

***Guideline to Assess the Visual Quality
of systems in insulating glass units***

Guideline to Assess the Visual Quality of systems in insulating glass units

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1.0 Scope

1.1 Active and rigid systems

This Guideline applies to the assessment of the visual quality of cavity installed active and rigid systems (slats, foils, light control profiles, pleated blinds, etc.) with all visible parts. The IGU assessment is based on the relevant guidelines and standards.

1.2 Test principles

The assessment of the visual quality of the integrated systems is based on the test principles and test criteria specified below, such as viewing angle, viewed surfaces, tolerances and the special features of the individual systems. The assessment covers the remaining visible inside area of the integrated systems in the installed condition.

1.3 Units

The Guideline covers one single unit. This Guideline does not cover the simultaneous control of several units.

1.4 Further guidelines and standards

- DIN 18073 “Roller shutters, awnings and other blinds and shutters in buildings”
- EN 13120 “Internal blinds – Performance requirements including safety”

2.0 Test principles

Preliminary remarks

- The noises produced by opening or tilting the windows and by moving the installed system, are of technical nature and are not considered as defects.
- The assessment criteria apply only to horizontally and vertically aligned systems, are specified in the applicable test requirements and apply to the specified test specimens.

2.1 Slat systems

Testing of slat systems depends on the visible surfaces of the slats, the headrail and bottom rail, and the position of the slats in the top and bottom end positions (no partial surfaces such as half-lowered blinds). The assessment of laterally mounted systems (e.g. held by tension cords) covers the slat surfaces and the side brackets.

2.2 Foil systems – pleated blind systems

The assessment of foil systems and pleated blind systems covers the surfaces and their appearance in the top and bottom end positions.

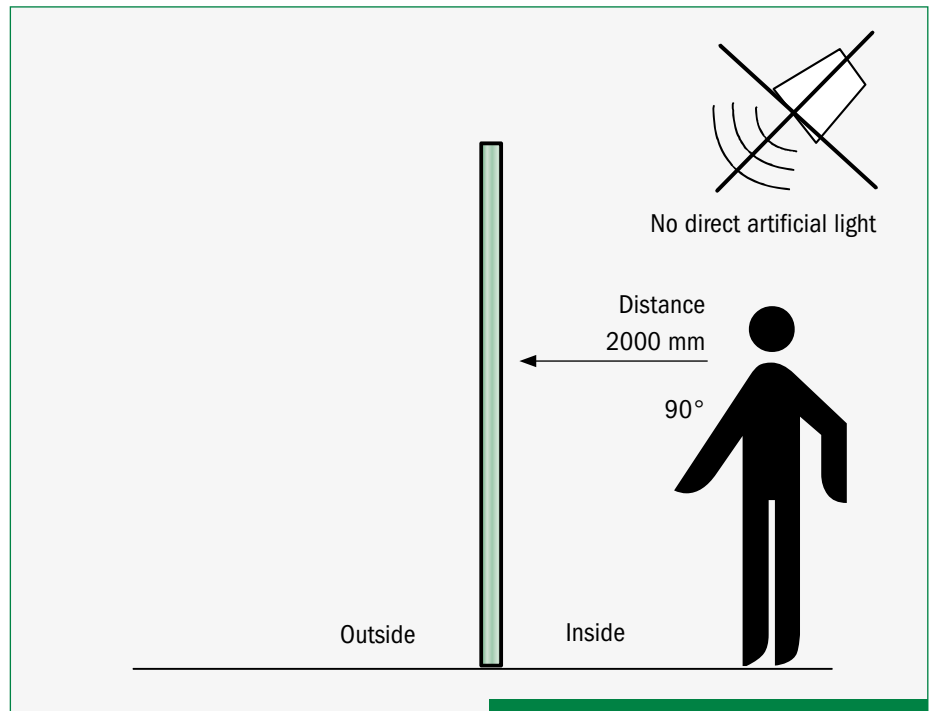
2.3 Test criteria

2.3.1 As the blinds must be assessed from the front, they must be viewed at a distance of 2 m.

The viewed areas must not be marked and there must be no direct artificial light incidence on the slats or foils. Testing is conducted in diffuse daylight. The glazing units in rooms (indoor glazing) should be assessed at a normal (diffuse) illumination intended for the use of the rooms and at a viewing angle preferably perpendicular to the surface. The test requirements apply to the top and bottom end positions. A partially closed system cannot be assessed, as there is no function in terms of the requirements for solar shading, privacy screening or anti-glare protection.

