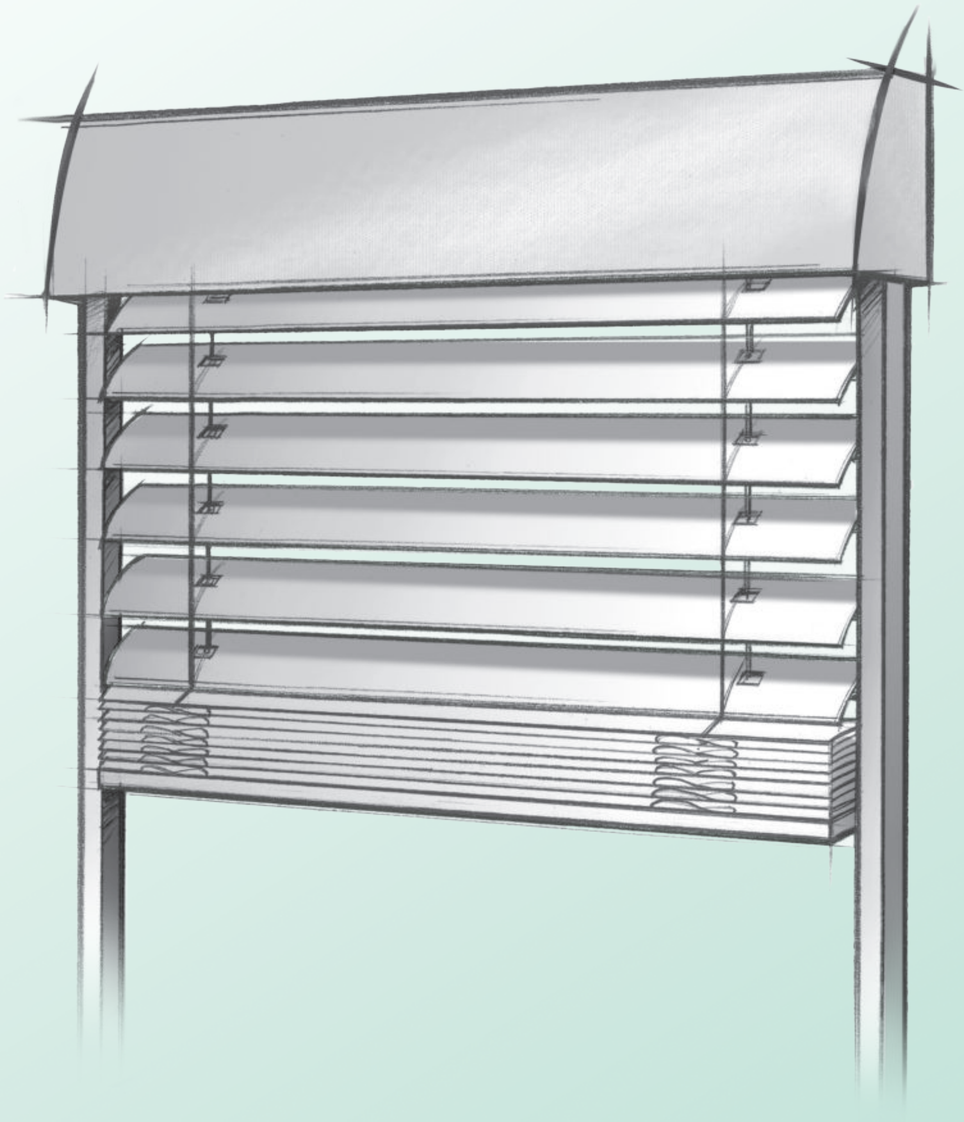
Guideline

for evaluating product characteristics of external Venetian blinds



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1. Foreword

1.1 General information

External Venetian blinds are tried and tested products. Despite careful production and proper installation, customers and contractors may disagree on whether certain characteristics of the external Venetian blinds are defects or not.
This guideline will provide a basis for specialist dealers and fitters as they advise the user on product quality, technical limits and product-specific characteristics. It will assist experts in evaluating the feasibility limits for external Venetian blinds.
In addition, it should help prevent disputes and differences of opinion.

This guideline is therefore intended for dealers, installation companies and end users.

1.2 Scope and structure of the guideline

This guideline applies to the evaluation of product characteristics of symmetrical, external Venetian blinds for the building trade. Due to the special structural shape of asymmetrical external Venetian blinds, this guideline does not apply to the asymmetrical product type. The product is evaluated according to the principles described below. This guideline is subdivided into individual sections that describe the various product characteristics.

2. Function

2.1 General information

This section describes the requirements for fault-free operation and operability under certain framework conditions and discusses the topic of “noise”. The instructions and other information provided by the manufacturer must be observed in all cases.

2.2 Requirements for fault-free operation

This section lists the requirements that are deemed essential for fault-free operation. A basic requirement is adherence to the installation, operating, maintenance and cleaning instructions provided by the manufacturer. If these are not adhered to, fault-free operation cannot be ensured and permanent damage could occur. It is especially important that the safety-relevant instructions are observed. The following list of points is not exhaustive. Additional negative consequences are possible, especially in the event of improper use.

Note: For further information, refer to the maintenance guideline.

2.2.1 Obstructions when raising and lowering the product and possible resulting damage

The external Venetian blind must not be obstructed while it is being lowered. This particularly applies to the following situations:

- The blind strikes an obstacle (operating error).
- The system’s height is greater than the existing guide rail or cable length. The external Venetian blind strikes the end locks or the cable fastener (order, measurement or installation error).
- Ice has formed on individual components such as the guide rails (operating error, follow the manufacturer’s instructions, see also Section 2.3).

2.2.2 Installation and operating errors

Guide rails and/or cable guides must be installed according to the manufacturer's installation instructions. It is particularly important to note the following:

- The lateral play must not be too great, otherwise damage may occur in the form of excessive wear on the draw strings or the blind may come loose from the guide rails.
- If the arrangement is too narrow, the blind may jam, causing excessive wear, an overloaded drive system or tearing of the draw string.
- A guide arrangement that is not vertical or is uneven causes similar problems.

The operation of systems that are iced over also generally results in damage (operating error, follow the manufacturer instructions, see also Section 2.3).

2.2.3 Freely suspended bottom rail

For proper operation, it is important for the bottom rail to hang freely and not to rest against the base. The generally accepted technical rule is that there should be a distance of approx. 20 mm between the bottom edge of the bottom rail and the tension cable bracket or the locks in the guide rails (special manufacturer specifications must be adhered to).

2.2.4 Special characteristics of coupled systems

Systems must be mechanically coupled locally, taking the positions of both systems into account. If two incorrect system positions are coupled, the stack of a coupled blind could make contact with the top rail faster than the drive-blind. The same applies to offset (radially twisted) tilt rods, even when the systems seem to be in their correct positions. This may cause the draw strings to become stretched or tear.

In cases where several systems are coupled, the drive system should not be located in an external system component. Otherwise, the following situations may arise:

- Different slat positions due to drive shaft torsion
- Different stack build-up at the individual positions, also due to torsion
- One-sided overloading of the drive system
- Overloading of the coupling elements
- Permanent deformation of the drive shaft and tilt rod due to overloading

2.3 Operation in icy conditions

In cold seasons, malfunctions and damage (e.g. torn draw strings) may occur due to the effects of frost. This situation is caused by moisture (such as melt water, rain or snow) on the external Venetian blind that can freeze at temperatures around zero degrees Celsius. Airing out rooms with the windows tilted and the external Venetian blinds closed causes increased levels of moisture to form on the slats. This results in the following situations, among others:

- Freezing of the slats and/or bottom rail
- Freezing of components in the guide rail
- Frost, snow and ice formation on the inside and outside of the blind, resulting in a greater stack height (i.e. the external Venetian blind may no longer fit into the box).
- Snow and ice in the guide rails hinder the lowering of the blind.
- Freezing while raised (the system was raised while wet or covered in frost)
- Noise development as components are pulled out of position
- Melt water formation in the external Venetian blind box and freezing

This is a physical process that cannot be influenced by the manufacturer. Even electrical drive systems with obstacle detection do not guarantee absolute protection. The operating instructions of the external Venetian blind indicate whether it may be operated in the event of frost and which measures should be taken to prevent damage (the instructions must be followed especially carefully for automatic operation).

Damage due to the effects of frost is generally the result of operating errors!

2.4 Characteristics of electrical drive systems

2.4.1 Electrical drive systems for external Venetian blinds6

The electrical drive systems are generally based on AC asynchronous motors. These have the following characteristics:

- The higher the load, the lower the rotational speed. This is due to their functional principle and, depending on the type of motor, may drop to as low as 5 rpm.
- The speed drops as the electrical drive system heats up during operation and at high ambient temperatures.
- Operating duration of at least (S2) 4 min (for short-term operation see Section 2.4.2).
- Temperature limiter that switches off the drive system at excessively high temperatures (see Section 2.4.2).

There are a large number of manufacturer-dependent systems that switch off the external Venetian blind at the top and bottom limit positions:

Mechanical limit switch-off devices:

- Lower limit position is fixed, optionally adjustable
- Adjustment of the upper limit position is optional, alternatively with a mushroom switch (switching sensor)
- An intermediate position can be set as an additional option
- Parallel connection only possible via cut-off relay (external component)

Electronic limit switch-off devices:

- As above, but electronically adjustable via a programming cable, or directly at the drive system as an additional option
- Optional torque overload protection (obstacle detection), freezing protection
- Drive systems without a continuous power supply have a start-up delay due to their functional principle
- In general, a parallel connection is possible using drive systems with the same design

Limit switch-off devices with a bus interface:

- As above, but using drive electronics with a continuous power supply
- Interface between the motor electronics and building controller used to exchange information on the drive system's position (bus line)

A common feature of all limit switch-off methods is that the blind can be moved precisely to the lower limit position and, if applicable, to the upper limit position, via position measuring devices located in the drive system (see also EN 14202, Accuracy of the limit switch-off).

