angle shall be as perpendicular as possible.

Air pressure and temperature may bend the glass and thus change the image reflected from the insulating glass unit. This is normal, because it only indicates the

integrity of the insulating glass unit edge seal. Visible impurities are not allowed when the glass is examined in the same way as float glass. Faults accepted for single glasses are also accepted for insulating glass units, which means that faults are likely to multiply. If a unit is composed of 3 or more glass panes with slightly different sizes or positions, the difference that is seen from aperture shall be not more than 3 mm up to an edge length of 2,5 m.

8.6 Other phenomena:

Opacity: Glass surfaces may be corroded by alkaline aqueous solutions with the result that the glass loses its gloss. Also, its transparency may decrease and the glass may look greyish. This opacity is not allowed. Even sodium ions (Na⁺) from the glass reacting with a smallest drop of water, e.g. condense water, may corrode the glass surface. This may happen if glass panes are stacked without any medium material between them.

8.7 Coated glasses may appear slightly opaque and glass panes may vary in colour in certain light, but this is typical of the product and thus is acceptable.

8.8 Interference colouration:

Float glass is transparent and colourless or colourful with flat parallel glass panes. Therefore, insulating glass units may show interference colouration resembling a rainbow, i.e. Brewster's fringes, or Jamini reflections (sometimes called a little bit incorrectly Newton's rings). This optical phenomenon is not considered a quality defect.

8.9 Anisotropic phenomenon:

In thermally toughened safety glass, the surface parts of the glass have different stresses than the inner parts of the glass, causing light to polarize (to deflect in two directions). This may appear as vague spots resembling "leopard pattern". This optical phenomenon is not considered a quality defect.

8.10 In certain circumstances, moisture may condense on the outer surface of insulating glass units with very low U-values (high thermal insulation). This physical phenomenon is not considered a product defect.

8.11 When the glass surface gets moist, e.g. due to condensation, areas of water droplets of different size may be seen on it. The droplet size depends on drop formation features. These areas may form defined patterns, e.g. stripes, rings, spots etc.

Over time, the behaviour of water molecules on the surface tends to change. Reasons for this are not known but some mechanical and chemical actions can change the surface characteristic towards a more hydrophobic or hydrophilic direction. Hydrophobic phenomenon increases the size of droplets while hydrophilic phenomenon causes water to spread all

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over the surface. These patterns are not visible when the surface gets wetter or dries out. It shall be ensured that glass surface is dry during examination.

9. IMPURITIES IN CAVITIES

If glass panes are to be permanently attached to each other, the glass surface shall be clean. There may be single insignificant particles on the surface but no larger areas or line of contamination or accumulation. Spots and lines are allowed if not visible when examining at > 2 m distance in normal daylight.

10. BREAKAGES OF GLAZED DOORS AND WINDOWS

The manufacturer or processor of glass is not responsible for breakages (single glass pane, insulating glass unit, laminated safety glass and toughened safety glass etc.) occurring after reception and beyond their influence. Examples of breakages beyond the manufacturer's or processor's influence are:

- Careless handling, storing and transport at the window factory, at the construction site etc.
- Bending of the window frame during installation and structural movement of the building
- Point load on the glass edge
- Impact or negligent opening against a stay fastener or child lock
- Damage caused during installation of venetian blinds
- Damage caused by nails during frame manufacture
- Abnormal overheating of glass due to unsuitable venetian blind or unfit glass structure
- Distinct shadows causing large differences in temperatures
- Window frames being too tight
- Sound barriers broken by aeroplanes
- Vibration caused by heavy vehicles, blasting work etc.
- Attaching of film, aluminium foils, tapes, adhesives or such to insulating glass units, even partially.
- Transport or storage in a horizontal position. Glass must at all times be transported, stored and carried in a vertical position and supported
- Wrong installation procedures

The manufacturer or processor is responsible for the breakage if it can be proven that the fracture originated from the manufacture of glass.

11. COMPENSATION

11.1 For condensation in cavities and the accumulation of dust, the terms of the guarantee are described below. In the case of defects detected after

the period of the guarantee or defects not specified in the terms of the guarantee, the general provisions of construction carpentry products 1994 are applied (Rakennuspuusepäntuotteiden kuluttajakaupan yleiset sopimusehdot 1994). For insulating glass units, request for repair or compensation under guarantee or any other declaration of fault has to be addressed primarily to the company who has supplied the product to the user (house factory, building contractor, window manufacturer or glass company).

