CRITERIA

VISUAL EVALUATION

CONTENTS

1. Introduction

1.2 Subject of the Instruction

The instructions contain information on the criteria for visual assessment of surfaces, taking into account national and European requirements as well as the guidelines of system providers and manufacturers of the structures being assessed.

1.2 Scope of application

The instructions apply to the following types of surfaces and connections: • painted surfaces, • veneered surfaces, • anodized surfaces, • extruded system supplier profiles, • steel and aluminum profiles together with their surfaces, • wooden profiles together with their surfaces, • transparent glazed surfaces (single and insulating glass), • welded PVC corner connections, • aluminum corner connections, • wooden corner connections, • connections of additional elements (extensions, connectors, main and additional profiles).

1.3 Scope of occurrence in products

The types of surfaces described in point 1.2 are found in the products of Fenbro Sp. z o.o.

2. Evaluation criteria

The assessment should be made by looking at the tested surface at a vertical angle of 90°, from the distance specified in Table 1. The inspection is carried out with the naked eye on closed products (finished, manufactured) or semi-finished products, in natural daylight, but not in a place exposed to direct sunlight. During the test, no magnifying devices or sources of intense light (e.g. halogen lamps, flashlights) may be used. The tested surface must be completely clean and dry.

2.1. How to perform a visual inspection

Drawing showing the position for visual assessment

2.2. Criteria for assessing different types of surfaces

Distances from the controlled sample depending on the surface and product

	Types of products					
Type of surface/connection	Profile PVC	Aluminum and steel gates	Sectional doors	Aluminum products	Wooden products	Fences
Varnished	1 m	1 m	1 m	1 m	1 m	2 m
Veneered	1 m	1 m	1 m	1 m	1 m	2 m
Anodized	1 m	1 m	1 m	1 m	1 m	2 m
PVC extruded profiles	1 m	1 m	1 m	1 m	1 m	2 m
Steel and aluminum profiles	1 m	1 m	1 m	1 m	1 m	2 m
Wooden profiles	1 m	1 m	1 m	1 m	1 m	2 m
Glazed surfaces	2 m	2 m	2 m	2 m	2 m	2 m
PVC corner connections	1 m	1 m	1 m	1 m	1 m	2 m
Aluminum corner connections	1 m	1 m	1 m	1 m	1 m	2 m
Wooden corner joints	1 m	1 m	1 m	1 m	1 m	2 m

2.2.1 Painted surfaces

The surfaces (of a given assessed element) that are significant from the point of view of the visual aspect or usability of the product are assessed. Cases such as: unpainted, chips, inclusions, blisters, lack of paint adhesion, colour changes, excessive dullness of the varnished coating, excessive roughness, streaks, scratches are eligible for assessment. The coating should have an even colour and gloss. A visual assessment is permitted, but the gloss should be comparable from the same angle with the reference sample. The wood grain is not subject to visual assessment. The installation of wooden joinery before performing the so-called wet works (e.g. screed) is not subject to visual assessment. Only the RAL palette sample should be used for colour verification. Colour differences will be assessed using the aforementioned sample and in accordance with the guidelines of the following standards:

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

2.2.2 Anodized zinc surfaces

The assessment covers surfaces that are important from the perspective of the visual aspect or usability of the product. The assessment does not cover blooms on elements that have been caused by storage or use in long-term damp conditions. The assessment does not cover damage caused by extreme natural phenomena, contact with an aggressive environment or the action of external factors such as salts, alkalis or acids. The colour of the oxide coating on aluminium depends on the type of input material. The type and content of alloy components in the material, as well as the conditions of obtaining the product, have an impact here. The most uniform coatings are obtained from materials that have been mechanically deformed or subjected to temperature homogenisation. The use of high-alloy materials causes the coatings to become grey. Improper homogenisation of alloys promotes the formation of stains of various colours on the surface.

2.2.3 Glazing

Glazing, glass and glass fillings are subject to visual assessment,

according to the point "Visual assessment" in the document Quality Assessment Criteria for Insulating Glass.