For limit switch-off devices with a bus interface, the building controller can forward positioning commands via the bus to the drive system. Using this method, intermediate positions can be achieved with relatively high precision.

2.4.2 Operating modes of electrical drive systems

The method by which an electrical drive system may be operated is defined by the so-called operating mode (EN 60034-1). The operating mode describes how, and for how long, the drive system may be loaded to ensure that it is not heated to impermissibly high levels. Examples of operating modes include continuous mode, short-term mode and periodic mode.

Electrical drive systems for external Venetian blinds (usually AC asynchronous motors) are designed for short-term operation. The standard designation for short-term operation is S2. Short-term operation was formerly referred to as KB.

The product standard for sunblind drive systems (EN 60335-2-97) specifies a rated operating time of at least 4 minutes without a pause. In other words, an operational cycle for a system height of 5,000 mm and an outside temperature of 25 degrees Celsius is possible, taking all parameters into account; after this, the motor has to cool down.

Electrical drive systems that need to be protected against excessive temperature increases in case of improper or unfavourable operation are equipped with a temperature limiter (thermal protection switch). This allows the drive system to be stopped at any position, for the purposes of self-protection. It may be necessary to issue a new travel command. After a cooling phase, the system can be operated again normally.

2.5 Cable-guided systems
Special situations need to be taken into account when using cable-guided systems: it is especially important to note that when the blinds are partially lowered there is always the possibility of parts of the blind striking the facade even if the wind load is minimal. Damage to the facade or sunblind product, in addition to increased noise levels, may occur as a result.

This risk is greater for systems that are not connected to a building controller. In these cases, it is the sole responsibility of the system operator to always move the blinds to the lower or upper limit position in order to avoid intermediate positions that increase the chances of parts of the blind striking the facade. The manufacturer’s specifications in the operating instructions must be followed accordingly.

The tensioning of the cable guides is also an influencing factor.

2.6 Scraping/striking the facade
Under normal weather conditions, such as in the absence of wind loads above the wind speed limit (the limit value is specified by the manufacturer), the blind must not scrape against or strike the mullion, window post, drainage caps or facade.

If wind values exceed the usage recommendations, the external Venetian blind may strike the window/facade. The use of additional wind protection elements (as specified by the manufacturer) can reduce the chances of this occurring but cannot prevent it entirely.

For cable-guided systems, it must be ensured that the cables are sufficiently tensioned throughout the operating period and lifetime of the cables.

Special features of “cable guidance”:
Even with low wind loads, the bottom rail and the blind may strike the facade, leading to increased noise levels. This is especially the case when blinds are not located in the upper or lower limit position (in which case the possible deflection range of the bottom rail is greater). See also Section 2.5.

2.7 Noise development

2.7.1 General information

The standard DIN 4109: Sound insulation in buildings – Part 1: Minimum requirements and its associated rules are often described as hard to understand and contradictory. At the same time, however, users and clients have become more aware of and sensitive to the issue of sound insulation, resulting in stricter requirements for planners. Complex case law and precedents set by the courts add to the uncertainty. DIN 4109-1 is a national building legislation standard that was most recently amended in 2018. DIN 4109-1 specifies minimum requirements for noise protection between distinct building units (e.g. adjacent apartments) with the aim of "protecting persons in rooms from unacceptable disturbances caused by noise transmission". The practical application of DIN 4109-1 does not depend on the building type (non-residential, residential) but rather applies in every case to rooms that require sound insulation. In the case of apartments, DIN 4109-1 does not apply to one's own residential space, rather to rooms in other apartments that require sound insulation.

What constitutes a room requiring sound insulation?

Rooms requiring sound insulation in accordance with DIN 4109-1 include:

- Living rooms and bedrooms, children's rooms
- Offices/workspaces
- Classrooms/seminar rooms

What does this mean in general?
Building services systems are assessed in accordance with DIN 4109-1. Examples of these types of system are listed in DIN 4109-1. Motor driven exterior shutters/awnings are parts of building-technology systems. Therefore, corresponding technical acoustic requirements apply (such as for lifts, sanitation systems and ventilation devices). While it is true that manually operated shutters/awnings lead to similar noise levels, noise development is in this case influenced primarily by the user, which is why shutters/awnings are not subject to the standardised technical acoustic requirements of DIN 4109-1. According to DIN 4109-1, the designated sound pressure level in living spaces and bedrooms must not exceed a value of LAFmax 30 dB(A) for the operation of building-technology systems, and a value of LAFmax 35 dB(A) in offices and workspaces. This represents the minimum standard as stipulated by national building legislation, i.e. these values must not be exceeded. For Germany, the maximum noise level stipulated in DIN 4109-1 is the standard, while elsewhere in Europe the values vary on a country-to-country basis (Switzerland uses mean values, for example).

Attention: The measurement in the room must be carried out in accordance with DIN EN ISO 10052:2010-10 (Field measurements of airborne and impact sound insulation and of service equipment sound - Survey method).

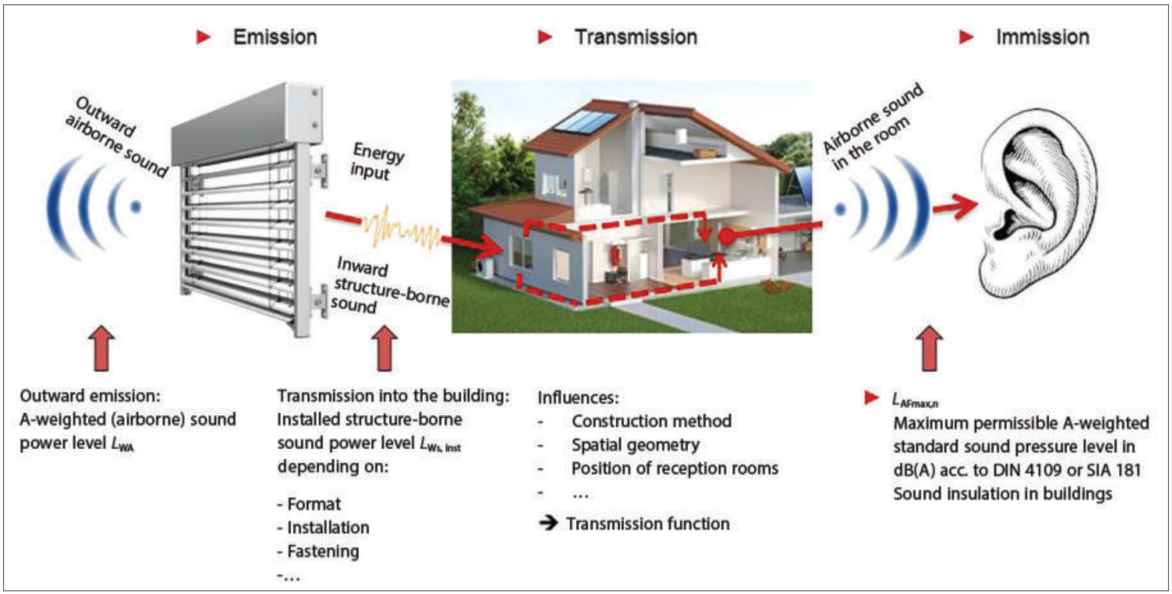

Figure 1: Noise transmission

Sound insulation is a planning task. Choosing suitable components can have a positive impact on the product's emissions via the transmission path, and thus generally lower immission in rooms requiring noise insulation to the required minimum standard. The required sound insulation for building services systems can, in principle, only be achieved in combination with acoustically favourable structural engineering and installation; see the interdependencies in Figure 1.

2.7.2 Noise development during operation

When external Venetian blinds are operated, running noises, switch-off noises and frictional noises are unavoidable despite high-quality manufacturing and installation. These noises are caused by the following situations and components:

- Opening and closing of the slats
- Raising and lowering of the blind
- Motor, gear and guide
- Braking of the motor (clicking)
- Vibration/quivering during raising and lowering

Simultaneous operation of multiple systems enhances these noises (group or central command).

2.7.3 Noise transmission

The transmission of noise and vibrations by the external Venetian blind into the building structure, which is also influenced by the design of the building structure in question, cannot be avoided, even where the system is properly installed with the necessary diligence. Additional noise-reducing measures require individual design planning. This results in additional costs.

2.7.4 Noise development in windy conditions

If wind values exceed the usage recommendations, the external Venetian blind may strike the window/facade. The use of additional wind protection elements (as specified by the manufacturer) can reduce the chances of this occurring but cannot prevent it entirely.

Due to the play that must be present in the guide rails to ensure proper operation, noise cannot be avoided – even when you comply with recommended use (rattling or clattering of the slats).

Noises due to wind load are technically unavoidable.

2.7.5 Effect of the building's acoustic design

Structure-borne sound transmission varies in quality according to the building's structural engineering. Solid walls made of heavy panels provide better acoustic quality than lightweight walling.

3. Wind values

3.1 General information

The wind load on specific sections of a building or on individual sections is determined by the pressure coefficient Cp. The Cp value is determined from the difference between the internal pressure cp_i and the external pressure cp_e on the building or individual sections. In the case of sections that are permeable by air, the internal pressure cp_i increases and thus reduces the Cp value. It should be noted that there is no preferred or main wind direction in Germany. Buildings and their parts must thus, as a rule, be designed to suit the most unfavourable case.

3.2 Special conditions for external Venetian blinds

In the case of external Venetian blinds, the value for Cp can fluctuate widely due to the dynamic movements of the blinds. For this reason, defining a wind speed based on static pressure that the external Venetian blind can withstand is not a suitable basis for assessment. This essential definition is provided in Appendix A of DIN EN 13659. The ground and the distance from the facade, the height and the corner situation also affect the maximum possible wind speed and are not considered in the standard (DIN EN 1932:2013-09 External blinds and shutters - Resistance to wind loads - Method of testing and performance criteria), even though these factors have a significant impact on the wind resistance of the product. DIN EN 1932 (8.2.3 Arrangement and dimensions of the test pieces) describes the test with the help of a defined reference value (2,000 mm * 2,500 mm) and a defined static pressure. This means it is hardly possible to apply the tested wind class (DIN EN 13659 Table 1 — Wind resistance classes) to diverging products even according to product standard DIN EN 13659. As a result, it is necessary to draw up application recommendations for the products (external Venetian blind) in order to enable the products to be deployed professionally.