11.2 Declarations of fault and claims for repair shall include the address of the object examined, contact information and, if possible, the following:

- The manufacturer of the unit, year of manufacture and brand mark
- Product markings including all possible special glasses
- The structural code of the insulating glass unit, glass thicknesses and cavity widths
- The number of units concerned
- Glass dimensions: width and height (in mm)
- The reason for the claim with a picture of damage
- The order number of initial supplier (date of order, if possible)

11.3 The glass or glass unit must be installed so that the glass can be replaced by removing the cover strips without damaging the strips. E.g. the removal or replacement of plaster or any kind of barrier is not covered by guarantee of the glass.

12. EXAMINATION OF DEFECT AND DAMAGE

The need for examination shall be assessed by the manufacturer of the glass product. When the examination is undertaken at the user's premises, a charge will be made to the declarer of claim in the following situations: when the manufacturer is not the same as in the claim, or the damage – or reasons for damage – are outside the field of the claim.

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13.1 Insulating glass units with double or triple glass are guaranteed for five (5) years by the manufacturer of insulating glass for its sealing (moisture and dust tightness), and moveable units are guaranteed for three (3) years, presuming the units are standards units for building purposes.

13.2 The product guarantee is valid from the date of reception. However, if the delivery relates to a project, the period of the guarantee will start from the date of reception of the contract work or the agreed-upon project. The manufacturer of the insulating glass unit is not responsible for damage if he can prove that the damage has resulted from an accident or similar event or has happened in conditions somebody else is responsible for.

The guarantee is valid only if:

- The fixing of the insulating glass unit corresponds to standards in force.
- The unit is not influenced by exceptional stresses, such as loads transmitted from structural part of the building,
- The frame of the unit and the sealing materials are continuously maintained according to the manufacturer's guidance.
- Glass surfaces are not painted, and no tapes, films etc. are attached to the surfaces.

13.3 The manufacturer of the unit shall be informed about all defects observed during the commissioning or during the examination at reception without delay. The product shall not be used without the permission of the supplier.

13.4 The guarantee of the new unit replacing the original defective item is valid for as long as the guarantee of the original defective item. Units other than those guaranteed by the moisture and dust tightness clause shall be supplied directly to the purchasing company or to the installation site of the unit.

13.5 For units with special structure and for units to be installed in special conditions, the guarantee is not valid in the following cases:

- when the glass is not float glass
- when the nominal width of the spacer is less than 6 mm or more than 15 mm and the nominal thickness of the glass is less than 3 mm
- when the nominal width of the spacer is less than 6 mm or more than 20 mm and the nominal thickness of the glass is 4 mm or more
- when the unit is not rectangular

- when the unit has been installed in special conditions (sauna, testing laboratory, cold store, factory etc.) influenced by exceptional temperature, moisture, pressure, vibration, radiation or chemicals, or the installation is not performed according to the installation instructions generally accepted. (SFS, SFS-EN standards, RT-files)

13.6 In order to maintain the functionality of the window throughout its useful life, the glazing and the structures surrounding the unit shall be kept in good condition. For wooden frames, inspections shall be made regarding surface finishing, sealing, window fittings and fixing of glazing beads and those parts shall also be serviced. Isolation and fixing of glazing shall be refurbished, when needed, and surfaces of wooden parts shall be re-processed.

13.7 For follow-up checks and servicing work of insulating glass units, the following shall be considered:

- The seal between the glass and the frame shall be restored, if needed.
- Fixing of glazing beads shall be repaired and surfaced or, if needed, renovated.
- The surfacing of the frame shall be renovated periodically.
- Good ventilation of the rebate space shall be ensured.

13.8 The manufacturer of the unit shall be informed about claims based on guarantee before the guarantee expires. Declarations of fault and claims for repair based on guarantee shall include the address of object examined, contact information and, if possible, the following:

- The markings on the unit (including year of manufacture, name of manufacturer or trade mark)
- The number of units concerned
- Glass dimensions: width and height (in mm)
- The reason for claim with a simple drawing of damage
- The order number of the original supplier and the date of order
- The structural code of the insulating glass unit

This English translation is from the original Finnish text. In case of conflict situation applies the Finnish terms.

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**This guidance is only for members of the Finnish
Association of Flat Glass.**