The full document Quality Assessment Criteria for Insulating Glass is available at:

Document available at the Producer’s website

Glazing should also be checked with regard to the following points:

• Construction of insulating glass • Applications of special glass • Markings of insulating glass • Visual assessment • Assessment of the performance of spacer frames • Assessment of the performance of internal glazing bars

Physical phenomena occurring in glass (Excluded from the qualitative and visual assessment):

• Glass deflection – distortion of image reflection • Moisture condensation on glass surface • Variable wettability phenomenon on glass surface • Color deviation – natural color • Glass cracking • Phenomena on tempered glass (anisotropy, roller waviness, roller reflection, spontaneous glass breakage)

2.2.4 Veneered surfaces

Surfaces that are important for the visual or functional aspect of the product are assessed. Cases of inclusions, blisters, peeling veneer, dents and excessive dullness of the veneer coating are eligible for assessment. Dark, dull or discoloured surfaces as a result of installation in places exposed to strong sunlight are not assessed.

2.2.5 Raw aluminum surfaces

Unprotected factory cut edges or those made during assembly (hole edges, etc.), located within 5 mm of the cut line, are excluded from the assessment. Aluminium elements on which defects created during use do not exceed 0.5% of the total surface are not subject to assessment. Loss of gloss occurs in direct proportion to exposure to the sun; stains and discolouration may occur (not subject to assessment).

2.2.6 Glazed surfaces

Condensation of water vapour is permissible, appearing on the external surfaces of glazing units, facing both the interior of the room and the exterior of the building. This is a natural phenomenon that occurs at increased air humidity and a glass temperature lower than the ambient air (so-called dew point).

Glazing deformation consisting of a concavity or convexity of the surface greater than 10 mm is not permitted.

The presence of dirt in the space between the panes is permitted.

2.2.7 Visual assessment of door and window joinery

The visual assessment of the joinery should be performed in accordance with the division into designated observation planes, taking into account the specified level of significance. The divisions are presented in the table below. Construction elements that are invisible after assembly are not subject to visual assessment.

Determining the importance of individual planes		
Plane "A"	**Plane "B"**	**Plane "C"**
High importance of the assessed surface, representative side of the structure.	Average significance of the assessed surface, representative side (highly dependent on the installation location)	Low value of visual assessment – limited representativeness of the assessed structural planes.

Plane "A"	**Plane "B"**	**Plane "C"**
Inner plane	Outer plane	Profile core area eye mounting location
The assessment should be carried out at closed and assembled structure, after removing assembly dirt. The following are assessed: - welded joints, - profile surfaces, - glass panes, - visible fitting elements, - door handles.	The assessment should be carried out after installation structure and removing assembly dirt. The following are assessed: - welded joints, - profile planes, - windows, - external technological holes	The assessment should be carried out with an open construction, it includes: The following are assessed: - welded joints in core parts, - fitting elements, - internal technological holes

Permissible surface defects when assessed visually from a distance of 1 meter

Plane	„A”	„B”	„C”
Mechanical damage	Minor spot damage: not exceeding 1 mm per section of 1 running meter – maximum 2	Minor spot damage: not exceeding 2 mm on section of 1 running meter – maximum 4	Minor spot damage: not exceeding 2 mm on section of 1 running meter – maximum 6
Dent longitudinal	Acceptable if they are palpable but not visible and do not havesharp edges	Acceptable if they are palpable but not visible and do not have sharp edges	Acceptable if they are palpable but not visible and do not have sharp edges
Meltdowns	With dimensions ≤ 1 mm – maximum 2 on a section of 1 m.b	With dimensions ≤ 2 mm – maximum 4 on a section of 1 running meter.	With dimensions ≤ 3 mm – maximum 6 on a section of 1 m.b
Thickening	With dimensions ≤ 1 mm – maximum 2 on a section of 1 running meter.	With dimensions ≤ 1 mm – maximum 2 on a section of 1 running meter.	Not applicable

In addition, the fit of the joints and frame extensions allows for a tolerance of 1 mm per 1 m for the fit of additional profiles, as well as the deviations resulting from this. If the permissible tolerance does not affect the functionality of the joinery, it is not subject to assessment.

All special structures requiring non-standard processing, such as models, arches or angle windows, should be assessed first in terms of functionality, and then in terms of aesthetics and quality of connections.

Glazing beads and the phenomenon of thermal expansion, known as the lens effect, are a natural feature of all materials. This phenomenon cannot be completely eliminated, but its scale can be minimized. According to the European standard EN 12608, the permissible change in the length of PVC profiles due to temperature differences is a maximum of 0.4% (e.g. 1000 mm x 0.4% = 4 mm). Therefore, windows should always be stored in shaded areas and the protective film on the pallet should be removed immediately after delivery to avoid the greenhouse effect. It should also be noted that damage resulting from incorrect storage by the customer is not covered by the warranty.