3.3 Planning wind monitors

For more detailed information on planning wind monitors and the corresponding usage recommendations, see the wind monitors guideline (www.ivrsa.de).

4. Torn draw strings

4.1 General information

The following section describes possible influencing factors that can cause damage to the draw string. It also describes the effects of use on possible tears in the draw string.

Draw strings are designed to have a tear strength of around 300 to 350 N (approx. 30–35 kg) over the course of their service life.

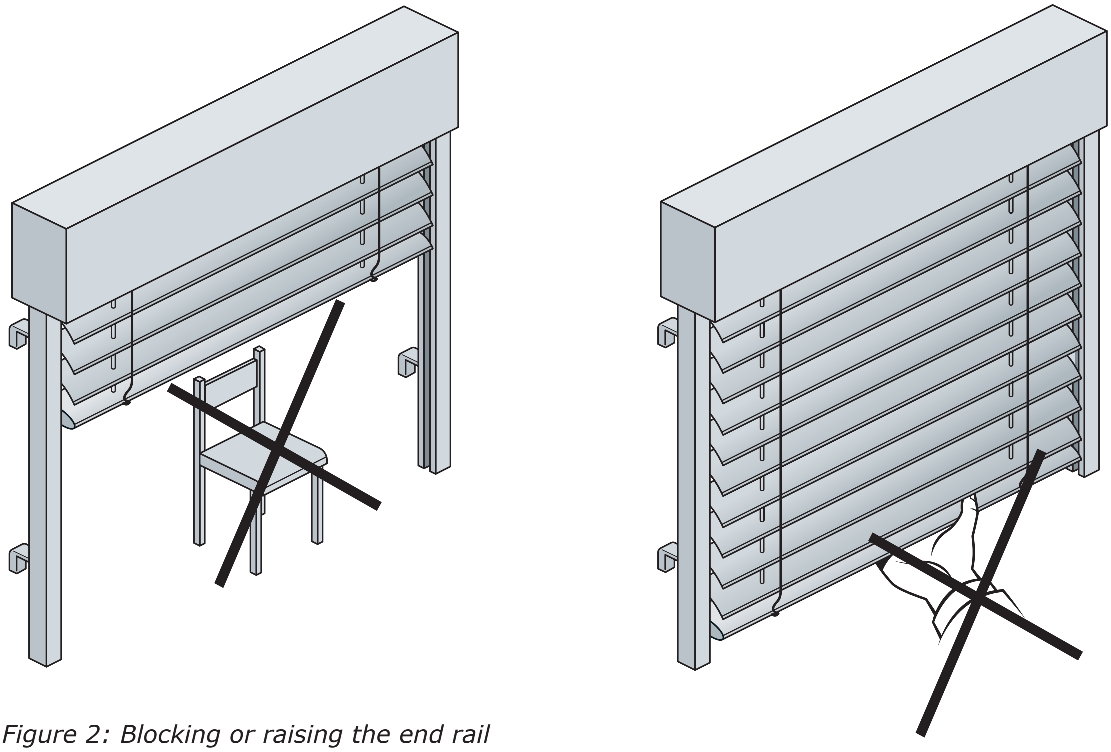

Figure 2: Blocking or raising the end rail

4.2. Relieving the draw strings by blocking or raising the end rail

If an external Venetian blind is blocked in the downward direction, e.g. by objects in its travel path or by lifting the external Venetian blind when it is moving downwards, the tension in the draw strings is relieved.
This could cause the draw strings to form loops in the reel, which could in turn cause the draw strings in a blind to wind up differently.
As this different winding often does not occur in all draw strings simultaneously, the blind may become slanted and the external Venetian blind may reach the upper limit stop before the motor's end position is reached. In this case, the drive system does not shut down and the draw string may be stretched or possibly torn.

4.3 Incorrectly set external Venetian blind height

If the external Venetian blind height is set incorrectly or it is measured too long, the blind may rest against the end caps of the guides, against the cable holders, against the windowsill or against the floor. The consequences of this are described in Section 4.2.

4.4 Installation specifications

During installation, make sure that the manufacturer's specifications in the relevant installation instructions are complied with. Failure to comply with the installation specifications can lead to increased wear of the draw strings.

Potential causes include:

- The top rail is not installed evenly horizontal across the guide rails. When tensioned, the draw string runs at an angle through the cutouts in the slats. Moving at this angle causes higher friction between the draw string and the cutouts in the slats. This leads to greater wear on the draw strings.

- The blind is not installed centrally between the guides or the cable holders are not installed in a single axis (plumb-vertical, parallel to the draw strings). The blind is pushed sideways by the offset, which can increase wear on the draw strings.

- Systems are coupled together with a rotary offset. This causes the coupled blind to reach its end position sooner, which blocks it and overloads the draw strings.

- The system dimensions between the guide rails and slats are not complied with. This can hinder the travel movement of the slats. This can, in turn, cause overloading of the draw strings when raising them or loops forming when lowering them (as described above), resulting in tearing the next time they are raised.

- See also Section 4.3.

4.5 Incorrect operation

See 2.3 Operation in icy conditions.

4.6 Passing the limit positions

If the motor's bottom limit position is overshot because of a motor malfunction or improper manual readjustment, the draw string is wound onto the reel in the wrong direction.
The causes the blind to be raised even though the motor is turning in the downwards direction. This renders the emergency-stop function of the upper limit switch (mushroom switch) on the motor inoperative.
If the blind reaches the upper limit stop, it is not recognised as the end position, the motor does not shut down and the draw string may be stretched or possibly torn.

5. Visual characteristics

5.1 General information

When checking for certain visual characteristics, the correct viewing distance must be maintained. This distance is 3 m for exterior parts and 2 m for interior parts. The following lighting conditions must be adhered to: diffuse daylight outdoors, lighting suitable for normal room use indoors; grazing light or targeted illumination are not permissible; the viewing angle is perpendicular to the surface.
The surface characteristics can best be evaluated on new components in their installed condition (immediately after they are mounted). Influences relating to the construction site, weather and chemical exposure, e.g. salty air, may result in major deviations. Additional information can be found in the publication “Hinzunehmende Unregelmäßigkeiten bei Gebäuden” [1] (Permissible Irregularities in Buildings).

5.2 Characteristics of organically coated surfaces

5.2.1 General information

Visible flaws may arise during manufacturing, surface coating, surface treatment, or the transport and installation of boxes, cover panels, guide rails, slats, bottom rails, cover panel caps, etc. The individual flaws are described and evaluated below. Surfaces are categorised into areas with high (•••), average (••) and low or no (•) requirements. The views shown in Figures 3 to 5 are intended to illustrate these surfaces.
The illustrations serve as examples and apply in kind to all types of external Venetian blinds. The general evaluation does not apply to manually applied coatings or touch-up work performed after installation. It only applies to coil-coated surfaces to a limited degree since certain characteristics cannot occur here. The information provided here is based on the VFF Merkblatt (Information Sheet) AL.02 from October 2016 [2].

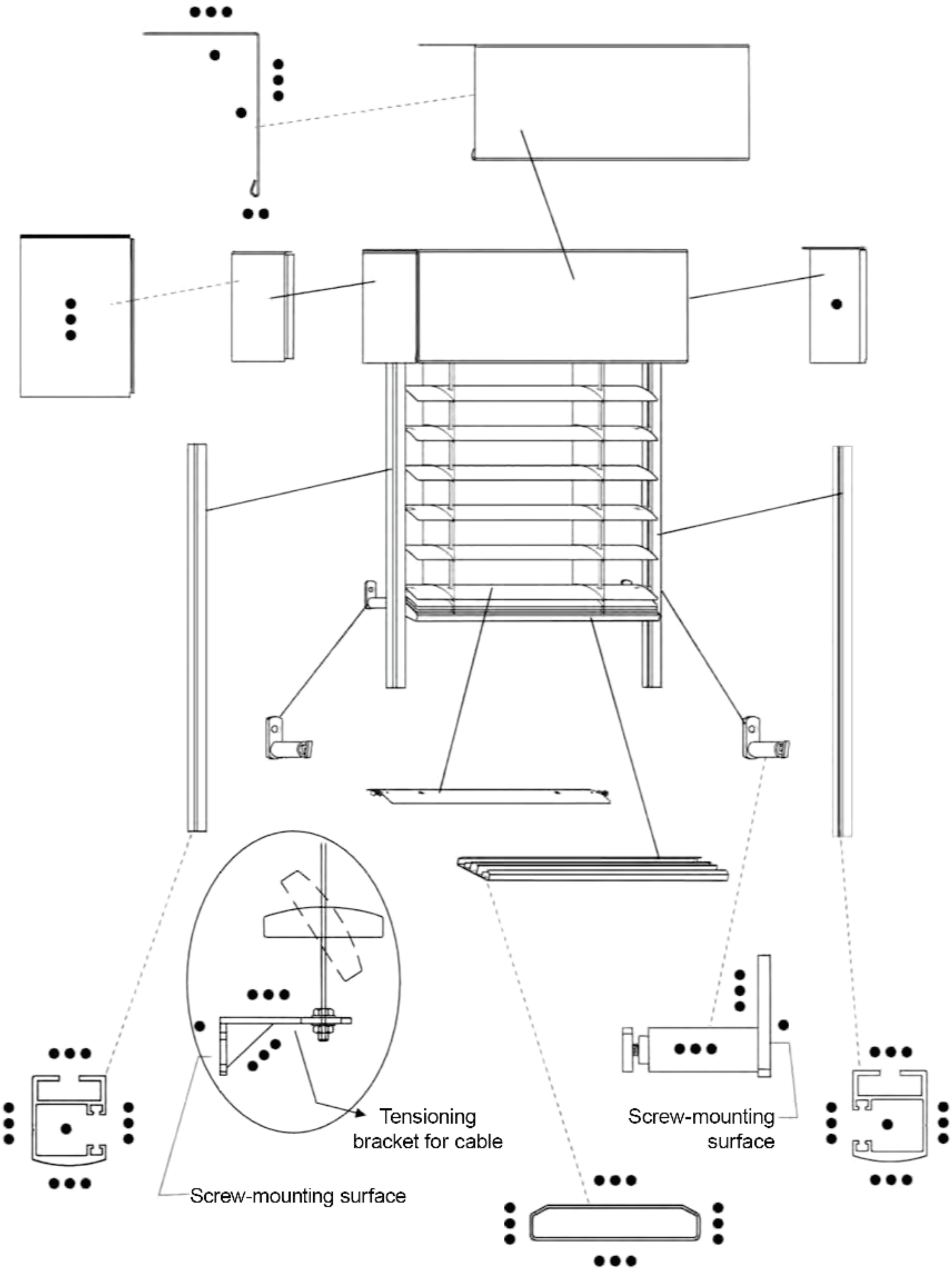

Figure 3: Definition of visible surfaces – External Venetian blinds with cover panel

