1. Introduction

1.1. Subject of the standard

The standard contains information on acceptable surface quality deviations and presents the criteria for assessing these deviations. This assessment is related to visual inspection of the following surface types:
- lacquered,
- veneered,
- anodized,
- extruded profiles,
- aluminium and steel profiles made in forming processes,
- transparent glazed surfaces (single- or double-glazed panels)

1.2. Scope of application

The standard applies to the following types of surfaces:
- veneered „sandwich" type panel surfaces
- veneered surfaces of extruded and bent aluminium profiles
- veneered surfaces of extruded and bent PVC profiles
- painted „sandwich" type panel surfaces
- painted surfaces of extruded and bent aluminium profiles
- painted surfaces of formed aluminium profiles
- painted surfaces of formed steel profiles
- galvanized surfaces of formed steel profiles
- raw surfaces of formed aluminium profiles
- anodized surfaces of aluminum profiles,
- transparent glazed areas in products (sealed glazing units, glazed sections of garage doors, etc.).
- welded and crimped profile surfaces

1.3. Surfaces of the products

Types of surfaces described in section 1.2 are featured in KRISPOL/KRISHOME products:

2. Assessment criteria

2.1. A method of conducting the visual inspection

The assessment should be made by looking at the analysed surface positioned vertically at an angle of 90º, from a distance specified in the table below. The inspection shall be carried out on a closed product in natural daylight, but not in direct sunlight. During the inspection do not use any magnifying devices or sources of strong light (e.g. halogen lamps, flashlights). The analysed surface must be completely dry.

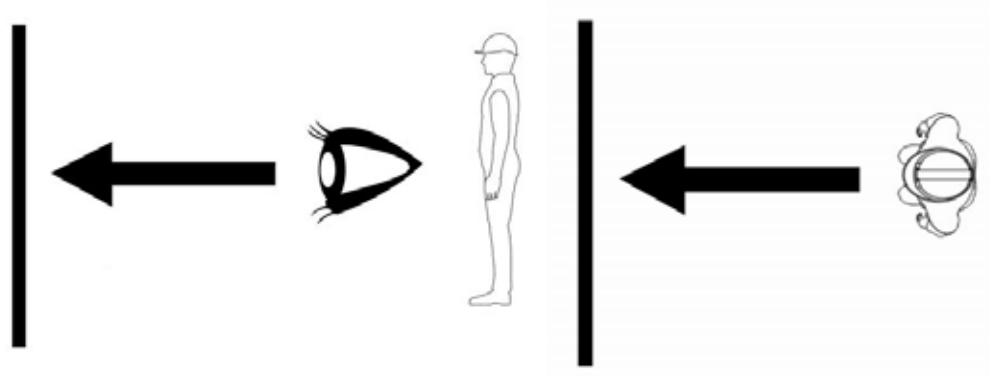


Table with distances of inspected product sample, depending on the surface and product types.						
Type of the surface	**K2 R** sectional garage doors	**RGZ/RGW** rolling garage doors	**K2 I** sectional industrial doors	**R1/R2** industrial rolling doors and grates	**ALU/FEN** joinery ALU/PVC EXT./INT.	**R/Z** external rollers shutters/blinds
„sandwich" type veneered panel surfaces	2 m	2 m	2 m	×	1 m / 1 m	×
veneered profile surfaces	2 m	2 m	×	×	2 m / 1 m	2 m
„sandwich" type painted panel surfaces	3 m	3 m	3 m	3 m	1 m / 1 m	×
painted profile surfaces	3 m	3 m	3 m	3 m	2 m / 1 m	2 m
galvanized surfaces of formed steel profiles	2 m	×	2 m	2 m	2 m	×
raw surfaces of formed aluminium profiles	3 m	×	3 m	3 m	3 m	3 m
anodized surfaces of aluminum profiles	3 m	×	3 m	3 m	3 m	3 m
glazed surfaces of the products	2 m	2 m	2 m	2 m	2 m / 2 m	×

All flaws are evaluated using the distances given in the table above.