2.2.7.1. Functionality assessment of the installed structure

The assessment should be carried out after the structure has been installed. The purpose of its execution is to confirm the correct functioning and installation of individual hardware elements, such as alarms, catches, anti-burglary bones or hinges. Deviations from straightness and dimensions that do not affect the functioning of the structure are permissible.

2.2.7.2 Straightness deviations of PVC profiles

Deviations from straightness are permissible if:

• do not cause deterioration (lowering) of the levels and classes of declared performance properties, • do not negatively affect functionality (e.g. rubbing, hooking), with the exception of slides and lifters and other supporting elements,

• the torque required to lock the fittings does not exceed 10 Nm (adjustment of fittings and possible replacement of closing elements are permitted).

In other cases, the PN-EN 12608 standard should be used.

2.2.7.3 Corrections made by an authorized person

A person with the appropriate knowledge and training can remove some surface defects, such as mechanical damage, dents or veneer defects, using appropriate tools and means.

cleaning. Correctly performed repair does not negatively affect thermal values or durability of profiles. The method of removing any defects remains solely at the manufacturer's discretion.

2.2.7.4 Assessment of welded profile connections - V-SUPER, V-PERFECT, HFL type welds

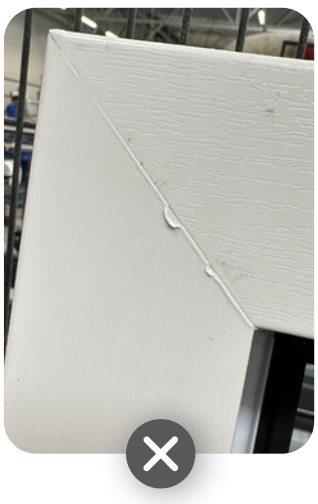
Regardless of the type of welded joint used, during visual assessment, the principles described in point 2.1 Method of performing visual inspection and Table No. 1 - Distances from the inspected sample depending on the surface and product should always be followed, also taking into account the levels of significance of individual planes and permissible surface defects during visual assessment.

V-PERFEC welded joints

The use of this type of weld means that excess material does not flow out of the joint area, which is called the "flowless" method. The smooth weld surface is obtained thanks to special stamps that crimp the film without causing its mechanical processing. Below are examples of correctly and incorrectly performed welds.

Welds are correct

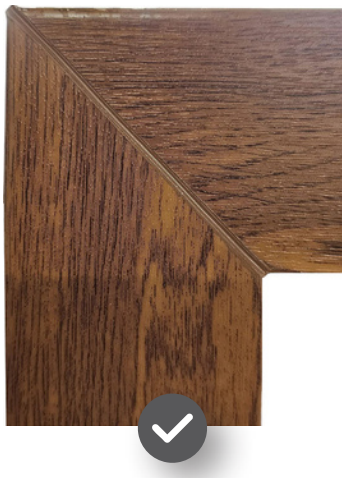
Welds are incorrect



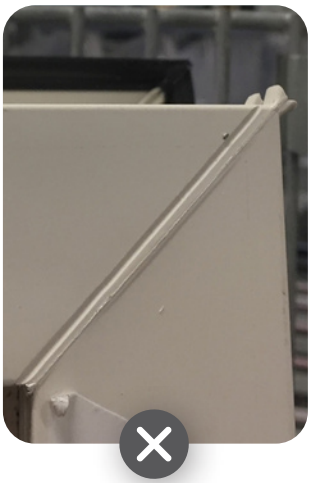
V-SUPER welded joints

A weld made using the V-Super technology is characterized by the presence of a groove on the outer and inner surface of the weld. Unlike the V-perfect method, the groove is made using a special machining tool, which means that in this case the welded joint is mechanically processed. Below are examples of correctly and incorrectly made welds.

Welds are correct



Welds are incorrect



HFL welded joints

The characteristic feature of this weld is the way the corners of the frame and sash are made, where the weld line is at an angle of 90°. This method is used only in the external part of the structure.

Welds are correct

Welds are incorrect

Aluminium

The corner connections and their quality of workmanship should be checked with regard to:

• uniform smooth joint surface,

• flush clamped corners without visible gaps at the joint
(The gap between the profiles does not exceed 0.5 mm).
•measure elements (length, width, diagonal),

Additionally

• appropriate and consistent length of connected profiles,

• no mechanical damage,

• made in accordance with the system supplier's assembly

catalogue,

• no glue contamination.

Steel connections

The corner connections and their quality of workmanship should be checked with regard to:

• measure the dimensions of the element (check the length, width and diagonal),

• check for mechanical damage (scratches, undercuts), • uniform, smooth

surface of the welded joint, • no damage to the external walls of the profile.