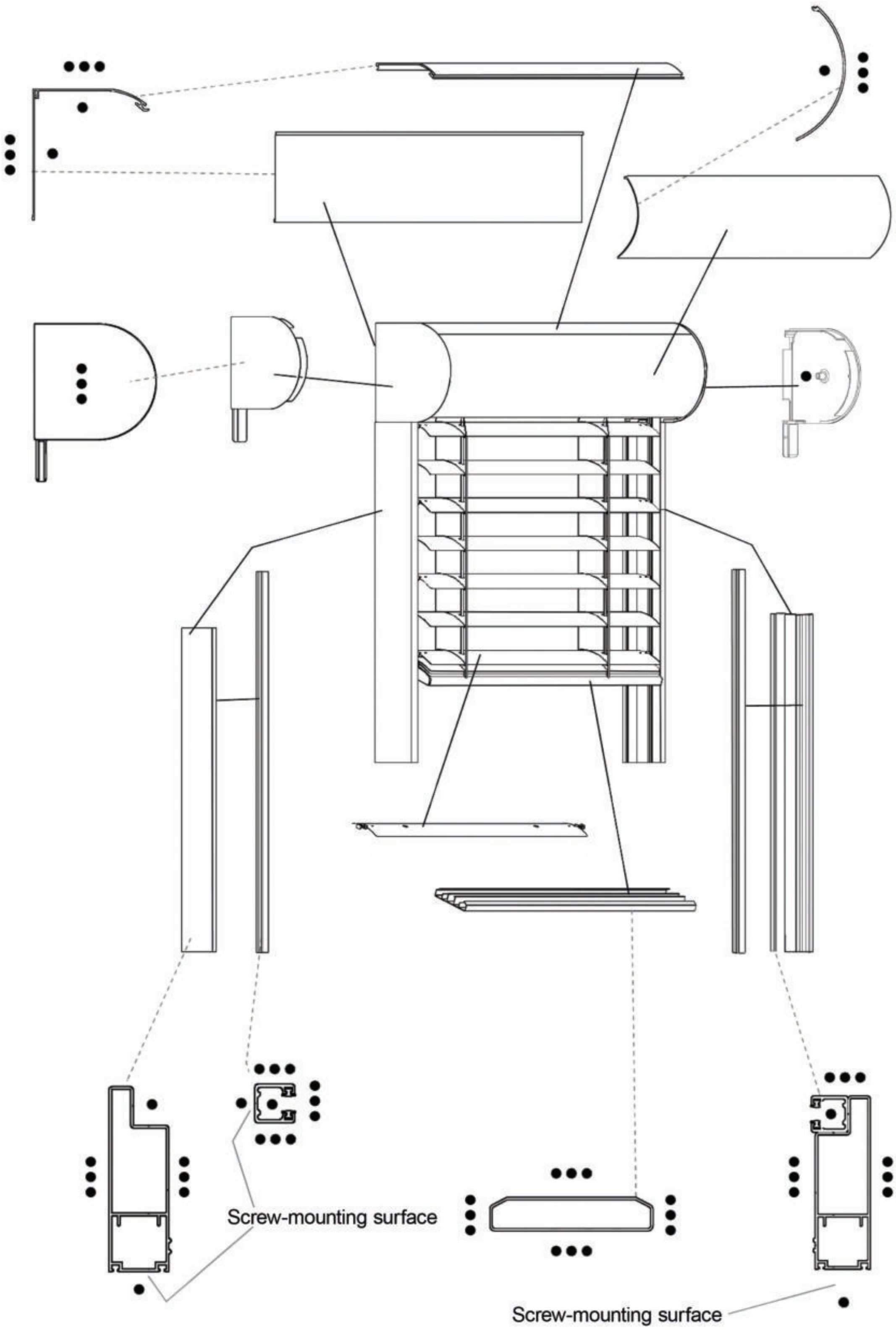

Figure 4: Definition of visible surfaces – Front-mounted external Venetian blinds

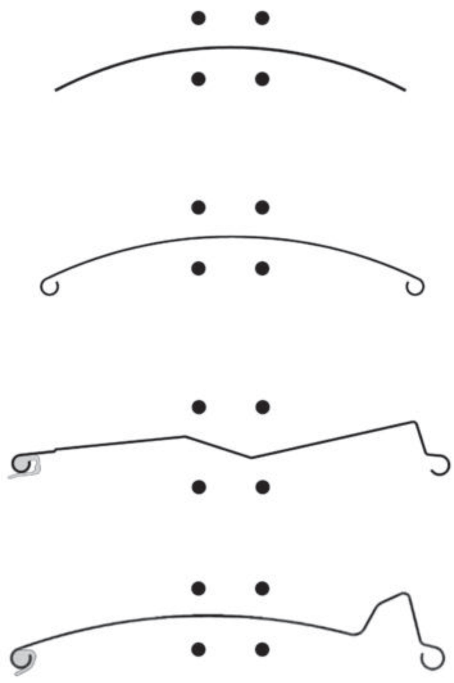

Figure 5: Definition of visible surfaces for conventional external Venetian blind slats

(coating of cutouts, longitudinal cuts and edges do not represent the current state of the art). Note: Colours may appear different in different batches. This may lead to different colour impressions, especially on profiled slats.

5.2.2 Craters, blisters
These flaws are permissible within the following limits:
••• Diameter less than 0.5 mm, up to 10 occurrences per m or m²
•• Up to 10 occurrences where less than 1 mm per m or m²
• Permissible

5.2.3 Inclusions (e.g. fibres)
These flaws are permissible within the following limits:
••• Diameter less than 0.5 mm, up to 5 occurrences per m or m²
•• Up to 10 occurrences of 1 mm per m or m²
• Permissible

5.2.4 Chipping
Only permissible in the • category

5.2.5 Paint run
Only permissible under certain conditions in the • category

5.2.6 Orange peel effect
••• Permissible if finely structured; coarsely structured effect only permissible with a layer thicknesses of over 120 μm (for design- or order-related reasons) and for paint-specific reasons (highly pigmented paint, e.g. yellow/orange/red)
••, • Permissible

5.2.7 Gloss variations

The causes here are often related to the manufacturing process or material and are not grounds for complaint in this case. Example: external Venetian blind slats are made from coil-coated aluminium, while the guide rails are made from extruded aluminium with powder or wet-paint coating. Comparisons can only be made if the same production method has been used. The following applies to the individual surfaces:

•••, •• Permissible if within certain tolerances
• Permissible

The tolerances can only be measured using reflection measurement as per DIN 67530 (60° measurement geometry) in gloss units: glossy surfaces ±10 units, satin finish ±5 units, matte surfaces ±5 units (VFF Merkblatt (Information Sheet) AL.02 [3]). Note that the matte effect may be reinforced in matte colours due to design-related edge conditions and edge piling.

5.2.8 Colour deviations

The causes here are often related to the manufacturing process or material and therefore cannot be avoided. Examples:

- Coil coating does not offer RAL colours and merely approximates these (sheet metal, roll-formed parts such as slats or cover panels).

- In larger orders, the coating materials may originate from different batches or different manufacturers. This also applies to subsequent deliveries.

- Metal components from different manufacturing/processing methods and plastic, even if they are all coated using the same method.

- In the case of metallic coatings, a different alignment of the metal pigments, for example due to the coating direction, can result in different colour impressions. The evaluation of metallic paints is considered to be particularly problematic. Therefore, they should only be evaluated visually. In the case of metallic paints, colour and metallic effect differences as well as clouding cannot be ruled out entirely because of the composition of the coating material. This primarily affects parts that are manually coated because of their geometry or that have different material thicknesses, for example.

- The component shape (e.g. of the slats) results in different colour impressions.

These points represent the current state of the art for the reasons specified in this section.

5.3 Properties of anodized surfaces

5.3.1 General information

Anodization is a corrosion-protection surface treatment for aluminium that does not apply material to the surface but instead creates an oxide layer by means of an electrochemical treatment. This oxide layer has the same colour as the natural colour of aluminium (colour designation EV 1). The colour can be changed using suitable metal salt-solutions (C 11-14, bronze to black) or colour pigment deposits.

The original surface structure remains more or less intact, depending on the selected surface pre-treatment. The pre-treatments are identified with the upper case letter E and classified from E0 to E6:
E0 means no pre-treatment, while E6 indicates a rough, matte surface due chemical pickling. In the other methods, the surface is processed mechanically by means of brushing, grinding or polishing. However, these methods are costly and cannot always be used on curved surfaces. The following criteria are based on the VFF Merkblatt (Information Sheet) AL.03 from October 2016 [3].

5.3.2 Silicon precipitation

This occurs on account of unfavourable heat treatment of hardening alloys or when using material that is not of anodization quality. This causes zones of differing electrical conductivity, which has an impact on the thickness of the anodized layer. This effect is only permissible in the • category.

