



QUALITY GUIDELINES

Windows, Entrance Doors and Facade Elements

The following quality guidelines are to serve as an aid to be able to judge the applicability of windows, entrance doors and facade elements neutrally.

Technical data and recommendations are based on the status quo at the time of print. No legal obligation may be inferred from this.

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1 VISUAL ASSESSMENT OF WINDOWS, ENTRANCE DOORS AND FACADE ELEMENTS

1.1 UPVC profiles

The assessment of the general appearance regarding visual blemishes occurs from a distance of three metres.

Outside construction elements should be assessed under diffuse daylight and inside elements under normal light as it is used in the respective room at an angle of 90° to the surface.

1.1.1 Surface condition

The colour of the profile should be even and identical on all surfaces visible after fitting. The surface should be smooth and free of holes and non-removable dirt, edges should be smooth and free from burrs. Streaks and matt portions, caused by the extrusion process, are permissible - as long as the visual impression is not particularly noticeable under the aforementioned conditions.

Source:

DIN-EN 12608

1.1.2 Gloss level

For the assessment of the gloss level of a larger surface there is no suitable assessment scale. Measurement of the gloss level occurs locally with measuring devices. Assessment of a larger surface can only occur with statistical means. Assessment with the naked eye is more suitable.

Due to the manufacturing process a differing gloss level over the surface is almost unavoidable. However, these differences may not appear to be noticeable according to the assessment method mentioned above. Differences in gloss level do not alter the performance of the aging profile, therefore these differences even out relatively quickly after the window has been fitted.

1.1.3 Stains

Stains can originate from the production process, from the fitting process or from various environmental influences after fitting. In the basic cleaning process, after fitting is completed, all production stains must be removable with normal cleaning agents. Window producers offer corresponding cleaning agents for this work. Protective foils on the UPVC profiles serve solely to protect the profiles during transport and for the fitting process. They may not remain on the window for a longer time period and are to be removed immediately after fitting. Foils are also to be removed if the unfitted element is exposed to intensive sunlight.

1.1.4 Designer surfaces

UPVC profiles are often coated with designer foils to apply colours and structures. These foils must be applied, without folds or bubbles, on all surfaces visible in the closed, fitted state of the window. In the area visible when the window is closed, the edges may only be raised off the profile to a point that this does not provoke staining or impede cleaning.

The foil may not feature partial detachment of single layers (bubbles within the foil).

In mitred areas the basic material of the UPVC profile is also visible for window profiles with applications. This gap is painted in a matching colour by most window producers.

1.1.5 Colour

The colour of UPVC profiles may differ slightly, these colour differences usually even out through normal weather exposure.

This colour difference may be determined with a spectral photometer. For permissible deviations see RAL GZ 716/1.

The visual colour comparison occurs according to DIN ISO 105 A03, the deviation may not be more than one level on the grey scale.

1.1.6 Appearance of the mitre and the position of the profiles to one another.

UPVC profiles are connected in the corners by welding. The seam may, after post-processing, not present any holes or inclusions. The colour should generally comply with that of the profiles. On the welding seam even the smallest differences in profile geometry become visible. For profiles with a depth of up to 80 mm the position tolerance of visible surfaces is max. 0.6 mm, for profiles larger than 80 mm it is max. 1 mm.

(Cf. ÖNORM-EN 12608 – measurements and permissible deviations)

1.1.7 Corrections through a specialist

Slight surface damages, distortions and matt parts can be corrected by a specialist by using corresponding tools and cleaning agents. Repair by a specialist does reduce the durability of the profiles.

The aforementioned criteria apply to the assessment of the repair.

Source:

EN 513 – Assessment of weather resistance and weather durability by artificial weather exposure.

EN 12608 – Profiles made from unplasticized polyvinyl chloride (UPVC) for windows and doors, classification, demands and test procedures

1.2 Aluminium profiles

Assessment of the general appearance regarding visual blemishes occurs at a distance of **2 metres on the inside and 3 metres on the outside (GSB guidelines)**

Outside construction elements should be assessed under diffuse daylight and inside elements under normal light as it is used in the respective room at an angle of 90° to the surface.

