IGALE KODULE OMA
KODUAKEN

Annex no.3

VISUAL QUALITY OF GLASS PACKETS AND QUALITY REQUIREMENTS

Developed on the basis of materials by the Danish Glass Industry Collaboration Organisation (Glasindustriens Samarbeijdsorganisatsion - GS) and the German National Association of flat glass sales and glass packet production (Bundesverband Flachglas GroBhandel, Isolierglasherstellung, Veredlung).

Goal

The goal of this regulation of the visual evaluation of the quality of the glass packet is to harmonize the quality evaluation criteria applied by the Manufacturer and the Contracting entity to ensure customer satisfaction and the conformity of the corresponding quality requirements.

Manufacturer's liability

In case of a warranty claim in relation with the visual quality of the glass packet, based on the criteria described hereinafter, the Manufacturer undertakes to supply the Contracting entity's factory in Estonia replacement glasses free of charge. The satisfaction of warranty applications submitted by the Client in relation with the quality of the glass packet is carried out according to the regulation of the quality control issued by the Manufacturer; the Purchaser has no right to compensation for the replacement of glasses with visible defects detected during the delivery to the Client.

Submission of reclamations

The Contracting entity is obliged to check the delivered goods in regard to defects that may occur during the transportation and visible defects upon the receipt and submit the reclamation during a reasonable time (2 weeks) after the defect is discovered.

Requirements to cleanliness and quality

Glass is a product consisting of lime, quartz and sodium carbonate. Even if the raw materials are cleaned carefully, it is not possible to avoid total impurity in the end product. A glass packet is a product, manufactured with utmost care in a precise production process. There may be tiny scratches and impurity particles in and on the glass.

Complaints concerning impure glass are checked according to a procedure described below, by deciding whether the impurity on the glass is relevant, how much it depends on the natural features of the material and whether it is included in the range of the warranty application or whether it is so important that gives the right to be replaced by a new glass.

Evaluation criterion

The evaluated glasses have to be observed at 2.0m distance inside and crosswise with the checked glass surface.

Evaluation has to be carried out in the diffusive light (e.g. cloudy sky) without direct sunlight or artificial light.

Irregularities not seen at 2m distance are not handled as defects.

To check the exterior reflection the viewing distance from the glass has to be 5m.

Evaluation has to be carried out according to the corresponding product. For example, in case of security glasses, the special features have to be assessed from the beginning of the usage and installation. In case of certain specific features the peculiarities of the corresponding glass have to be considered.

Features of the glass product

In relation to the features of the glass product, including for example thermal insulation and sound transmission, certain criteria are established, presented according to the function, connected with test standards. Corresponding measuring results are sent in test reports. The features of glass products may differ due to the difference of glass measuring, the structure of the glass and exterior impact.

Glasses with cover

Glass packets with cover may have a "needle hole", which is a production defect allowed.
The general evaluation criteria of the "needle hole" are presented in table no. 3.
Evaluation criteria connected with reflection:
overshadowing, double pictures, nuance differences, deformations and distortions are allowed on the free surface of the glass. Deformations may occur in case of tempered glass.

Cast glass and ornaments

Defects of the cast glass or unity of pattern are regarded as acceptable deviation.
Defects of parallel wires may occur in armoured glass. The wire should not be oxidized.

The following irregularities are not subject to warranty:

*interference phenomena;
*double glass effect;
*anisotropies;
*condensed water on the exterior surfaces (the glasses are sweating);
*accumulation of moisture on the glass surfaces;
*built-in elements (lead glass, id of the alarm system, blinds, etc.);
*damage due to thermal tension is not the manufacturer’s liability.

Own colour

The glass products have their own colour, which depends on the raw materials and the thickness of the glass. Glasses with surface cover have their own colour, which differs while looking through the glass or observing the reflection. The own colour and the impression of

colour may differ also due to the thickness of the glass, the content of iron oxide, the type of layer and the process of applying the layer.

Glass packets with a decorative slat

Due to the environmental impact (i.e. double glass effect) or shaking or handmade vibration the decorative slats may cause a temporary rattling noise. Visible sawing cracks and smaller spots, where the paint has peeled off, are caused during production. The correctness of the right angle of the decorative slats has to be checked as well taking into account the production and installation tolerances and the general appearance. It is not possible to avoid the different length of the decorative slats in-between the glasses caused due to the fluctuation of temperatures.

Damage of the exterior surface

The reasons of mechanical or chemical damage of the exterior surface visible after the installation have to be established. Such complaints can be checked according to the given table. The mechanical or chemical damages of the exterior surface are usually not the manufacturer's liability.

Phenomena of interference

They occur in the form of uneven rainbow stripes. They are usually seen only when you look through the glass at some certain angle. In addition, it is characteristic that they can move if slight pressure is applied on the window. This phenomenon occurs in case of cast glass due to its extremely good smoothness and the parallel position of the glasses.

Light is a wave movement and the length of the daylight waves is 0.00035-0.00078mm. Daylight consist of numerous colours, possible to be seen if the light is guided through a prism, in which the light is separated into the colours of the spectre.

When rays of light move through the glass, then due to interior reflection some waves get a shorter or longer way of movement. When the waves meet again, their phase does not have to be similar any more and the unevenness corresponds for example to the wave length of the red colour, the red colour becomes more intensive (interference) and it is represented on the glass in the form of a red stripe. The same applies to the other colours of the spectre.

