

Acceptable Glass Quality Standards

Scope

This document defines the level of acceptance for visible distortions in clear, tinted and coated glass in sealed double glazing units and in single glazed panels. Multi – layered glass, for example when two or more panels are laminated together, will increase the likely observance of visible distortions as the cumulative effect of each of the panels needs to be taken into consideration. Coating on glass, in particular solar controlled coatings, increase the reflective property of the glass and this can make the visual distortions more noticeable even though there is no more distortion present.

Objective

All glass supplied should be as free as possible from defects caused in manufacture, handling, storage and transit. However, the Customer shall accept glass with minor imperfections provided they fall within the scope of the following definitions and acceptance criteria. Glass which falls within these quality standards is not considered to be faulty goods.

Definitions

Viewing Distance – The distance from the observer's eye to the glass surface.

Edge Zone – A zone parallel to the edge of the glass, which extends round the perimeter of the glass, and is normally within the glazing frame or area.

Viewing Area – The area of the glass lying between the critical area and the Edge zone.

Scratch – A long narrow surface flaw produced by a hard object, e.g. grit, which produces a perceptible depression.

Sleek – A fine scratch with no perceptible depression.

Bubble – Small holes partially or wholly enclosed by glass which normally contain air. These may be spherical or non-spherical depending on the mode of formation.

Inclusion – In soluble matter retained within or on the surface of the glass during manufacture.

Scar – A scratch which is obtrusively visible being normally white in colour.

Method of Visual Inspection

The double glazed sealed unit is to be mounted vertically so that the whole surface can be seen. The double glazed sealed unit must be examined from the inside. The double glazed unit should be examined in natural daylight/overcast sky and not in direct sunlight with no visible moisture on the surface.

Viewing distance – A minimum viewing distance of 2.0 metres is to be used. Toughened, laminated or coated glass should be viewed from 2.0 metres.

Viewing position – A viewing position at right angles to the unit from room side.

Viewing aids – No visual aids other than spectacles for normal visual correction shall be used.

Visual focus – Vision to be directed at a point not less than 1 metre on the opposite side of the glass from the observer. This is to ensure that the glass is looked through and that the vision is not concentrated on the surface.

Edge Zone – 50mm around not covered by Method of Inspection

Acceptance Criteria

Minor defects/imperfections are to be accepted if they fall into the categories below:

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Seeds, blisters, hairlines or blobs are acceptable if they are no greater than 2.5mm.

White scars are not acceptable.

Defects within Viewing Area

Scratches and streaks which are not visible when examined as specified in Method of visual Inspection are to be accepted.

Bubbles and inclusions not greater than 2.5mm are acceptable provided such defects are at least 200mm apart.

Seeds, blisters, hairlines or blobs are acceptable if they are no greater than 2.5mm.

White scars are not acceptable.

Defects in Edge Zone

Scratches, streaks, bubbles, inclusions and scars are acceptable.

Condensation Patterning

Contaminates are often present on the surface of glass and are normally invisible to the naked eye. If condensation forms on the glass surface, then the contaminate becomes more apparent by influencing the rate of formation and appearance of the moisture. The variation in appearance maybe random or present itself in distinctive patterns. Fingerprints are the most common contaminate which creates a hydrophobic layer can produce these effects.

Window cleaning chemicals or degreasing agents are normally enough to remove most contaminates.

The pattern formed by condensation on glass surfaces do not, therefore indicate any fault, nor do they have any effect on the performance of the glass and are considered acceptable.

Optical Phenomena

Roller wave distortion occurs as glass passes over the rollers in horizontal, oscillating heat treatment furnace. As the glass heats up, it may sag between the rollers at the reversal of each oscillation, which then becomes set in place during the cooling process. This may produce roller wave distortion in the finished product.

Roller wave distortion can create a reflection in heat treated glass that can stretch and compress based on the observer's movement in relation to the glass surface.

Brewster's Fringes occur when wavelengths of light meet when they are exactly 180 degrees out of phase and is a result of modern glass manufacturing methods.

Edge Bow occurs as a result of the heat treatment process and can be reduced through the correct

control of the heating and cooling processes.

Distortions are an inherent characteristic of glass and there are currently no Industry Standards relating to the acceptability of levels of distortions with the exception of bow, which is determined in EN12150.

- **Nickel Sulphide Inclusion**

Nickel Sulphide Inclusion (NIS) is a naturally occurring phenomenon in toughened glass. Glass can be heat soaked which reduces the risk of NIS but cannot guarantee to eliminate it completely. UNDER NO CIRCUMSTANCES IS GLASS BREAKAGE DUE TO NIS COVERED BY GUARANTEE.

- **Switchable Blink Glass**

In addition to the general guidelines above, the following matters should be borne in mind when ordering switchable blink glass.

Very small bubbles and/or visual distortion may be present on clear/non switchable areas around notches/holes/cut outs, therefore a provision must be made for coverage of 10mm around all notches/holes/cut outs. Bubbles and distortion of this nature are acceptable.

An element of haze is present in all smart type LCD switchable privacy glass products, even in its transparent state. The level of haze must be checked before ordering as haze will not be accepted as a defect.

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