1.2.1 Coated surfaces - characteristics and mistakes according to EN 12020

Craters, Bubbles	are permitted on visible profile surfaces only conditionally: $\varnothing < 0.5$ mm, 10 per m or per m ²
Inclusions	are permitted on visible profile surfaces conditionally $\varnothing < 0.5$ mm, 5 per m or per m ²
Flaking	is not permitted on visible profile surfaces
Colour runs	are not permitted on visible profile surfaces
Dimples	On visible profile surfaces are permitted if finely structured, if not, also structured if visibility $> 120\mu\text{m}$ is due to construction restraint or order
Gloss differences	permitted on visible profile surfaces, if within the following tolerances: Measured assessment of industrial coating by reflection test acc. to DIN 67530 (ISO2813) (60° test geometry) with the following tolerances <ul style="list-style-type: none"> - glossy surface 71 to 100 E (+/- 10 E) - semi gloss surface 31 to 70 E (+/- 10 E) - matt surface 0 to 30 E (+/- 10 E)
Colour deviations	permitted on visible profile surfaces, if not obvious and if actions according to observation guidelines have been taken. For metallic colours larger colour deviations are to be taken into account, these are unavoidable due to manufacturing issues and represent no faults.
Sanding, Bumps, Welding Seams	are permitted on visible profile surfaces, unless fine sanding has been demanded.
Manufacturing related mechanical damages (e.g. dents, bumps, scratches)	permitted on visible profile surfaces, if not obvious and if actions according to observation guidelines have been taken.

1.2.2 Anodised surfaces - characteristics or mistakes

Silicon bleeding	is not permitted on visible profile surfaces
Visible bridges	are permitted on visible profile surfaces conditionally, if etching E0/E6 acc. to ÖNORM C2531 (DIN 17611) occurs
Pre-corrosion	is permitted on visible profile surfaces conditionally, if etching E0/E6 acc. to ÖNORM C2531 (DIN 17611) occurs
Gloss differences	permitted on visible profile surfaces, if within the following tolerances: For reflection measurements acc to DIN 67530 (85° test geometry) normally a difference of 20 units in assembled parts applies. Here profiles or sheets may be compared with each other, which have been anodised in natural colours or in a one or to two step process.
Colour deviations	permitted on visible profile surfaces, if not obvious and if actions according to observation guidelines have been taken.
Sanding, Bumps, Welding Seams	permitted on visible profile surfaces, unless fine sanding has been explicitly demanded or if not obvious after E0/E6 acc. to ÖNORM C2531 (DIN 17611)
Manufacturing related mechanical damages (e.g. dents, bumps, scratches)	permitted on visible profile surfaces, if not obvious and if actions according to observation guidelines have been taken.

1.2.3 Appearance of the mitre and the position of the profiles to one another.

Assessment is made of the fitted, closed element.

Plain attachment with no mechanical bonding

Mitres of aluminium attachment shells attached to UPVC elements, must be able to compensate heat expansion of UPVC in plain attachment elements. Therefore temperature unrelated gaps are according to construction and permitted.

Plain attachment with mechanical bonding

On attached profiles the remaining gap may not exceed 0.2 mm or 0.3 mm with offset.

Welded connections

The seam may, after post-processing, not present any holes or inclusions. On the welding seam small differences in profile geometry due to the manufacturing process become visible.

1.2.4 Deviations profiles/panels/casing sheets

Due to different materials and processing methods deviations in colour, gloss level, structure etc. may occur even if the original hue was identical.

These deviations are permitted - agreement of borderline patterns is recommended.

1.2.5 Filiform corrosion – corrosion on uncoated profiles

This type of corrosion (blooming) occurs on points that are bare due to manufacturing reasons (drill holes, cuts, millings), these are based on the material and cannot be avoided. However, by bi-annual cleaning this chemical reaction may be slowed down. Areas with high salt content in the air and high humidity (de-icing salt, proximity to the sea) are especially affected.

1.3 Coated wood surfaces - thick coated glaze

Assessment of the general appearance regarding visual blemishes occurs at a distance of 3 metres, special assessment distances see table 1.

Outside construction elements should be assessed under diffuse daylight and inside elements under normal light as it is used in the respective room at an angle of 90° to the surface.

For assessment a difference is made between visible surface (inside and outside), folding edge on sash or blind frame, rabbet area and fitting area of the blind frame.

1.3.1 Coated surfaces - characteristics and mistakes (table 1)

Item	Visible surface (inside and outside)	Folding edge of sash and blind frame	Rabbet area	Fitting area of blind sash
Sanding marks	longitudinally and diagonally not obvious, (assessment from 1 metre) permissible	permissible	permissible	permissible
Longitudinal cracks	may not be visible after coating, generally all cracks are to be corrected before coating	may not be visible after coating, generally all cracks are to be corrected before coating	permissible up to max. width of 0.5 mm and max. length of 100 mm, max. 1 per m side length	permissible up to max. width of 0.5 mm and max. length of 100 mm, max. 3 per m side length
Transversal cracks	not permissible	not permissible	not permissible	not permissible
Flaking (rips)	not permissible	Not permissible, must be corrected and covered with coating.	Edge flaking < 3 mm, with a max. length of 10 mm, max. 3 per m side length permissible	Edge flaking < 10 mm, with a max. length of 30 mm, max. 3 per m side length permissible, not combined
Smoothing plane cuts	not permissible (except: accessories like cover ledges, Georgian/feature bars,...)	< 2 mm permissible, 3 per m sash profile	permissible	permissible
Wood fibres	must be completely covered by coating	must be completely covered by coating	must be completely covered by coating	must be completely covered by coating
Glue remains	not permissible, on glue seams (frame connection) 3, measuring 3 mm each, permissible	not permissible, on glue seams (frame connection) 3, measuring 3 mm each, permissible	permissible up to a surface of approx. 0.5 cm ²	permissible