5.3.3 Web marks, coarse grain

The production of profiles by means of extrusion results in varying material structures.
•••, •• Permissible, if pickling treatment E0 or E6 (pickled) as per DIN 17611 is used or in the case of other pre-treatment methods if they are not conspicuous (adhere to the viewing distances). Not permissible for surfaces E1 to E5.
• Permissible

5.3.4 Pre-corrosion

The possibility of pre-corrosion occurring during transport from the manufacturing location of the semi-finished products to the surface treatment location cannot be ruled out and depends on the aluminium alloys in question. These oxide layers are partially accentuated by pickling treatment (E6) and can only be removed by machining (e.g. grinding, E1). The following evaluation must be made:
•••, •• Permissible under certain circumstances, i.e. if E0 or E6 (pickling treatment) in accordance with DIN 17611
• Permissible

5.3.5 Gloss variations

Depending on surface characteristics and material differences, there may be variations in gloss levels. Profiles and cover panels may only be compared if they are their natural colour or have been anodized using the one-stage or two-stage method. In general, these differences are permissible. Tolerances only exist in the ••• category, and these can only be determined using measurement technology (max. 20 units).

5.3.6 Colour deviations

Colour deviations arise due to different material structures, particularly due to welding.
On account of the material characteristics, they cannot be avoided.

5.4 Surface properties

5.4.1 General information

For manufacturing reasons, there may be variations in the surface characteristics that cannot be avoided. This does not include transport damage, however. Specifications regarding signs of wear are contained in Section 3.10.
See also bibliographic references [3] and [4].

5.4.2 Grinding marks and dents on weld seams

These characteristics occur during processing prior to coating and are not fully covered by the coating.
••• Permissible, if the highest surface quality has not been agreed on, such as polishing and grinding
••, • Permissible

5.4.3 Surface irregularities due to semi-finished products

(such as dents, drawing marks, longitudinal weld seams, imprints, structures)
These irregularities occur during “forming”, e.g. during casting, rolling and extruding, and are sometimes only visible after coating. They include the following:

- Dents
- Drawing marks
- Longitudinal weld seams
- Imprints
- Structures
- Uneven surfaces of cast parts
- Dents and rolling marks on rolled sheet
- Ejector marks

These are permissible at all positions and are not considered product flaws. Surface damage due to outgassing is impermissible on surfaces of category •••.

5.4.4 Production-related mechanical damage

(e.g. dents, bumps, scratches)
•••, •• Permissible if not conspicuous (adhere to the viewing distances)
• Permissible

5.5 Light transmission

5.5.1 General information

In general, it should be noted that external Venetian blinds are not designed to be blackout systems.
Apart from specially perforated slats or design-related cutouts and differing lateral guides (cable, rail), light is not permitted to pass through the individual slats themselves. Entry of light onto the lateral guides is permissible.

5.5.2 Entry of scattered light

The factors affecting the entry of scattered light are the slat size, slat shape, colour, installation conditions, wind load, guide types and the system size.
Scattered light is permissible in the area of the lateral guides (Figure 6) and the design-based cutouts as long as the processing requirements of the manufacture are adhered to.

Figure 6: Permissible entry of scattered light through the lateral guide

As a result of the permissible shape-based and dimensional deviations (see Section 6), variances in light reflection can arise on the blind's surface.

The visual perception of this reflection depends on differences in brightness levels (indoors, outdoors), see Figure 7.

Figure 7: Variable entry of scattered light (interior view)

5.6 Closing behaviour/tilting
When the blind is fully closed, the slats must overlap. When the closed slats are viewed from a right angle, it must not be possible to look through the slats. This means that the slat angle positions of a blind are permitted to vary from the top to the bottom.

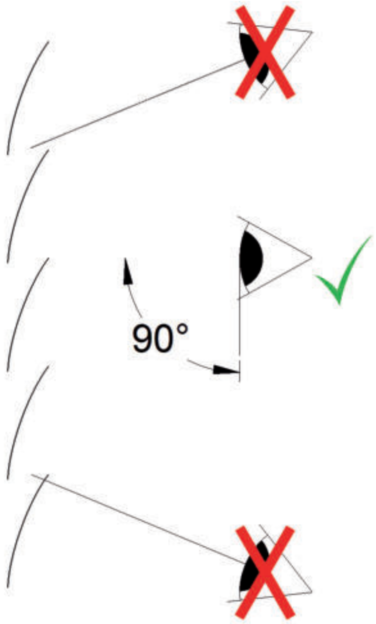

Figure 8: Correct viewing angle to evaluate the closing behaviour of the slats

Consequently, this means that at certain viewing angles, either looking down or looking up, it will be possible to look through the blind. This effect will be more or less pronounced depending on the slat shape. It is particularly prominent in dark conditions with room lighting. This correlation is shown in Figures 9 and 10.

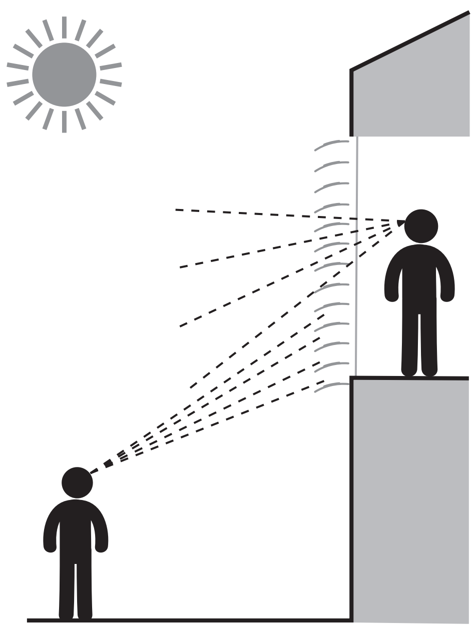

Figure 9: It is possible to see through from a certain angle.

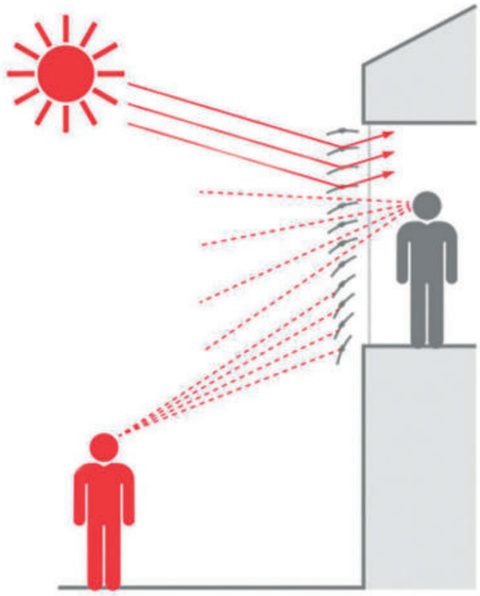

Figure 10: This view can be minimised by an external Venetian blind in the working position.

Note: This situation should be mentioned during the consultation.

5.7 Distance between bottom rail and windowsill
For proper operation, it is important for the bottom rail to hang freely and not to rest against the base. The generally accepted technical rule is that there should be a distance of approx. 20 mm between the bottom edge of the bottom rail and the tension cable bracket or the locks in the guide rails (special manufacturer specifications must be adhered to).

5.8 Asymmetrical running / slanted bottom rail and slat
This section provides a definition of uneven blind positions.
It describes the causes and the permissible tolerances. To be able to evaluate this effect, the top rails (top boxes) must be mounted horizontally. External Venetian blinds make use of textile draw strings with a special coating for smooth gliding behaviour and a very low thickness tolerance to ensure that the bottom rail can be raised and lowered as horizontally as possible.

The bottom rail may nevertheless hang unevenly while it is moving or when it is raised.
This is due to the winding behaviour of the draw string and can be attributed to:

- Small frictional differences in the guide rails or cable guides.
- Uneven stacking behaviour of the slats if the ladder strings form loops; this causes the stack to move against the top rail in a lop-sided fashion.
- Contact force of the contact switches in electrical systems.
- Weather-related changes in the characteristics of the textile ladder strings and draw strings.
- Tolerances of the draw strings (related to the batch and manufacturer).

These parameters cause the draw strings to wind with varying degrees of tightness.
As a result, the winding diameters may differ and lead to a slight change in length per revolution while the blind is being raised or lowered.
This effect is particularly pronounced in the case of minimal blind widths and large blind heights.
When lowered, the bottom rail should hang horizontally due to the draw string length.
The permissible tolerance is 5 mm (see Figure 11).

Figure 11: Position of the bottom rail when fully lowered

Tipping of the bottom rail (inward or outward) cannot be avoided for design-related reasons.

Asymmetrical running:
The current state of the art dictates that a blind is running asymmetrically (relative to the bottom rail, see Figure 12) if the deviation from the horizontal is 15 mm/m blind height at any point between the fully raised and fully lowered position. This is determined once the product is permanently mounted.
In systems <800 mm wide, the value may be considerably larger, especially with large blind heights.

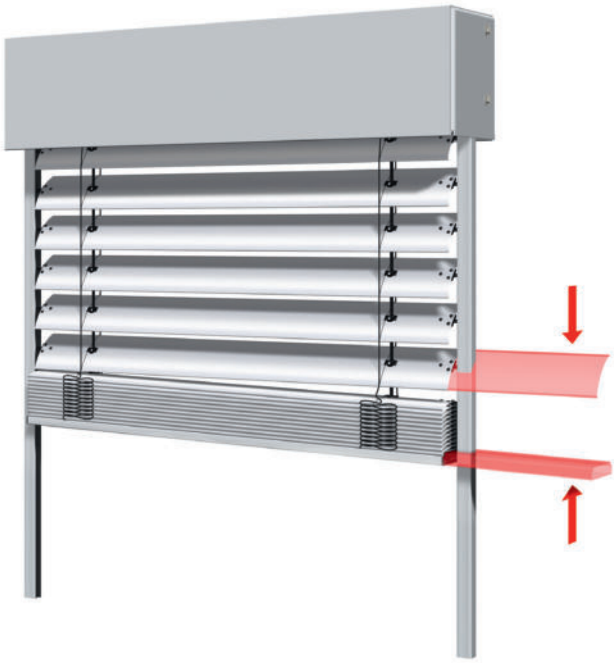

Figure 12: Slanted position of lower rail (for parallel slat stacks)

5.9 Stack build-up (stack only)

This section explains stack build-up. It describes the permissible tolerances. To be able to evaluate this effect, the top rails must be mounted horizontally.