2.2. Criteria for assessing different types of surfaces

2.2.1. Veneered surfaces

The surfaces relevant to the visual or utility aspect of the product are subject to assessment. The assessment shall cover abrasions, inclusions, bubbles and excessive matting of veneered coating.

The surfaces which are dark, matted or discoloured, as a result of installation in locations exposed to strong sunlight should not be subject to the assessment.

2.2.2. Painted surfaces

The surfaces relevant for the visual or utility aspect of the product are subject to the assessment. The assessment shall cover insufficiently painted areas, chipping, scrapes, inclusions, bubbles, flaking paint, discolouration, excessive matting of lacquered surfaces, excessive roughness, stains and scratches. The coating should have a uniform colour and gloss - visual inspection is allowed, which compares gloss of the sample at the same angle as of a reference sample.

To verify colours, only use the Krispol K5 RAL colour chart or a spectrometer. Colour differences shall be evaluated using the above measuring device in accordance with the guidelines of the following standards:

PN-EN ISO 3668:2002 - Paints and varnishes - Visual comparison of the colour of paints
PN-ISO 7724:2003 - Paints and varnishes - Colorimetry - Parts 1-3
PN-EN ISO 11664:2011 - Colorimetry - Parts 1-5

2.2.3. Galvanized surfaces after forming

The surfaces relevant for the visual or utility aspect of the product are subject to the assessment.

The assessment shall not cover the tarnish on galvanized surfaces, which consists mainly of zinc oxide or zinc hydroxide formed as a result of a long-term storage or use in humid conditions. The assessment shall not cover damage resulting from extreme natural phenomena, contact with aggressive media or from external factors such as salts, alkalis, acids.

2.2.4. Raw aluminium surfaces after forming

The surfaces relevant for the visual or utility aspect of the product are subject to the assessment.

The assessment shall not cover the tarnish on elements, which was formed as a result of a long-term storage or use in humid conditions. The assessment shall not cover damage resulting from extreme natural phenomena, contact with the aggressive media or from external factors such as salts, alkalis, acids.

2.2.5. Anodized aluminum surfaces

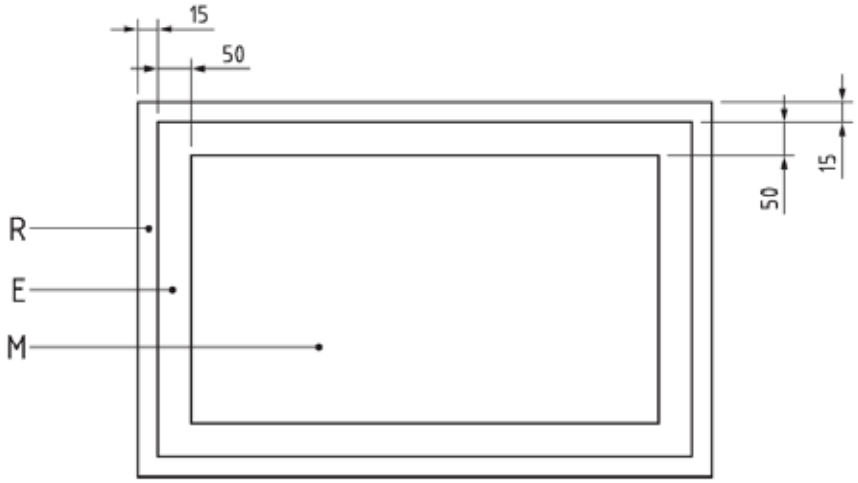
Any areas relevant to the visual aspect or usability of the product are assessed.

The assessment does not cover elements tarnished due to the storage or operation in long-persisting damp conditions. The assessment does not cover damage caused by extreme natural phenomena, an aggressive environment or exposition to the factors such as salts, lye, acids.

2.2.6. Glazed surfaces

Any areas relevant to the visual aspect or usability of the product are assessed. The assessment covers of scratches, chipping and point defects with a diameter greater than 2 mm. Any cracks caused by thermal or mechanical external factors resulting from improper assembly or operation are not subject to the assessment.

The qualitative assessment of the packages is carried out on the basis of the figure below for each zone separately. The main and edge zones are determined according to the given dependencies.