Wooden connections

The corner connections and their quality of workmanship should be checked with regard to:

• measure the dimensions of the element (check the length, width and diagonal),

• the aesthetics of the corner joints,

• the quality of the corner joint twist,

• any remains after joining (glue),

Additionally

• appropriate and consistent length of the connected profiles,

• no mechanical damage,

• made in accordance with the system supplier's assembly catalogue,

• contamination from the adhesive,

3. Permissible deviations

3.1 Painted surfaces

One inclusion is allowed – a spot defect with a diameter of up to 1 mm per 2 m of panel. If a defect is noticed, it should be measured using an appropriate measuring device (millimeter scale/measure). Color differences between elements of different materials or made using a different technology are allowed. Color shade differences between painted elements in different production batches are allowed.

In the event that a new product is installed near a previously installed one, differences in structure, colour, shade and gloss of the panels are permissible. Surfaces invisible when the product is closed may differ from visible surfaces. The colour of the paint coating of the profiles should be compared visually with the colour of the reference sample coating (in the shade, at the same angle as the material being assessed). In case of doubt, perform a colour assessment according to ISO 7724. This does not apply to coatings with a metallic effect.

3.2 Veneered surfaces

If you notice a defect (air bubbles, inclusions, thickenings, etc.), measure it using an appropriate measuring device (millimeter scale/measure). Slight color differences are allowed in veneered coatings in the area of the same veneer pattern. Due to their specificity and the way the grain is arranged, wood-like colors may show a difference in structure. No visible surface defects are allowed on smooth veneers. If a new product is installed near a previously installed one, differences in the structure, color, shade and gloss of the surface are allowed. Surfaces invisible when the product is closed may differ from visible surfaces. Please assess the surface in relation to Table No. 2. Designation of assessment planes.

3.3 Anodized zinc surfaces

Condensation of water vapour is permissible, appearing on the external surfaces of glazing units, facing both the interior of the room and the exterior of the building. This is a natural phenomenon that occurs at increased air humidity and a glass temperature lower than the ambient air (so-called dew point).
Glazing deformation consisting of a concavity or convexity of the surface greater than 10 mm is not permitted.
The presence of dirt in the space between the panes is permitted.

3.4 Raw aluminum surfaces

It is permissible to cut edges that are not protected at the factory or made during assembly (ends of lines, edges of holes, etc.) within a distance of up to 5 mm from the cutting line are excluded from the assessment. Galvanized elements on which defects that have arisen during use do not exceed 0.5% of the total surface are not subject to assessment. The loss of gloss is directly proportional to sun exposure, the occurrence of stains and discoloration is permissible.

3.5 Glazed surfaces

Condensation of water vapour is permissible, appearing on the external surfaces of glazing units facing both the interior of the room and the exterior of the building. This is a natural phenomenon occurring at increased air humidity and a glass temperature lower than the ambient air (so-called dew point). In the case of PMMA glazing units, evaporation is permissible inside the glazing. Absorption of moisture from the air results from a number of factors and their combinations. The main reason is moisture diffusion (moisture penetration) caused by pressure, air humidity, temperature and condensation point. The process is permitted as occurrence, but is excluded from the quality assessment of glazing. We define defects in glazing as:

Edge defects

External shallow edge damage or conchoidal fractures that do not affect the strength of the glass and that do not extend beyond the width of the edge seal are acceptable. Internal conchoidal cracks without loose fragments that are filled by the sealant are acceptable.

Point error

Spherical or hemispherical disturbance of transparency when viewed through the glass. Entry note: This may be a solid inclusion, a gas inclusion, a pinhole in the coating or a point defect in laminated glass.

Point error
Spherical or hemispherical disturbance of transparency when viewed through the glass. Entry note: This may be a solid inclusion, a gas inclusion, a pinhole in the coating or a point defect in laminated glass.

Halo
A locally distorted area, usually around a point defect when the defect is contained within a glass pane.

Dirt
A residue on the surface of a glass pane that disturbs the view through the glass in the form of stains, streaks or discoloration.

Linear/Extended Errors
Defects that may be present on or in the glass, in the form of deposits, marks or scratches that occupy a longitudinal band on the surface of the glass.

Stain
A defect larger than a point defect, often irregular in shape, partially with a mottled structure.

Defect group
Accumulation of very small defects giving the appearance of stains.

Rough edge
Defects that may occur on the edge of a piece of cutting size in the form of technological cutting processes and the resulting voids and/or bevels.

