

## Quality Evaluation Criteria

### Glass products manufactured by Pilkington IGP Sp. z o.o.

#### General Provisions

According to the "Sales Conditions" and "Standard Warranty General Conditions for Insulating Glass Units Manufactured by Pilkington IGP Sp. z o.o." – the buyer is responsible for filling in the Acceptance Report about any noticed scratches, breakage or other mechanical defects of the delivered insulating glass units and/or single glass panes. Lack of such notes in the Acceptance Report may be the basis for rejection of possible complaints by Pilkington IGP Sp. z o.o. and other claims resulting from the presence of such defects.

#### Insulating Glass Unit and Single Glass Panes Quality Evaluation Methods

The insulating glass units and single glass panes produced by Pilkington IGP Sp. z o.o. should be evaluated according to the methods provided in the European/Polish Standards applicable to the specific type of product. List of the Standards – see section 9.

**According to the above mentioned Standards, the evaluation of presence of defects is performed with the glass in a vertical position, from a distance of at least 2 metres, on a grey screen background, and with bright scattered lighting. Any glass defects visible in such conditions when observed at the right angle – are subject to evaluation for conformity with the requirements defined in the above mentioned standards.**

#### Insulating Glass Units and Single Glass Panes Quality Evaluation Criteria

##### 1. Permissible glass defects in insulating glass units and single glass panes

Defect name	Main area	Edge area (strip along the glass pane edges of 10% width of the glass unit dimension)
Hair scratches	permissible, but not in clusters	permissible, but not in clusters
Scratches	permissible a single scratch of 15 mm length, sum of all lengths of all scratches must not exceed 15 mm	permissible a single scratch of 30 mm length, sum of all lengths of all scratches must not exceed 90 mm
Spot defects		
<ul style="list-style-type: none"> <li>• &lt; 0.5 mm</li> <li>• &lt; 1.0 mm</li> <li>• &lt; 2.0 mm</li> <li>• &gt; 2.0 mm</li> </ul>	<ul style="list-style-type: none"> <li>permissible</li> <li>permissible, but not in clusters</li> <li>2 spots per m<sup>2</sup>, max. 5 spots</li> <li>not permissible</li> </ul>	<ul style="list-style-type: none"> <li>permissible</li> <li>permissible, but not in clusters</li> <li>1 spot per 1 m of length of one glass panel side</li> <li>not permissible</li> </ul>

## 2. Glass soiling

No dirt visible from a distance of 2 metres is permissible inside the insulating glass unit.

## 3. Dimensions and thickness tolerances of insulating glass units

Parameter	Permissible tolerance
dimensions	+2.0/-1.0 mm
thickness	± 1.0 mm (annealed glass) ± 1.5 mm (toughened glass, laminated glass, texture glass)
diagonal difference	< 2 mm/m
glass pane offset	< 2.0 mm

## 4. Chips, nicks, edge defects

Glass defects such as edge chips are permissible up to 2 mm or 20% of the glass thickness, while individual chips can be up to 6 mm. Cracks, even minor – are not permissible and should be reported at glass receipt.

## 5. Glass type

Any deviation from the glass product types specified in the purchase order is considered as a product fault.

## 6. Defects - Muntins / Georgian bars

Decorative elements can be installed inside an insulating glass unit at the buyer's request. The type, colour, geometry of elements are according to the purchase order. The evaluation method regarding the accuracy and quality of these elements is the same as for the entire insulating glass unit – see sections 1 – 3.

From time to time, the decorative element may move within the unit, e.g. through opening or closing or when a heavy load vehicle passing by. In order to reduce the potential of damage to either glass or muntin, silicone spacer pads are applied as standard at the muntin junction points.

## 7. Spacer bar defects

The internal surfaces of the spacer bars should be clean. In standard insulating glass units the distance between spacer bar and a glass edge should not exceed 13 mm, and the variation of the distance from the glass edge at one side of insulating glass unit should not exceed 2 mm.

## 8. Loss of tightness

This is an insulating glass unit defect which occurs when the internal space between the insulating glass unit panes loses its tightness and allows gas and moisture exchange. A sign of such a fault is visible by permanent or periodic condensation on the internal surfaces of the insulating glass unit panes, or water collecting at the bottom of the insulating glass unit.

According to the "Standard Warranty General Conditions for Insulating Glass Units Manufactured by Pilkington IGP Sp. z o.o." the manufacturer provides warranty for tightness of the delivered insulating glass units. The standard warranty period for insulating glass unit tightness is:

- 5 years for rectangular shape insulating glass units,
- 2 years for non-rectangular shape insulating glass units.

The Warranty covers only the cases where the tightness was lost due to material or workmanship defects of the delivered insulating glass units, if the defects can be attributed to the Pilkington IGP Sp. z o.o.

It should be emphasised that only the water vapour condensation (dew) visible on the internal surfaces of insulating glass unit panes can be considered an insulating glass unit defect. Such dew cannot be removed by wiping the glass panes dry.

However, it is quite a common effect that water vapour condenses on the insulating glass unit surfaces towards the inside of the room or outside of the building – this is a natural effect which occurs when air humidity is high and the glass temperature is lower than that of the ambient air. Such dew can be removed by wiping the glass panes dry.

The water vapour condensation on the external surfaces of insulating glass units is not considered as an insulating glass unit defect and is not covered by the warranty provided by Pilkington IGP Sp. z o.o.

#### **9. Product quality evaluation methods in European/Polish Standards:**

- for insulating glass units: PN EN 1279-1 "Glass in building. Insulating glass units. Part 1. Generalities, dimensional tolerances and rules for the system description."
- for toughened glazing panels: PN EN 12150-1 "Glass in building. Thermally toughened soda lime silicate safety glass. Part 1: Definition and description."
- for glass panes made of float glass: PN EN 572-8 "Glass in building. Basic soda lime silicate glass products. Supplied and final cut sizes."
- for glass panes made of coated glass: PN EN 1096-1 "Glass in building. Coated glass. Part 1: Definitions and classification."
- for glass panes made of laminated glass: PN-EN ISO 12543-6 "Glass in building. Laminated glass and laminated safety glass. Appearance."
- for glass panes made of heat strengthened glass: PN EN 1863-1 "Glass in building. Heat strengthened soda lime silicate safety glass. Part 1. Definitions and description."
- for glass panes made of heat-soaked glass: PN EN 14179-1 "Glass in building. Heat-soaked thermally toughened soda lime silicate safety glass. Part 1. Definition and description."

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