R – edge zone – 15 mm, usually covered with a frame or corresponding to the edge sealing (in the case of an unframed edge)
E – perimeter zone - 50 mm wide, at the periphery of the visible area
M – main zone

Correct inspection of the glazing unit is based on the assessment from a distance of **2.0 m** at a right angle in daylight (avoiding direct sunlight) or against a gray screen in bright diffused lighting.

Is the defect visible from a distance of **2 meters** under natural lighting? — **YES** → The defect is analyzed further in accordance with the **PN-EN 1279-1** standard

Is the defect visible from a distance of **2 meters** under natural lighting? — **NO** → The glazing complies with the **PN-EN 1279-1** standard, the defect does not qualify for recognition

Further inspection according to the table below

PERMISSIBLE NUMBER OF POINT DEFECTS (e.g. blisters, pebbles, „grains", lack of coating)					
Dimension of the defect without the envelope		**Glass area S (m²)**			
ZONE	**Ø in mm**	**S ≤ 1**	**1 < S ≤ 2**	**2 < S ≤ 3**	**3 < S**
R	All dimensions	No limits			
E	Ø ≤ 1	Acceptable if less than 3 pieces for every area Ø ≤ 20 cm			
	1 < Ø ≤ 3	4	1 for each meter of circumference		
	Ø > 3	Not permitted			
M	Ø ≤ 1	Acceptable if less than 3 pieces for every area Ø ≤ 20 cm			
	1 < Ø ≤ 2	2	3	5	5 + 2/m²
	Ø > 2	Not permitted			

PERMISSIBLE NUMBER OF POINT RESIDUES IN THE FORM OF DOTS / POINTS AND / OR STAINS (e.g. grains, dirt, stains, etc. after the production process)			
Dimensions and type of the defect		**Glazing area S (m²)**	
ZONE	**Ø in mm**	**S ≤ 1**	**1 < S**
R	All dimensions	No limits	
E	Points / Dots Ø ≤ 1	No limits	
	Points / Dots 1 < Ø ≤ 3	4	1 for each meter of circumference
	Plama Ø ≤ 17	1 pcs	
	Points / Dots Ø > 3 and stain Ø > 17	Max. 1 pcs	
M	Points / Dots Ø ≤ 1	Max. 3 pcs for every area Ø ≤ 20 cm	
	Points / Dots 1 < Ø ≤ 3	Max. 2 pcs for every area Ø ≤ 20 cm	
	Points / Dots Ø > 3 and stain Ø > 17	Not permitted	

ACCEPTABLE NUMBER OF LINEAR / ELONGATED DEFECTS (e.g. hairline scratches ≤ 0.15 thick; normal scratches)			
ZONE	**Type of defect**	**Length od individual defects (mm)**	**Total length of individual defects (mm)**
Whole surface	Hairline scratches ≤ 0.15	No limits	
R	Other linear / elongated defects	No limits	
E		≤ 30 mm	≤ 90 mm
M		≤ 15 mm	≤ 45 mm

Insulating glazing units other than made of two panes of monolithic glass. The permissible number of defects is increased by 25% for each additional glazing component (e.g. a two-chamber glass pane by 1.25)

DEFINITIONS:

Point defect - a spherical or semi-spherical disturbance of visual transparency when looking through glass. It may have a form of a solid or gaseous inclusion in insulating glass units. These types of defects include blisters (gas inclusions), pebbles and „grains". They are assessed in terms of the number of defects and their size.

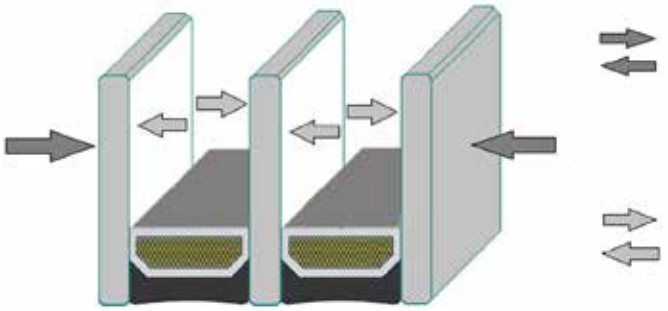
Residue / dirt - material remaining on the surface of the glass having a form of a stain or „patch", also inside insulated glass.