End grain	is treated with end grain sealing, which closes pores after the coating process and protects them from direct weather exposure.	must be treated with end grain sealing, which closes pores after the coating process	open pores permitted (are not exposed to direct weather)	permissible (must however be coated)
V gaps	must be completely closed	must be completely closed	must be completely closed	must be completely closed
Pressure marks	< 2 mm Ø, max. 3 per m side length permissible	< 2 mm Ø, invisible when sash is closed, max 3 per m side length permissible	< 1 cm ² , max. 3 per m permissible	permissible
Roughness	slight, non fibrous roughness permissible, total surface not more than 7 cm ² (dust)	slight roughness permissible, but surface may not be fibrous, so that a rip or damage might ensue during cleaning	slight roughness permissible, but surface may not be fibrous, so that a rip or damage might ensue during cleaning	permissible
Annual rings	due to the hygroscopic characteristics of wood, relief shaped visible annual rings cannot be avoided and are permissible	due to the hygroscopic characteristics of wood, relief shaped visible annual rings cannot be avoided and are permissible	due to the hygroscopic characteristics of wood, relief shaped visible annual rings cannot be avoided and are permissible	due to the hygroscopic characteristics of wood, relief shaped visible annual rings cannot be avoided and are permissible
Primer stains	not permissible	not permissible	100 mm long per side permissible	permissible
Inclusions of foreign bodies, assessment distance 0.4 m	< 0.25 cm ² permissible	< 0.5 cm ² permissible	< 0.5 cm ² permissible	permissible
Stains (not removable)	not permissible	not permissible	3 per m < 1 cm ² permissible	permissible
Insect eating marks	not permissible	not permissible	not permissible	up to 2 mm Ø permissible, 3 per m
Resin	in small amounts permissible, in droplets	in small amounts permissible, in droplets	in small amounts permissible, in droplets	permissible
Repair with mini spots	two or more mini spots next to each other not permissible, one spot per side permissible	two or more mini spots next to each other not permissible, one spot per side permissible	max. three mini spots next to each other or max. one row of spots (3) per 1.5 m side length	permissible

Alkaline remains from plaster, lime, cement, etc. harms the water soluble glaze and the timber material, therefore irreparable marks may occur.

Therefore timber surfaces must be protected in the construction phase.

Source:

Guideline for visual assessment of finished surfaces of wood windows and French doors (Version 09/2000)

ÖNORM B 3803 - Timber Protection in Engineering - Coatings on dimensionally stable outside timber construction parts (Version 2006-05-01)

1.3.2 Colour

The material timber can have different colours depending on the wood's contents, which, in turn, may be seen in the coating. These colour differences do not represent defects. Furthermore the colour changes after fitting due to UV irradiation. In cases where small differences were visible at the time of delivery, these changes usually result in adaptation of the colour between the profiles.

1.3.3 Corrections through a specialist

Larger surface damages, should definitely be corrected by a specialist by using corresponding tools and cleaning agents. Repair by a specialist does reduce the durability of the surfaces.

1.4 Glass surface

Insulating glass may, due to peculiarities of the materials used, but also due to the production process, have certain features. These features may be: fine scratches, scratches, bubbles, dots, stains, remains, inclusions, etc. Depending on their type, characteristics, frequency, size and position on the insulating glass pane their impact on the quality must be assessed.

Assessment is made according to ÖNORM B 3738 Glass in Construction – Insulating glass demands to visual quality, corresponding to the following assessment guidelines with permissions featured in table 1. The assessment of special glazing types, such as burglary impeding glazing, alarm glazing, fireproof glazing, etc. based on these quality guidelines is only partly possible. In these cases manufacturer's information on the assessment of these glass types are to be regarded.