Double glass effect

Due to the fixing of the edges of the glass packet, they are filled with the air-gas mixture, which pressure depends on the air pressure and the air temperature at the production site. When glass packets are installed at other altitudes and temperatures and air pressure (high and low pressure), concavities or convexities of some glass may occur and optical distortions are inevitable.

Multiple reflections may occur on the surface of the glass packet. The phenomena are especially intensive when the surface behind the glass is dark or the glasses are with surface cover. This phenomenon is the law of physics, which is valid in case of all glass packets.

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Anisotropy

Anisotropy is a physical phenomenon in thermally processed glass caused due to the division of internal tension in the glass. Depending on the viewing angle it can be seen in polarised light and/or watching through dark circles/stripes of the polarised glass. Polarised light usually occurs in case of common daylight. The level of polarisation depends on the weather, altitude of the sun and the direction of it. The phenomenon can be observed under a small angle and in case of glass facades, which are under tensions in regard to each other.

Condensed water on exterior surfaces (sweating of glasses)

Condensed water occurs on the exterior surfaces of the glass when the temperature of the glass surface is lower than the surrounding temperature. The occurrence of condensed water on the exterior surfaces of the glass packets depends on the air humidity, the direction of wind and the temperature of the glass surface. The occurrence of the condensed water on the surface of the glass packet in side the room depends on high air humidity, strong window lights, curtains, pot plants, flower boxes, blinds and improperly installed radiators, etc. On the exterior surfaces of glass packets with high insulation capacity (small U value) condensed water may temporary occur on exterior surfaces when the air humidity outside is high and the temperature is higher than on the temperature on the surface of the glass packet.

Moisture on glass packets

The occurrence of moisture on the surface of the glass may vary and cause imprints made by rolls or fingers, i.e. by etiquettes, working with a suction device, putty residue, lubrication substances or environmental impact. Handling with greasy or other organic substances creates a thin water-resistant layer on the glass. Usually it is possible to remove them with common window cleaning substance. In case the stains are more persistent on the glass, forming a chemical bond with the surface of the glass, it is very difficult to remove them. It may be done by using some abrasive substance but later the glass has to be polished anew. If such pattern occurs on the surface of the glass due to condensate, it does not necessarily show that the glass is not of high quality. It does not influence the mechanical and physical features of the glass.

Built-in elements

The manufacturer shall hold no liability of compensation for added and/or built-in elements like posters, transparencies, lead glasses, alarm systems, blinds, etc. or damage to the glass packets when the damages are caused due to the above-mentioned added/built-in elements – compare with the warranty conditions provided for the valid warranty.

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	Visible irregularities allowed
Spindle area	Outer flat edge damages, which do not affect the strength of the glass and do not exceed the edge's closing width.
	Inner edge damages without loose fibres, filled with putty. Dot-shaped and flat
18 mm from the edge	Production residues and scratches are not considered to be defects. Edge damages are allowed as follows: With max width:
	1/2 of the glass thickness, length 10mm and depth 2mm. If the width of the splinter is smaller than 1/5
	of the glass thickness, the depth of 6mm is allowed.
Edge area	**Residues inside the glass - bubbles, spots, stains, etc:**
10% of the length of the glass edge measured from the edge of the glass	Area of the glass < 1 m2: max 4pc a´ ø 3,0 mm Area of the glass > 1 m2: max 1pc a´ ø 3,0 mm per one meter of the glass edge
	Production residues (on the surface) in between the glasses:
	Light grey or transparent allowed maximum 1pc < 3 cm2
	Scratches:
	Max 30mm x 2mm per one length, visible at 2m distance.
	The total length of all lengths max 90mm
	Hair scratches:
	Allowed but not in big quantity.
Inner area	**Interior residues, bubbles, spots, stains, etc.:**
	Area of the glass < 1 m2: max 2pc a´ < 2,0 mm ø
	Area of the glass > 1 m2 and <= 2m2: max 3pc a´ < 2,0 mm ø
	Area of the glass > 2 m2: max 5pc a´ < 2,0 mm ø
	Scratches:
	Max 30mm x 2mm per one length
	Total of single lengths max 90mm
	Hair scratches:
	Allowed but not in big quantity.
Edge area and inner area	Interior residues, bubbles, spots, stains and etc. with the size of 0,5 < 1,0mm are allowed irrespective of the area of the glass,
	but not in big quantity. Big quantity in a circle-shaped area with the diameter < 20cm at least
	4 interior residues, bubbles, spots, stains, etc.
	Laminated glass:
	1. Frequency of allowed visible defects in the edge area and inner area 50% per glass layer is bigger.
	2. In case of the cast laminated glass undulation caused in production may occur.
	Tempered glass:
	1. Max allowed location curvature 0,5mm per 300mm
	2. Max allowed general curvature 3mm per glass edge length 1000mm (valid to 6-15mm in case of cast tempered security glasses)
	Cast glass and ornaments:
	Casting defects, pattern unity defects are considered to be deviations allowed.

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Table no. 2

	Decorative slats and Wiener sprosses:
	Area of glass < 1 m2: location deviations +/- 1mm per packet slat
	Area of glass < 1 m2: location deviations +/- 2mm per packet slat

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	Glass covered with a layer
Area of the edge	**"Needle holes" in glass covered with a layer:**
	ø1mm - 1,5mm 5 pc/200mm
	Ø over 1,5mm is not allowed
Interior area	ø1mm - 1,5mm 5 pc/200mm
	ø over 1.5mm is not allowed