Envelope - refers to locally distorted area, usually around a point defect when the defect is within the glass pane.

Stain / damp patch - a defect larger than a point defect, often irregularly shaped, partially with a speckled structure, e.g. a fingerprint.

Linear / elongated defects - defects that may appear on the glass surface or inside the glass in the form of tarnish, scratches or marks, extending over a specific length or surface. These are defects with dimensions greater than the other defects' dimensions, e.g. a scratch.

Determination of the location of the defect in the glazing unit



Scratches / damages on the outside of the package:
Palpable under the fingernail (assessment according to the terms of cooperation).

Scratches / damages inside the packet:
Undetectable under the fingernail.

Fig. Three-pane two-chamber package

2.2.7. Corner connections

The surfaces that are important in terms of the visual aspect are subjected to the assessment. Defects visible from a distance of not less than 0.5 m shall be subjected to assessment. The finished joint must not have any discontinuities or inclusions.

Dimensional deviation of visible, joined surfaces of profiles must not be greater than:
a) 0.6 mm for welded PVC profiles
b) 0.2 mm for aluminium crimped profiles

3. Acceptable deviations / aspects not constituting a product defect

3.1. Veneered surfaces

For bright colours, a single surface abrasion point with a diameter of up to 5 mm is permitted. Should a flaw be noticed, it should be measured with a suitable measuring device (millimetre scale/ rule). Slight colour variations in veneer coatings in the area of the same veneer pattern are permitted. Due to their properties and the mode of distribution of the wood rings, wood-like colours may exhibit minor differences in structure. No flaws of visible surfaces are permitted on patternless veneers. Should a new product be installed close to a product installed earlier, differences in the structure, colour, tone and shine are permitted. If a product is closed, surfaces that are not visible may differ from visible surfaces.

3.2. Painted surfaces

A single intrusion – a point defect – is permitted at a diameter up to 1 mm per 2 r. m. of panels. For bright colours, a single surface abrasion point with a diameter of up to 5 mm is permitted. Should a flaw be noticed, it should be measured with a suitable measuring device (millimetre scale / rule). Component colour differences for various materials or materials manufactured using different technologies are permitted. Differences in colour tone of varnished components are permitted should they stem from different production lots. Should a new product be installed close to a product installed earlier, differences in the structure, colour, tone and shine are permitted. If a product is closed, surfaces that are not visible may differ from visible surfaces.

3.3. Galvanized surfaces after forming

Cut edges not secured in the factory or made during installation (ends of lines, opening edges, etc.) situated within a distance of 10 mm from the cutting line are excluded from the assessment. The assessment shall not cover galvanized elements with defects resulting from operation which do not exceed 0.5% of the total surface area. Loss of gloss occurs in direct proportion to exposure to the sun, stains and discolouration is possible (not subject to assessment).

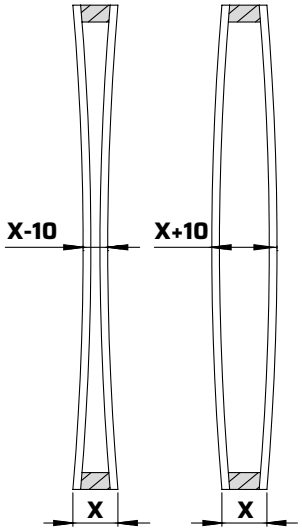
3.4. Raw aluminium surfaces after forming

Cut edges not secured in the factory or made during installation (opening edges, etc.) situated within a distance of 10 mm from the cutting line are excluded from the assessment. The assessment shall not cover aluminium elements with defects resulting from operation which do not exceed 0.5% of the total surface area. Loss of gloss occurs in direct proportion to exposure to the sun, stains and discolouration are possible (not subject to assessment).