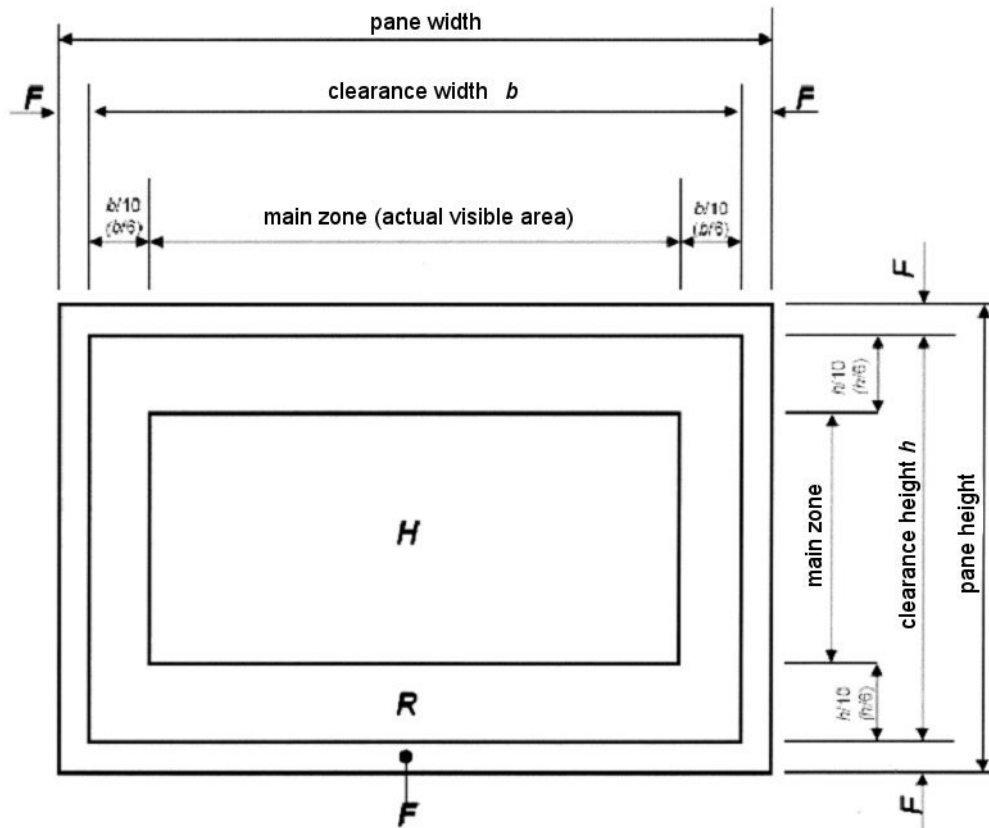
First the insulating glass pane is divided in a folding area F, a side area R and a main area H, according

to image 1. Different demands apply to each of those zones: the

highest demands apply to the main area H, the lowest to the side area R.

Then, according to table 1 it is assessed which characteristics are permissible and which not.

(Image 1)



Explanation

F Folding area: 18 mm (except agreed special constructions and constructions according to structural demands).

R Side area: up to a pane surface of 5 m² one tenth (10 %), with a pane surface over 5 m² one sixth (16.66 %) of the respective clearance width and height.

H Main are: actual visible field for assessment.

Image 1 - assessment areas for visual assessment

1.4.1 Glass Characteristics

Generally, when testing for faults, the view through the pane, i.e. the appearance of the background is important, and not the appearance of the pane itself. Here the noted faults may not be particularly pronounced.

Assessment of the glazing units according to table 1 is made at a distance of approx. 1 m to the observed surface, at an observation angle that corresponds to generally usual room usage. The test is processed under diffuse daylight (e.g. with overcast sky) without direct sunlight or artificial light.

Table 1 – Permissible Errors in Insulating Glass made of Float Glass

Zone (acc. to Image 1)	Permissible per unit (double pane insulating glass)		
F	Flat damage to edge or shells that do not diminish the durability of the glass and do not protrude over the edge.		
	Shells without loose parts on the inside, filled with sealant.		
	Localised or superficial residue and scratches as well as irregular and/or wavy butyl remains, unrestricted.		
R	Inclusions, bubbles, spots, stains, etc.		
	Window surface	Number	Diameter/surface
	≤ 1 m ²	max. 4	ø ≤ 3 mm
	> 1 m ²	max. 1 with ø ≤ 3 mm per meter of edge all around	
	Localised residue in the area between the panes (SZR)		
	≤ 1 m ²	max. 4	ø ≤ 3 mm
	> 1 m ²	max. 1 with ø ≤ 3 mm per meter of edge all around	
	Surface residue in the area between the panes (whitish grey or transparent):		
	up to 5 m ²	max. 1	≤ 3 cm ²
	> 5 m ²	1 each	≤ 3 cm ²
	Scratches		
	Window surface	Single length	Sum of lengths
	up to 5 m ²	max. 30 mm	max. 90 mm
> 5 m ²	max. 30 mm	proportional calculation	
REMARK: the "proportional calculation" refers to the "sum of lengths" and not to their size or single length.			
Fine scratches: only a few permitted			
H	Inclusions, bubbles, spots, stains, etc.		
	Window surface	Number	Diameter
	≤ 1 m ²	max. 2	ø ≤ 2 mm
	> 1 m ² ≤ 2 m ²	max. 3	ø ≤ 2 mm
	> 2 m ² ≤ 5 m ²	max. 5	ø ≤ 2 mm
	> 5 m ²	proportional calculation	
	REMARK: the "proportional calculation" refers to the "number of errors" for a window pane surface of > 2 m ² to ≤ 5 m ² and not to the maximum size.		
	Scratches		
	Window surface	Single length	Sum of lengths
	up to 5 m ²	max. 30 mm	max. 90 mm
	> 5 m ²	max. 30 mm	proportional calculation
	Fine scratches: only a few permitted		
	Complaints ≤ 0.5 mm are not considered. Apparent damages (main zone) may not be larger than 3 mm. The permissible number of fields raises by 50 % for triple pane insulating glass and by 100 % for quadruple pane insulating glass.		
Laminated glass (VG) and laminated safety glass (VSG):			
1) Permitted frequency numbers in the zones R and H raise per laminated unit by 50 %.			
2) In liquid resin panes production related waves may occur.			
Single pane toughened glass (ESG) and partly pre-stressed glass (TVG):			
1) Local distortions on the glass surface may not exceed 0.5 mm, over a measured area of 300 mm.			
2) On ESG with a nominal thickness of 3 to 19 mm and on TVG with a nominal thickness of 3 to 12 mm made of float glass, the general distortion with relation to the length of the edges or the diagonal may not exceed 3 mm per 1000 mm.			
3) If VG or VSG is produced from pre-stresses units, then the above distortion values are to be assumed at 50 % higher.			