Stack height

The stack height results from the way in which the slats are stacked and from the positioning of the loops (see Figure 13 and compare the lower and upper illustrations). The reasons for this are described below.

Generally, the deviation from the nominal size or specified size should not exceed approx. 20 mm. The manufacturer’s tolerances should be adhered to, especially when determining the required height of the cover panel/shaft. The stack height specified by the manufacturer must be adhered to.

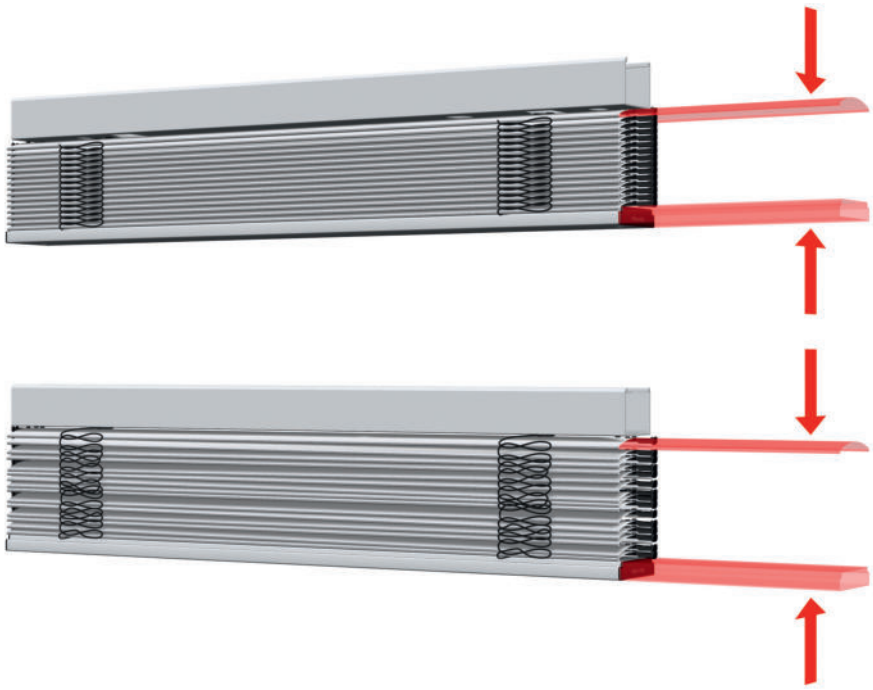

Figure 13: Varying slat stack heights due to increased stack build-up (straight lower rail)

Stack parallelism
Stack parallelism describes the deviation of the slat stack across the entire system width. The following limit value is the current state of the art:
Up to a blind height of 2 m **max. 20 mm**, for a blind height greater than 2 m **max. 1%** of the blind height.

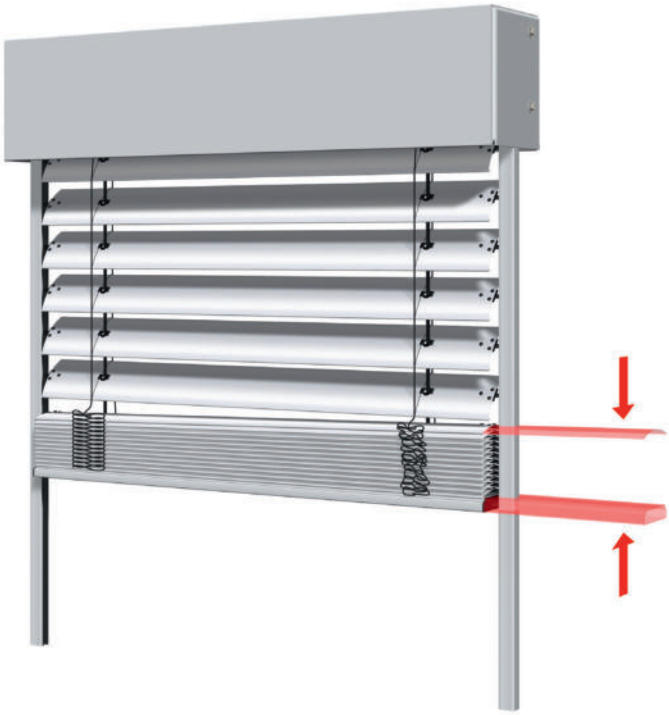

Figure 14: Stack parallelism (slat stack slanted, bottom rail straight)

Loop position
Textile ladder strings of spinning-nozzle-dyed thread are used to secure slats in external Venetian blinds. The flexibility of these ladder strings may change over time for manufacturing-related or weather-related reasons.

As a result, a greater or smaller number of loops form between the slats due to variations in loop formation in the ladder strings, which in turn gives rise to variations in stack build up. In addition, ladder strings in new systems may form larger loops between the slats since the folds need time to straighten out. Weather-related effects play an important role here.

There is not yet an applicable standard that specifies the tolerances for this behaviour. Differences in the loop formations in a blind or in adjacent blinds are part of the current state of the art (provided all other values are adhered to; see the limits specified in Section 3).

5.10 Light gap between the lowest slat and the bottom rail

This issue only applies to external Venetian blinds with a lower spacing compensation mechanism (which may also be located at the top of the system in special applications).
In external Venetian blinds, the slats are generally suspended in ladder strings spaced at a distance based on the slat width. This spacing needs to be compensated. The necessary compensation depends on the height of the external Venetian blind and is often achieved, in structural-design terms, between the top edge of the bottom rail and the lower edge of the lowest or second lowest slat. Depending on the height of the external Venetian blind, the lowest slat may either be almost vertical (see Figure 15, rear illustration) or may rest flat against the bottom rail (see Figure 15, front illustration) when the blind is closed. Consequently, the second to last slat will be positioned at a slight slant. Depending on the design and the limit position setting, it is also possible for multiple slats to rest on the bottom rail.

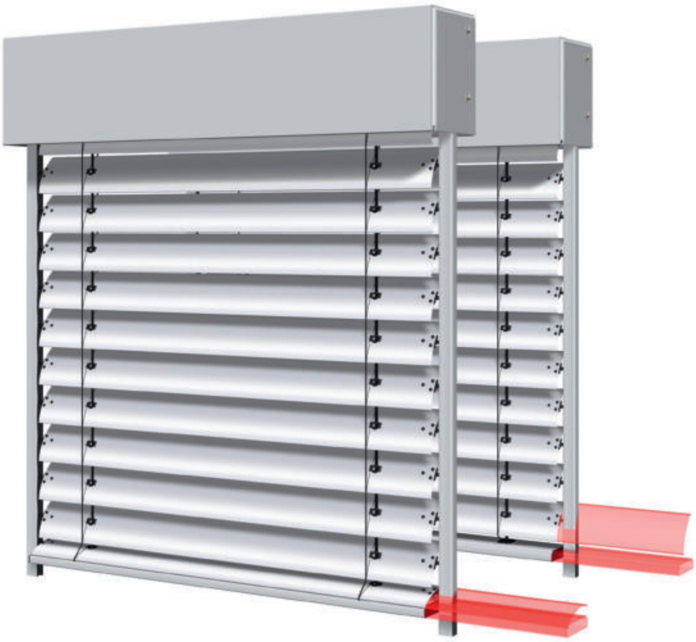

Figure 15: Spacing compensation

The advantage of lower spacing compensation is that the horizontal slat distribution is always the same, even when the external Venetian blinds differ in height or in the case of door-window combinations.
The operation of the external Venetian Blind is not affected by the slats resting at the bottom and there is no additional wear on the draw strings and ladder strings. Blind functionality and usability are in no way impaired.
The current state of the art is a **maximum distance of 7 mm** when viewed horizontally and with the slats closed.

5.11 Design-related signs of use

5.11.1 Limit positions of the bottom rail (parked position)

In the context of external Venetian blind use, the draw string is subjected to a bedding-in process (becomes more pliable and also longer due to the nature of the fabric and the design). This can cause the limit positions to change.
As a result, the stacks may no longer fully retract into the cover panels/shafts.
Figures 16 and 17 show the resulting bottom rail positions. The related information provided by the manufacturer in the operating and maintenance instructions must be adhered to. The upper limit positions set at the factory (no switch-off via mushroom switch) change over the course of the system's service life. They must be checked and adjusted to the specifications at regular intervals.

Figure 16: Changed limit position of the bottom rail (slanted bottom rail), slat stack visible on one side

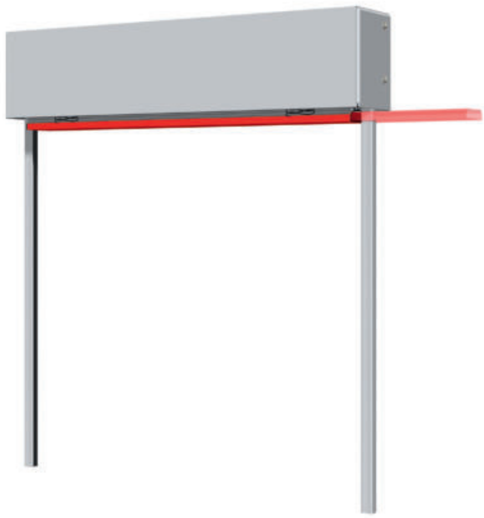

Figure 17: Changed limit position of the bottom rail (bottom rail is horizontal), slat stack is visible along its entire width

5.11.2 Signs of wear in and around the guides

Movement of the slats causes friction in the guide rails, resulting in wear in the guide rails or on the guide cables.
Even when sliding inserts are used, wear in the guide rails must still be expected. The plastic profiles (beading in the guide rails) are especially subject to wear, and it may also be exhibited by the slats. These signs of wear are unavoidable and are therefore not considered to be a product flaw.