3.5. Anodized aluminum surfaces

Cut edges not protected in the factory or made during the assembly (edges of holes, etc.) within 10 mm from the cutting line are excluded from the assessment. Aluminum elements with defects arising during use do not exceed 0.5% of the total area are not subject to the assessment. The loss of gloss occurs in direct proportion to the sun exposure; the occurrence of stains and discoloration is also possible (and not subject to assessment). The occurrence of defects resulting from production processes is allowed, such as: visible die lines, visible processing lines, scratches and streaks.

3.6. Glazed surfaces



Condensation of water vapor appearing on the outer surfaces of the glazing units inside and outside of the building is allowed. It is a natural phenomenon that occurs when the air humidity is high and the glass temperature is lower than the ambient air (the so-called dew point). In the case of PMMA glazing, evaporation is acceptable inside the glazing. The absorption of moisture from the air results from a number of factors and their combinations. The main reason is moisture diffusion (moisture infiltration) caused by pressure, air humidity, temperature and condensation point. In PMMA glazing units, stand-offs are used, the number of which depends on the dimensions and shape of the glazing.

A gap in the joining of inter-pane frames is allowed provided that it does not exceed 1 mm. External damage to the glass edge and nicks are acceptable, provided that it does not affect the strength of the glass and does not exceed the width of the insulating glass sealing (EN1279-1: 2018 F.6).

Changes in the perception of color are permissible, as they may result from the iron oxide content in the glass, the coating process, the thickness of the glass, pane structure and pane coating.

Variations in the color of the insulating glass unit are allowed; facades made of insulating glass containing coated glass may have different shades of the same color. The described phenomenon can be magnified when we observe the glass at an angle. Possible reasons for color variations include slight variations in the color of the substrate to which the coating is applied and slight variations in the thickness of the coating itself. In the case of insulating glass made of float glass, interference effects can cause the appearance of spectral colors. Optical interference is caused by the superposition of two or more light waves at one point and is not a defect.

Optical distortion of the glass pane resulting from the place where the window is installed is acceptable if the insulating glass unit is installed at a different height or when the temperature or barometric pressure changes in place are higher or lower than in the place where the insulating glazing is produced, as the panes tilt inwards or outwards causing a specific deflection effect. When insulating glass is installed above 700 m above sea level or if the relative height difference between the production site of the glazing unit and its installation site is greater than 500 m, it is recommended to perform pressure compensation. This will reduce the concavity / convex effect of the insulating glass units and reduce the risk of glass breakage, keep this in mind when ordering.

Iridescence, or anisotropy, is not a product defect. When viewed under polarized light of a thermally toughened soda lime silicate safety glass, the stress areas appear as colored zones, sometimes called „leopard spots". Light polarization occurs in normal daylight. The degree of light polarization depends on the weather and the angle of the sun's rays. The birefringence effect is more pronounced when viewed at an angle or through polarized glasses.

Marks formed on the surface of the glass caused by water / moisture condensation are known as „drip patterns" / suction cubs are not a glass defect. They are formed due to the presence of microscopic silicone deposits on the glass surface, which decompose over time.

Thermal cracks are not a product defect; thermal stress cracks occur in the event of sudden changes in the temperature of the glass. The risk of thermal cracks increases in installations where there is high partial shading (e.g. through curtains, blinds, posters, furniture, stickers, etc.). In the areas where curtains are used and where heaters or air conditioners are directed directly at the glass, films are applied on the glass.

3.7. Exclusions from the assessment

Coated surfaces exposed to air temperatures lower than -25ºC and higher than +55ºC are excluded from the assessment. Painted and veneered surfaces manufactured from different production batches may reveal differences between colour, colour tone, texture and gloss. According to operational characteristics the rolling process of the garage door shell / rolling grille / external roller blind may cause abrasion of the panel / profile coating, which is a natural phenomenon and is not subject to assessment. The above phenomenon may occur after approx. 200 cycles.

During operation of sectional garage doors, due to permitted dimensional deviations of panels, thermal expansion and operational parameters, abrasion of garage door segments is natural in the areas of connecting locks and it shall not be assessed. Due to operational parameters of garage doors, grilles, shutters, windows and doors, their contact surfaces with seals may reveal some abrasions of coats, which is a natural phenomenon and is not subject to assessment. All visual defects which, after installation of the product are not visible shall not be assessed.