(Table 2)

1.4.2 Edge connection

Sealing or glue for the element may, for float glass panes, not run into the the interior of the pane for more than 2 mm above the edge and onto the glass pane.

Spacers should be parallel to the glass edge if possible. The permissible deviations from the parallel position of the spacer(s) to the glass edge or to other spacers (e.g. for triple glazed insulating glass) may be taken from Table 2.

Table 2 – Permissible Deviations

Spacer material	Edge length ≤ 2 m	Edge length > 2 m	
aluminium and steel	3 mm	3 mm + 1 mm for each further started metre	but no more than 5 mm
stainless steel with wall thickness ≥ 0.2 mm	3 mm	3 mm + 1 mm for each further started metre	but no more than 5 mm
stainless steel with wall thickness < 0.2 mm	3 mm	3 mm + 1 mm for each further started metre	but no more than 6 mm
UPVC	4 mm	4 mm + 1.5 mm for each further started metre	but no more than 6 mm

In the visible area of the spacer and the side area in insulating glass on the spacer frame, marks due to the production process as well as minor dry material remains may be present.

Within one length of the spacer frame of 5 mm a maximum of two divisions outside the corner area per spacer frame are due to the production process and therefore permissible.

1.4.3 Double pane effect

Insulating glass includes a gas volume, the condition of which mainly depends on the air pressure, the elevation of the production facilities over sea level as well as the air current temperature and the one at the place of manufacturing. When using insulating glass in other elevations, with air temperature changes and changes of air pressure (high or low pressure) the necessary result is warping of the single panes and therefore visual differences.

This effect is a physical regularity in all insulating glass units. A double pane effect represents no quality fault, however, in no case may the two warping panes touch.

1.4.4 Proper colour

All materials used in glass production have their own proper material colour, which may, with increasing thickness, become more visible. Coated glass also has its own colour. This proper colour may be recognisable to various extents when looking through and/or on the glass.

Differences in colour impression are possible due to the ferrous oxide content of the glass, the coating process, the coating material as well as differences in different glass thicknesses and the glass layer structure and cannot be avoided.

1.4.5 Insulating glass with included Georgian/feature bars

Visible cutting edges and production related minor colour flaking in the cutting area are permissible.

Deviations from right angles in the fields are permissible under consideration of the topic "assessment" regarded earlier.

Effects of temperature related length changes of Georgian/feature bars in the space between panes (e.g. mitre gap, bending, etc.) can generally not be avoided and are therefore permissible.

The perception of the Georgian/feature bar colour may be altered by coatings or the proper colour of the glass.

1.4.6 Wettability

On wet glass surfaces, due to dew water, rain or cleaning water, differing wettability may be perceived. This occurrence may exist e.g. due to imprints of rollers, labels, vacuum suckers, smoothing agents, etc. and does not represent a defect.

This effect usually becomes weaker with ongoing use.

1.4.7. Visual appearance of toughened glass (ESG) and partly pre-stressed glass (TVG) (anisotropies)

When producing heat treated glass (ESG or TVG) different stress phenomena occur, so called anisotropies. These become visible under certain light angles as dark rings and stripes.

This is an unavoidable, production related, physical effect and does not represent a reason for complaints.

Assessment: cf. ÖNORM B 3738 Glass in Construction – Insulating glass demands to visual quality

2 INSULATING GLASS

2.1 Georgian/feature bar rattling

Due to environmental influence (e.g. double pane effect) as well as due to tremors or manually caused oscillation, sometimes rattling sounds may occur in two part Georgian/feature bars.

These effects do not represent defects (cf. ÖNORM B 3738).

2.2 Thermal tension breakage

Thermal tension breakage is the case if, due to irregular heating, shadow or cover temperature differences over 40°C occur inside a glass pane, which lead to tension and finally to breakage of the glass pane.