Cracks
Sharp-edged cracks or crevices running through the glass from the rim.

Wrinkles
Distortions occurring in the interlayer (the foil in laminated glass) after production, as visible overlaps.

Streaks
Distortions in the interlayer (foil in laminated glass) caused by defects in the interlayer production process, which become visible after production or streaks resulting from not cleaning the glass.

Frames are dirty
Streaks and dirt on frames invisible from a distance of 2m are allowed. Butyl leaks inside the chambers up to 2 hmm are allowed, according to glass practices this is the effect of excess butyl used by the glass manufacturer, having at most a visual aspect, improving the insulation of insulating glass units, not subject to complaint.

Base:
EN 572-2:2012 - Glass in building -- Basic soda-lime-silicate glass products -- Part 2: Float glass.

EN 12150 - 1+A1:2019 - Glass in building

-- Thermally toughened soda-lime-silicate safety glass -- Part 1: Definition and description.

EN 1096 - 5:2016 - Glass in building - Coated glass - Part 5: Test method and classification of the self-cleaning properties of coated glass surfaces EN ISO 12543 -2:2022 - Glass in building - Laminated glass and laminated safety glass - Part 2: Laminated safety glass

3.6. Exclusions from assessment

Coatings exposed to air temperatures lower than -25 o C and higher than +55 o C are not subject to assessment. Painted and veneered surfaces prepared in different production batches may differ in colour, shade, structure and gloss. According to the operating characteristics, rolling the gate / roller grille / external roller shutter may cause abrasion of the slat / profile coatings, which is a natural phenomenon and is not subject to assessment. During the operation of the sectional gate, due to the permissible dimensional deviations of the panels, thermal expansion and the characteristics of the gate operation, abrasion of segments on the connecting locks is a natural phenomenon and is not subject to assessment. According to the operating characteristics of the gate, roller shutter, window, door, in the places of contact of the surfaces with the sealing gaskets, abrasion of coatings may occur, which is a natural phenomenon and is not subject to assessment. Any visual defects that are not visible after the product has been installed are not subject to assessment. The advertised (replaced) individual panels may differ in a different shade, which is an acceptable phenomenon.

4. Final provisions

This instruction applies to the areas of visual assessment of products, which must be analyzed and observed in relation to normative provisions, general terms and conditions, warranty cards and other quality provisions in force at Fenbro Sp. z o.o.

Related documents:

Standard: PN-EN 14351-

1+A2:2016-10 - Windows and doors

-- Product standard, performance characteristics -- Part 1: External windows and doors PN-EN 12608-1+A1:2021 - Unplasticized poly(vinyl chloride) (PVC-U) profiles for the manufacture of windows and doors

-- Classification, requirements and test methods -- Part 1: Uncoated PVC-U profiles with light coloured surfaces PN-EN 1279-1:2018 - Glass in building - Insulating glass units

-- Part 1: General, system description, substitution rules, tolerances and visual quality EN 572-2:2012 - Glass in building

-- Basic soda-lime-silicate glass products -- Part 2: Float glass.

EN 12150-1+A1:2019 - Glass in building

-- Thermally toughened soda-lime-silicate safety glass -- Part 1: Definition and description.

EN 1096 - 5:2016 - Glass in building - Coated glass

-- Part 5: Test method and classification of self-cleaning properties of coated glass surfaces EN ISO 12543-2:2022 - Glass in building

-- Laminated glass and laminated safety glass -- Part 2: Laminated safety glass PN-ISO 7724-1:2003 Paints and varnishes -- Colorimetry -- Part 1: Basics

PN-ISO 7724-2:2003 Paints and varnishes -- Colorimetry -- Part 2: Color

PN-ISO 7724-3:2003measurement
Paints and varnishes -- Colorimetry -- Part 3: Calculation of color differences

Instructions/Guidelines:

Guidelines for the installation of windows and external doors - Edition 11/2022 Gütegemeinschaft Fenster, Fassaden und Haustüren e. V., Frankfurt IFT Rosenheim.

ISO 9001:2015 system instructions - Production and delivery of the product Quality Assessment Criteria for Insulating Glass 3/2019 Warranty Cards Installation instructions Guidelines for the installation of external windows and doors

- Wyd. 11/2022 Quality Association for Windows, Facades and Front Doors e. V., Frankfurt IFT Rosenheim.

ISO 9001:2015 system instructions - Production and delivery of the product Quality Assessment Criteria for Insulating Glass 3/2019 Warranty Cards Installation instructions