5.11.3 Signs of wear on the slat surfaces

Slats rub against each other when the slat stack is raised and lowered. A small amount of wear is unavoidable and is therefore not considered a product flaw. The same applies to signs of wear due to movement/friction of the draw strings in the guides and/or movement of the ladder strings/loop strings. This wear is increased considerably by deposits resulting from environmental factors (e.g. dust, soot). To keep levels of wear as low as possible, regular cleaning is recommended (see the operating and maintenance instructions).

5.11.4 Corrosion caused by structural-physical factors

This section describes the role played by room climate. Particular attention is paid to the moisture on the crank mechanism and corrosion on the internal components:

- Moisture on the crank rods

Because the crank mechanism is connected through to the outside, the indoor crank rods are colder than the component surfaces that surround them. As a result, ambient humidity may condense on these parts. Condensation may also form in the area of the wall bushing. This physical process cannot be avoided and does not lead to any further impairments in normal interior climatic conditions. In extreme cases, it may be advisable to wipe the moisture off.

Humidity on the crank mechanism is physically unavoidable even when the system is installed properly.

- Corrosion on interior components

Pivot bearings, collapsible cranks and other internal fittings that are galvanised or nickel-plated are sufficiently corrosion-resistant in normal interior atmospheres (Class 1 in accordance with DIN EN 13659 Section 17.3).

A normal interior atmosphere as defined in this regulation corresponds to room types I1 and I2 in accordance with EN 13120 Appendix A. If higher humidity levels arise, e.g. I3 (poorly ventilated), or an aggressive I5 atmosphere exists, corrosion resistance must be improved. This must be arranged separately with the contractor.

Note that during construction work, e.g. when plastering the interior, a normal interior atmosphere usually does not exist. In particular, this must be observed when the operating elements are to be mounted before plastering and tiling.

5.11.5 Factors influencing running behaviour and positional accuracy of external Venetian blinds

Both external Venetian blinds (see A) and the electrical drive systems (see B) influence the running behaviour and positional accuracy of the system during operation.

A) Influences of external Venetian blinds:

- Variations in the winding behaviour of the draw strings caused by greater or lesser winding tightness that results from varying frictional behaviour in the guide elements.
- Bedding-in characteristics of the draw strings, which become more pliable and therefore wind more tightly after repeat windings.
- Changes in the winding diameter in relation to the external Venetian blind height as the draw strings are wound up.
- Uneven stacking behaviour due to loop formation of the ladder strings, which can potentially cause the stack to strike the top rail on one side only.
- Weather-related changes in the characteristics of the textile ladder strings and draw strings.
- Play in the tilt rod couplings.
- For design-related reasons, there may be light jerking and vibrations (jumping of the blind) when the external Venetian blind is raised and lowered.
- Unfavourable motor position.

B) Influences of the electrical drive system if time commands are issued by the building controller:

- The load- and temperature-dependent speed behaviour of the AC asynchronous motors (see Section 2.4.1) leads to varying blind speeds. For this reason, blinds can only move to intermediate positions or specific slat positions – which are triggered by the building control by means of time commands – with limited positioning accuracy and repeat accuracy.

The effects of influences A) and B) for different external Venetian blind system configurations are as follows:

External Venetian blind system configuration	Possible effects
Individual external Venetian blind system	The repeat accuracy of intermediate positions or specific slat positions is limited by influences A) and B)
Multiple adjacent external Venetian blind systems, mechanically coupled (see also Section 5.11)	The repeat accuracy of intermediate positions or specific slat positions is limited by influences A) and B) (see above). In addition, the slat position, bottom rail position and simultaneous movement of adjacent systems may vary due to influences A)
Multiple adjacent external Venetian blind systems that are electrically actuated simultaneously (not mechanically coupled), (see also Section 5.12)	The repeat accuracy of intermediate positions or specific slat positions is limited by influences A) and B). In addition, the slat position, bottom rail position and simultaneous movement of adjacent systems may vary due to influences A) (see above) but also influences B)
Multiple adjacent external Venetian blind systems. Electrical drive systems with bus interface (see also Section 5.12)	The repeat accuracy, slat position, bottom rail position and simultaneous movement of adjacent systems is only limited by influences A)

Thus, the current state of the art is as follows:

- External Venetian blinds do not move completely simultaneously when being raised and lowered, even if they have the same blind heights and surface areas.
- The repeat accuracy regarding the slat position and bottom rail position of a system is not exact.
- The repeat accuracy and synchronicity of adjacent systems regarding the slat position and bottom rail position are not exact.
- Through the use of electrical drive systems with a bus interface, the repeat accuracy and synchronicity of the slat position and bottom rail position in adjacent systems can be improved.
- The influence of user behaviour is also relevant in this context.

Due to these influences, the offset between adjacent blinds when they are being raised and lowered may be up to 500 mm depending on the blind height.

DC motors are not covered.

5.12 Behaviour of mechanically coupled systems
Differences in height can occur between the bottom rails of coupled systems, especially if the widths of the coupled external Venetian blinds differ significantly.

The bottom rail may be slanted or in a different position than that of an adjacent system while it is moving or fully raised. The same applies to the slat angles.

The causes of varying draw string winding behaviour are varied:

- Slight frictional differences in the guides.
- Uneven stacking behaviour of the slats if the ladder strings form loops; this causes the stack to move against the top rail in a lop-sided fashion.
- Contact force of the contact switches in electrical systems.
- Unequal blind weight.
- Weather-related changes in the characteristics of the textile ladder strings and draw strings.
- Coupling play.
- If the blind widths differ and the blind heights are large, the effect is more pronounced since the lighter stack weight of narrow systems is less effective at tensioning the draw strings.
- See also 5.11.5, A.

Incorrect installation (faulty coupling) must be excluded from these observations.

5.13 Behaviour of electrically coupled systems
When multiple adjacent individual blinds are actuated together as a group, the behaviour of mechanically coupled systems described in Section 3.11 applies here as well. In addition, the influences of the electrical drive system have an impact here, too (see Section 3.10.5, B).

Electrical drive systems with a bus interface that transmit incremental encoder signals to the building controller are largely unaffected by drive-related influences since they are actuated using positioning commands rather than time commands issued by the building controller.

5.14 Protective and wrapping film, stickers
Protective and wrapping films must be removed after installation according to manufacturer’s instructions or as soon as possible, unless otherwise agreed. This also applies to labels on visible surfaces that are no longer needed after installation.

5.15 Non-vertically positioned crank rod
When using crank holders, it is not always possible for the crank rod to be completely vertical. This can be attributed to the fact that crank holders are not available in every depth and that adjustable holders cannot be adjusted steplessly.

6. Deviations in shape and dimensional irregularities

6.1 General information

This section only applies to the manufacturing process. During use, greater shape-based and dimensional deviations may occur due to weather-related influences, type of usage and handling. Where no special agreements have been reached, no material-specific standards are in place and no further relevant stipulations are detailed below, then DIN 18202 should be considered the basis for the evaluation of tolerances. For contracts based on the German Construction Contract Procedures (VOB), the tolerances as per DIN 18358 apply unless otherwise agreed. For the dimensional tolerance limits of order-based dimensions, the manufacturer's specifications must be consulted. Regarding individual deviations, EN 13120 "Internal blinds – Performance requirements including safety" must be consulted since special "standard values" for external Venetian blinds do not exist.

6.2 Deviations in shape

6.2.1 Twisted slats

Twisting refers to an angular difference between the two ends of a slat.

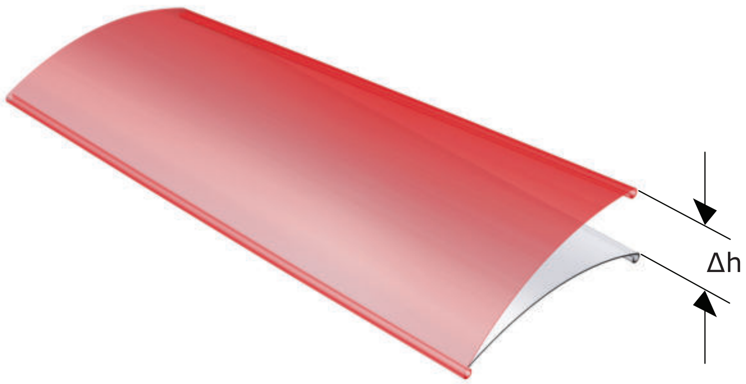

Figure 18: Twisted slats

Deviation Δh in mm/m is measured as shown in Figure 18 (when removed and on a level surface). The permissible deviation is 2 mm/m across the entire width of the slat. For slats that are less than 2 m in length, twisting Δh is limited to max. 4 mm.

6.2.2 Sabre-shaped slats

This is the deviation of the edge of a slat with length L from a straight line when the slat is placed on a level surface.

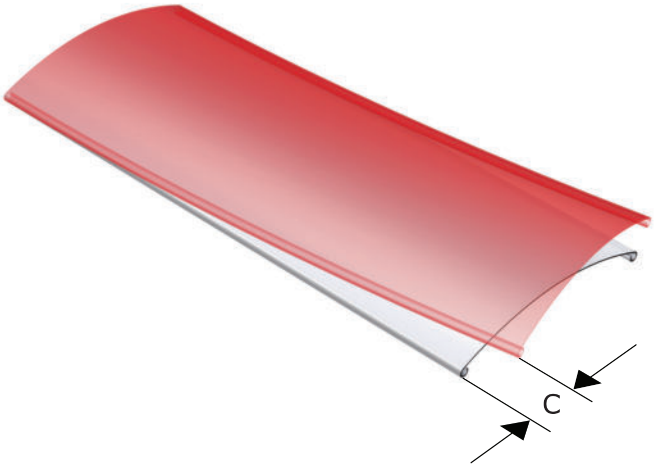

Figure 19: Sabre-shaped slats

Permissible maximum value of C (maximum value of C is measured)

Lengths of slats (m)	Max. value for sabre-shape C (mm)
L ≤ 1.5	1.2
1.5 < L ≤ 2.5	3.1
2.5 < L ≤ 3.5	6.1
L > 3.5	½ L^2

6.2.3 External Venetian blind boxes for new buildings (ready-made boxes)

The following dimensional limits apply:

5 mm/m, but a maximum of 10 mm, both for sagging and for deviations from the horizontal.