Thermal tension breakage is no manufacturing mistake or product fault, but an unavoidable material characteristic and is not subject to guarantee.

By using ESG glass you reduce the danger of thermal tension breakage considerably and raise with comparably small input the durability of your glass surfaces.

2.3 Condensate on insulating glass elements

Condensate can occur on outside glass surfaces in cases where the glass surface is colder than the surrounding air. Condensate occurrence on the outer pane surfaces of insulating glass depends on the U value, the humidity in the air, air movement as well as inside and outside temperature.

Condensate on the inside pane surface may occur if air circulation is impeded, e.g. by deep soffits, curtains, potted plants, inside louvreblinds, etc. or by unfavourable positions of heaters or similar.

With insulating glass with high heat insulation on the weather exposed glass surface condensate or ice may occur preliminarily if the outside humidity (rel. air humidity outside) is high and the air temperature is higher than the temperature of the pane surface.

Therefore condensate is permissible acc. to ÖNORM B8110-2. In these cases suitable measures must be taken to ensure the connected construction element does not soak up moisture. Details see chapter 5.

2.4 Division of spacers outside of corner area

Max. two divisions outside the corner area per spacer frame are due to production procedures and therefore permissible.

3 FITTING

The quality of the fitting procedure or the construction connection gap is the key to usability of a construction element.

Fitting must occur under consideration of expansion, fitting and structural restraints, and the construction connection gap towards the building must be generated according to rules of the trade.

3.1 Fitting

All forces that occur on the window must be safely transmitted into the building. This occurs by choosing type and position of the support of the fitted part and the fitting means.

The choice of fitting means must happen under consideration of the forces to be transferred, the adjoining construction elements and the movement to occur in the connection gap.

3.2 Construction connection gap

The construction connection gap is to be planned with regards to the following points:

- Determination of the material of the frame profile
- The surface of the adjoining construction parts that are used to create the gap
- Insulating material applied
- Outside and inside lining profiles
- Sealing
- Filling of the gap spaces
- If applicable, wind or rain protecting foils as well as gradual vapour barriers
- Determination of the material of the fitted part
- Fitting and fitting conditions of the fitted part and the gap compartment
- Tolerances of wall openings and fitted parts
- Coordination measurements
- Gap measurements

Ensure technically feasible and economically justifiable gap size!

The basis (surfaces of wall compartments in the window connection area) must be so clean, dry, smooth, level, tough, free of ridges and so free of materials that a diminishing of the adhesive effect of applied sealants is impossible. Holes such as dents, rock pockets, cavities and similar are to be levelled permanently. Plaster gaps must be executed flush and level with the stone. If applicable, material must be rodded.

Connection of the facade to the window construction on all sides, impermeable to driving rain, irrespective of the windowsill, is necessary for a correct construction connection. The connection of the windowsill to the building and the window frame must be impermeable to driving rain. Furthermore the different heat expansion characteristics of the different materials must be considered.

3.3 Advice for the construction phase

- After completed fitting, the functionality of the elements must be ensured by adjusting the hardware.
- During the construction process many climatic and chemical strains are put on windows and doors. Therefore the elements should be protected by covering/masking and any excess moisture should be allowed to leave through sufficient airing.
- Problems occur especially with plaster and screed works. Elevated moisture levels may lead to damages on elements and the connection gap. Therefore sufficient airing is necessary.
- In order to protect the surface, suitable adhesive strips must be used. These must be compatible with the surfaces. The strips must be removed as soon as possible.

If, despite great care, stains should remain on the elements, these must be removed immediately after they occur with non-aggressive cleaning agents (pH between 5 and 8) completely.

Buildup of too high moisture (max. 60 %) should be avoided. It leads to follow-up damages, such as swelling of timber parts, warping of elements, corrosion damages on hardware parts, dissolution of thick coat glaze, mould and an unhealthy living climate.

3.4 Visual assessment of finished inside construction gap

Due to different movement of the materials combined in the connection area, gaps and cracks may also occur if fitted correctly. A construction connection gap according to ÖNORM B 5320 will compensate this movement - therefore functionality is not impaired. These gaps and cracks do not represent defects of the construction connection gap.

Source:

ÖNORM B 5320 Construction connection gaps in Windows, Doors and Gates in Outside Elements - Basic Information for Planning and Execution

4 CARE AND MAINTENANCE

Generally all surfaces are to be cared for and maintained regularly according to manufacturer's advice. Only then can long term usability and quality of the surface be guaranteed.

Regular cleaning and adaptation of the cleaning intervals to occurring stains reduces the probability of stains that are difficult to remove.

In maintenance often works are carried out in places with falling hazard. Therefore before works are carried out ensure safe working conditions.

4.1 Surfaces of UPVC elements

Various cleaning products are available from the manufacturers, which have been specifically adapted to cleaning UPVC surfaces and the suitability of which has been proven. Soap containing cleaning agents is generally suitable. Scrubbing and solvent containing cleaning agents may harm the surface and may only be applied by trained personnel.

The application of gloss sealants may enlarge the cleaning intervals and simplify cleaning.

4.1.1 Stains and environmental influence

Stains may appear on UPVC surfaces, which might only be removed with much time and effort. The reason is the combination of sunlight, water and depositions of pollen, farina, frass or debris from brake pads and railroad tracks, etc. over a long time.

4.1.2 Designer surfaces

Designer surfaces are cleaned with the same cleaning agents as UPVC surfaces. However, in no case are scrubbing agents to be used. In specialist shops special care products for designer surfaces are offered which, if used regularly, clean and refresh the surface.

4.2 Surface of wood elements with thick layer glaze

The surface of wood elements must be examined for damages and weather impact (cracks, bumps, bubbles) twice each year.

With mechanical damage, e.g, hail, the open spot must be immediately corrected by a double cover of thick layer glaze. Open connection gaps on frame connections must immediately be closed with suitable sealants.

4.2.1 Care of thick layer glaze

Various cleaning products are available from the manufacturers, which have been specifically adapted to cleaning thick layer glazed wood surfaces and the suitability of which has been proven. Soap containing cleaning agents are generally suitable. Scrubbing and solvent containing cleaning agents harm the surface and may not be applied.

Application of special cleaning agents may enlarge the maintenance intervals.

Due to the natural weather wear of the coating, colour particles may be given off. This weather wear does not represent a defect.

4.3 Aluminium elements and aluminium attachment shells

4.3.1 Cleaning intervals and cleaning agents

Under normal impact in residential areas, cleaning twice each year with a cleaning and care agent recommended by the manufacturer must be carried out. Cleaning agents must correspond to cleaning agent guidelines of GRM RAL-GZ632.

4.3.2 Conservation

In order to prolong cleaning intervals and in order to facilitate cleaning, conservation agents are offered, which block aggressive atmospheric particles.

4.3.3 Long term characteristics of powder coated surfaces

Weather wear / chalking of powder coated surfaces

In the language of producers of paints and lacquers, the term chalking is used for weather wear. Chalking may be recognised by a whitish matt surface of the coating. A whitish residue remains on the hand after slight rubbing with the hand. This residue consists of weathered polymer residues and fillers, pigments, etc. (in former times chalk was used as filler exclusively, hence the term chalking). This chalking effect is not to be confused with fading effects. Fading is the change of the colour of a pigment, but chalking is the destruction of the underlying structure.

Generally darker colours, such as RAL 9005, 8017, 7016, 6005 are subject to a higher impact than light ones, due to higher UV absorption, therefore here weather wear may begin earlier. Additional stress factors lie in the position of the object and the orientation.

How does chalking occur? Mainly the polymer structures, the "skeleton" of the varnish, is damaged by UV light. Pigments today are generally UV stable. This damage to the skeleton is responsible for the fact that fillers and pigments at the object's surface, lose their hold on the object and wear off (the white residue). Depending on the degree of damage to the skeleton, fillers and pigments fall out of the compound, the varnish becomes lighter and lighter.

Cleaning and care agents

Below instructions for cleaning:

- | | |
|--|---|
| [] Cleaning at least 2 x per year: | Only clean water, possibly with slight additions of cleaning agents, e.g. common household washing up liquid, with soft, non-abrasive* cloths, rags or industrial cotton. Refrain from tough rubbing. Immediately after each cleaning process use clear, cold water to rinse. |
| [] Conservation at least 1 x per year: | After cleaning, with a product acc. to manufacturer's indication. |

* *abrasive = grinding*

- [] Fatty, oily or sooty substances may be removed with methylated spirit or isopropyl alcohol (IPA). Residues from glues, silicone rubber, adhesive strips etc. may also be removed in this way. Do not use varnish removers / solutions, scrubbing or abrasive cleaning agents / cloths!
- [] Do not use strong acidic or alkaline cleaners and wetting agents. We recommend neutral cleaning agents!
- [] Do not use additives of unknown composition.
- [] Due to the danger colour hues or effects might be altered, a suitability test should be carried out.

- Cleaning agents should not be warmer than 25°C. Do not use high pressure or steam pressure devices.
- The surface temperature of the facade elements during a cleaning session should also not exceed 25°C.
- The maximum reaction period for these cleaning agents should not be longer than one hour, if necessary, the entire cleaning process may be repeated after at least 24 hours.

Depending on the degree of the present weather wear, specific agents from the manufacturer are used. The application of these agents should occur according to indications by the manufacturer!

Take note

- Any transport protection foils should be removed immediately after fitting in order to prevent impact of solar irradiation that might harm the surface.
- Transport protected, wrapped, coated elements should be stored dry and far from sunlight on site.