6.2.4 Sagging of metal front-mounted boxes

Regardless of the manufacturing process, the following deviations are permissible:

3 mm/m, max. 10 mm.

These tolerances apply only to sagging. Height differences between the left and right are evaluated as per DIN 18202.

6.2.5 Boxes for plastering

Plastering of the box must not cause any changes in the box shape that may lead to malfunctions. Boxes that are not yet embedded in plaster must meet the stipulations of Sections 6.2.3 and 6.2.4.
In addition, the manufacturer’s dimensional specifications must be met.

7. Maintenance

7.1 Maintenance definition

Maintenance refers to all measures taken to maintain and restore the desired condition and to determine and assess the actual condition of technical working equipment, systems and buildings. The term "maintenance" is an umbrella term for inspection, servicing and repairs (this includes cleaning and care).

7.2 Maintenance specifications

The manufacturer's specifications must be observed. For more information, refer to "the guideline on the maintenance of shutters and sunblind products".

8. Escape routes and emergency routes

Emergencies can occur at any time and anywhere in public and private buildings. In an emergency, escape routes are essential to the safety of people inside buildings. Escape route requirements are normally defined on a case-by-case basis by a specialist planner in coordination with the responsible authorities. It is therefore not possible to specify any generally applicable requirements (either statutory or normative). A sunblind positioned in an escape route must not represent a hindrance in an emergency.

For further information, refer to the publication "Sonnenschutz in Rettungswegen" (Sun protection along emergency evacuation routes).
You will find this on the IVRSA homepage.

9. Bibliography

DIN 4109-1:2018-01 Sound insulation in buildings - Part 1: Minimum requirements, Beuth-Verlag Berlin

EN 13120:2009+A1:2014 Internal blinds - Performance requirements including safety, Beuth-Verlag Berlin

EN 13659:2015-07 Shutters and external venetian blinds - Performance requirements including safety, Beuth-Verlag Berlin

EN 14202:2004-10 Blinds and shutters - Suitability for use of tubular and square motorizations – Requirements and test methods, Beuth-Verlag Berlin

DIN 17611:2011-11 Anodized products of wrought aluminium and wrought aluminium alloys – Technical conditions of delivery, Beuth-Verlag Berlin

DIN 18073:2020-11 Roller shutters, awnings and other blinds and shutters in buildings - Terms and definitions and criteria for use, Beuth-Verlag Berlin

DIN 18202:2005-10 Tolerances in building construction - Structures, Beuth-Verlag Berlin

DIN 18358:2019-09 German Construction Contract Procedures (VOB) – Part C: General technical specifications in construction contracts (ATV) - Rolling shutters works, Beuth-Verlag Berlin

EN 60034-1:2011-02 Rotating electrical machines – Part 1: Rating and performance (IEC 60034-1:2010, modified); German version EN 60034-1:2010 + Cor.:2010, Beuth-Verlag Berlin

DIN EN 60335-2-97:2017-05; VDE 0700-97:2017-05 Household and similar electrical appliances – Part 2-97: Particular requirements for drives for rolling shutters, awnings, blinds and similar equipment (IEC 60335-2-97:2002, modified + A1:2004, modified + A2:2008, modified); German version EN 60335-2-97: 2006 + A11:2008 + A2:2010 + A12:2015, Beuth-Verlag Berlin

[1] Oswald/Abel, Hinzunehmende Unregelmäßigkeiten bei Gebäuden (Permissible Irregularities in Buildings), 3rd edition 2005, Vieweg-Verlag Wiesbaden, ISBN 3-528-11689-7

[2] Visuelle Beurteilung von organisch beschichteten (lackierten) Oberflächen auf Aluminium, VFF-Merkblatt AL.02, Verband der Fenster- und Fassadenhersteller e. V. (Visual Evaluation of Organically Coated Surfaces on Aluminium, VFF Information Sheet Al.02, Association of Window and Facade Manufacturers)

[3] Visuelle Beurteilung von anodisch oxidierten (eloxierten) Oberflächen auf Aluminium, VFF-Merkblatt AL.03, Verband der Fenster- und Fassadenhersteller e. V. (Visual Evaluation of Anodized Surfaces on Aluminium, VFF Information Sheet Al.03, Association of Window and Facade Manufacturers)

[4] Technische Richtlinie Blatt 103, Rollladenkästen, Bundesverband Rollladen + Sonnenschutz e. V., Bonn (Technical Guideline Sheet 3, Roller Shutter Boxes, Federal Association for Manufacturers and Installers of Roller Shutters and Sun Protection Products, Bonn)

[5] Beck‘scher VOB-Kommentar VOB/A, 2001, 2. Auflage 2008 (Beck German Construction Contract Procedures Comment VOB/A, 2001, 2nd edition 2008)

IVRSA – Sonnenschutz in Rettungswegen (Sun protection along emergency evacuation routes), July 2022
IVRSA – Leitfaden für den Einsatz von Windwächtern (Guideline for the use of wind monitors), November 2020
IVRSA – Richtlinie zur Instandhaltung (Wartung) von Rollladen und Sonnenschutz-Produkten (Guideline on the maintenance of shutters and sunblind products), November 2019

10. Other guidelines/information

Einsatzempfehlungen Raffstore Stand: 13.06.2016 vom IVRSA eine Fachgruppe des ITRS e.V. in Zusammenarbeit mit dem Bundesverband Rollladen + Sonnenschutz e.V., Bonn (Recommendations for external Venetian blinds, as of 13.06.2016, from IVRSA a specialist group of the ITRS e.V. in conjunction with the Federal Association for Manufacturers and Installers of Roller Shutters and Sun Protection Products, Bonn)

Richtlinie Abschlüsse an Fenster und Rollläden bei Putz, Wärmedämm-Verbundsystem und Trockenbau, gemeinsame Richtlinie u.a. vom Bundesverband Rollladen + Sonnenschutz e.V., Bonn, 2022 (Guideline for Window and Roller Shutter Connections to Plastered Systems, Heat Insulation Compound Systems and Dry Wall Construction, joint guideline of the Federal Association for Manufacturers and Installers of Roller Shutters and Sun Protection Products, Bonn, 2022)

DIN EN 12216:2018-12 Shutters, external blinds, internal blinds - Terminology, glossary and definitions; Trilingual version EN 12216:2018, Beuth-Verlag Berlin

Technische Richtlinie Blatt 121 Produkteigenschaften Rollläden, Bundesverband Rollladen + Sonnenschutz e.V. , Bonn 2020 (Technical Guideline Sheet 121 Product Characteristics of Roller Shutters, Federal Association for Manufacturers and Installers of Roller Shutters and Sun Protection Products, Bonn 2020)

Broschüre Energiesparen mit Rollläden, Markisen, Jalousien und Co., Bundesverband Rollladen + Sonnenschutz e.V., Bonn (Brochure on saving energy with roller shutters, awnings, Venetian blinds and more, Federal Association for Manufacturers and Installers of Roller Shutters and Sun Protection Products, Bonn)

VDI 6011 – Optimierung von Tageslichtnutzung und künstlicher Beleuchtung, July 2016 (Optimisation of Daylight Utilisation and Artificial Lighting)

Manufacturer information (operating and maintenance instructions, installation instructions, cleaning instructions)

In addition, the following must be noted in general:
When planning and executing sunblind systems, the following guidelines and requirements must be complied with to prevent work-related accidents, work-related illness and work-related risks to health. For this purpose, the trade associations have published the following trade association rules (Berufsgenossenschaftliche Regeln BGR), trade association regulations (Berufsgenossenschaftliche Vorschriften BGV) and trade association information (Berufsgenossenschaftliche Informationen BGI).

- DGUV Vorschrift 1 „Grundsätze der Prävention" (DGUV Guideline 1 "Principles for prevention")
- ASR A3.4 "Beleuchtung" (ASR A3.4 "Lighting")
- Screen and office workplace design guideline (DGUV information 215-410)
- Sun protection in offices (DGUV information 215-444)

These requirements for external Venetian blinds are supplemented by the German Occupational and Health Act (Arbeitsschutzgesetz / ArbSchG) from 7 August 1996 (BGBl. I p. 1246), which was most recently modified by Article 15 Paragraph 89 of the act from 5 February 2009 (BGBl. I p. 160), and the requirements of the Workplaces Ordinance (Arbeitsstättenverordnung / ArbStättV) from 12 August 2004 (BGBl. I p. 2179), which was most recently modified by Article 4 of the ordinance from 19 July 2010 (BGBl. I p. 960).

Edition:
1st edition, February 2012

2nd edition, September 2012
- Individual images replaced due to quality considerations.
- No text-based changes

3rd edition, August 2017
- Section 2.7 "Noise development" expanded.
- Section 5.5 "Light transmission" expanded and amended.
- Sections 5 and 6 updated.

3rd edition, August 2023
Restructuring of and amendments to the entire guideline
2.7. "Noise development" expanded
3.5 "Light transmission" expanded
Section 4 amended and updated
Section 6 updated
Section 7 added
Section 8 added

4rd edition, November 2023
- editorial changes

The following guidelines are available from **IVRSA**:

- Guideline on Technical Consultation, Sales and Installation of Extending-Arm Awnings
- Guideline on Cleaning and Care of Awning Cloth
- Association Recommendation for Use of Radio Technology in Building Automation
- Guideline for the Evaluation of Product Characteristics of External Venetian Blinds/Awnings
- Guideline for the Evaluation of Product Characteristics of Awning
- Guideline: Instructional Content, Certificate, Order and Verification for Electrical Specialists for Specified Duties in the Field of Skilled Shutter and Sun Protection Work
- Sun protection along emergency evacuation routes
- Association Recommendation for Measuring Windows with Attached Shutter Boxes
- Connections to Sunblind Products
  Interfaces for Sunblinds, Guide Rails, Windows and Windowsills

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