** abrasive = grinding*

4.4 Hardware

All movable hardware parts that are visible when the element is opened must be oiled on the moving surfaces at least once each year with a suitable oil or oil spray. After applying the lubrication all opening functions of the element are to be executed several times to spread the oil over the sliding surfaces. A hardware mechanism, that is hard to move indicates badly adjusted hardware. In this case the hardware should be adjusted immediately by trained personnel. The interval for hardware readjustment depends on element size and opening type.

Hardware parts are to be tested regularly regarding their tight position and, if necessary, to be replaced by trained personnel.

4.5 Seals

Seals should be kept smooth after cleaning of the elements with a care product as indicated by the manufacturer, at least once each year.

The functionality and durability of seals is bad when seals are compressed too tightly or adhere to tightly on the sealing surface. Slight squeaking of the seals when opening the window elements is possible and does not represent a defect. With good lubrication these sounds can usually be avoided.

4.6 Insulating glass

Insulating glass is maintenance free. Cleaning is carried out with common glass cleaners and, if necessary with special scrapers, which do not harm the surface. Scrubbing agents may harm the glass and are therefore not permitted!

For self-cleaning glass please observe separate maintenance indications by the manufacturers.

The seal between insulating glass and frame is to be tested for rips in the sealant or seal material and/or dissolution of the seal material from frame and glass. Any damage should be corrected by trained personnel immediately, as otherwise follow-up damages may occur.

4.7 Construction connection gap

The sealing between fitted element and building is to be examined, faults must be corrected.

Source:

ÖNORM B 5305 – Window maintenance

5 CONDENSATE AND MOULD

If the air is not exchanged regularly enough (insufficient airing) too high humidity may lead to wet construction elements, reduced insulation, increase of micro-organisms and mould on construction elements.

ÖNORM B 8110-2 Thermal Protection in Engineering – Part 2: Vapour Diffusion and Condensate Protection regulates the necessary air conditions for living spaces and similarly used rooms.

These are:

max. 65 % air humidity over max. 8 hours/day

max. 55 % air humidity over the remainder of the time

Here for each °C outside temperature below 0°C 1 % air humidity must be subtracted. These max. values should therefore never be exceeded, as otherwise negative effects on materials and health of the users might ensue.

PLANNING ADVICE

The following measures are recommended for planning:

- The use of highly heat insulating glass leads to a higher surface temperature of the inside glass pane. This leads to more comfort close to the pane and also reduces the affinity of the inside glass edge to let condensate occur.
- Application of heat insulation optimised glass edge systems
- Planning of improved heating effects in recesses, outside corners, in front or large glass surfaces, in pure glass corners, pure glass connections, etc.
- If possible, fit controlled living space ventilation. This ensures adhering to a hygienically sufficient air exchange rate (also at night).
- However, the application of controlled living space ventilation requires special planning and adjustment with regard to heat streams, condensation protection and air tightness. If this is not sufficiently ensured, there may be comfort problems, condensate and mould around the window.

The following measures are recommended for use:

- Sufficient and continuous heating of all rooms. Avoidance of short-term temperature drops, e.g. at night. This also applies to rooms that are not used all the time or in which a lower temperature is desired.
- No stopping of air circulation towards the windows and outside walls.
- No impeding of heat given off heaters by casings, long curtains or furniture.
- Avoid continuous ventilation with tilted windows.
- Ventilation must be active, according to needs and yet energy conscious. Some heating energy is lost here. This, however must be taken into account in the interest of healthy room climate conditions and to avoid humidity damages. It is important to keep this loss as small as possible. The best way to do this is short, intensive airing.

Windows and doors should be opened wide for a short period - if possible create a draught. After approximately five minutes, the used, moist air in the room will have been replaced by dry, fresh air, which will be able to take in additional water vapour. The advantage of this "**forced ventilation**" is that with the used air only the heat contained therein escapes, while the heat stored in the walls and furniture remains in the room and that after the windows have been closed again, the fresh air can be raised to the desired temperature quickly again. This "forced ventilation" should be repeated several times a day while present in the living space. Larger water vapour volumes that may occur in separate rooms, e.g. while cooking or taking a shower, should be forced outside by specific ventilation of the affected rooms. The inside doors should remain shut during these processes, so that the water vapour cannot spread through the entire living space.

The Platform "**WINDOWS AND WINDOW FACADES**" consists of companies and organisations, realising projects in various materials together.

In the Platform the manufacturing companies

Actual
Gaulhofer
Hoco
Internorm
IPM Schober
Josko
Stabil and
Wicknorm

cooperate actively and are supported by the organisations

AMFT (Consortium of Manufacturers of Metal-Windows/Doors/Gates/Facades)
Austrian Wood Manufacturers' Organisation and
ÖAKF (Austrian Workshop for UPVC Windows)

administratively.

In its work the Platform tries to find the best solutions for common issues for the benefit of the customer.

Additionally the entire industry shall be presented more strongly in the public and information on topics regarding several materials shall be presented.