2.3.2 The test requirements and viewing distances specified in the product standards for the glazing covered here may deviate and are not taken into

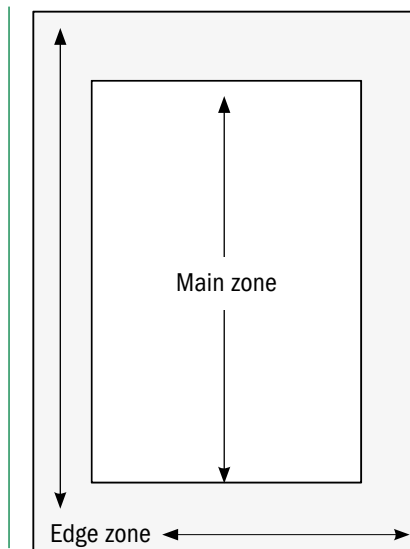
account by this Guideline. The test requirements set out in these product standards often cannot be complied with on site.



2.4 Viewed areas

The surface area to be assessed is divided into

- edge zone = 50 mm visible perimeter area of the blind (less strict assessment)
- main zone = remaining visible surface area from the surface centre to the edge zone (strict assessment)
- The assessment of the edge seal does not form part of this Bulletin, the assessment of the integrated system is the crucial factor.



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3.0 Tolerances for slat systems

3.1 Identifiable surface deviations

3.1.1 Technically induced wear caused by the movement of the slats during tilting and raising/lowering cannot be ruled out for the guide rails, tension cords, lift cords and lift tapes. The permissible deviations are described in the ift Guideline VE-07.

3.1.2 Spots, inclusions, stains, coating defects, etc. are assessed as follows

Permissible number per m² surface area

Edge zone:

max. 4 defects of diam. \leq 3 mm

Main zone:

max. 2 defects of diam. \leq 2 mm

3.1.3 Scratches in the main and edge zones

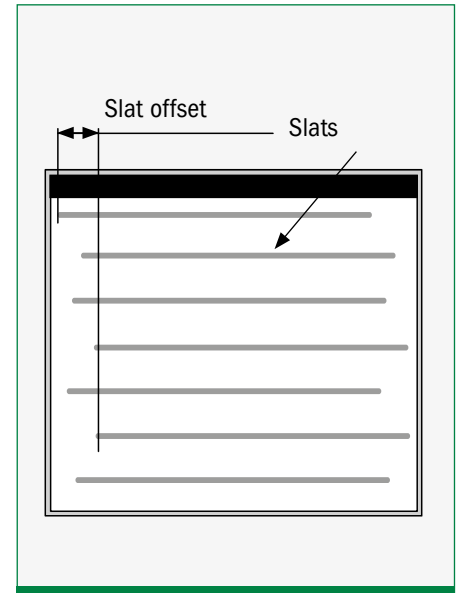
Barely visible hairline scratches, without cluster, permitted if the total of their individual lengths does not exceed 30 mm. The maximum individual length of the scratches is 15 mm.

3.2 Slat offset tolerance

- The slat offset is assessed from the two maximally offset slats of a pane
- Slat offset is assessed only for single-piece blinds, split blinds (two blinds in one pane) are not covered by this Guideline

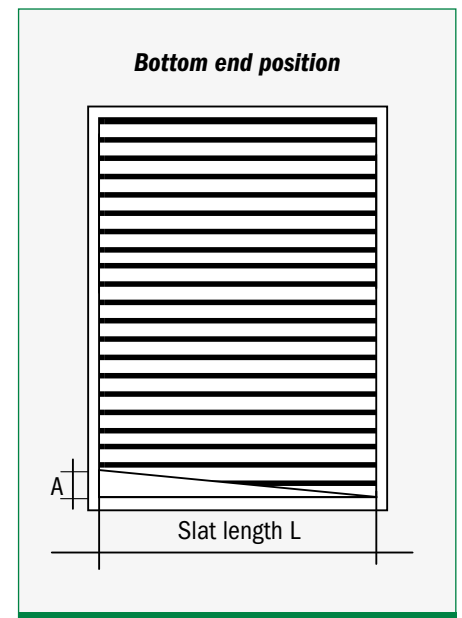
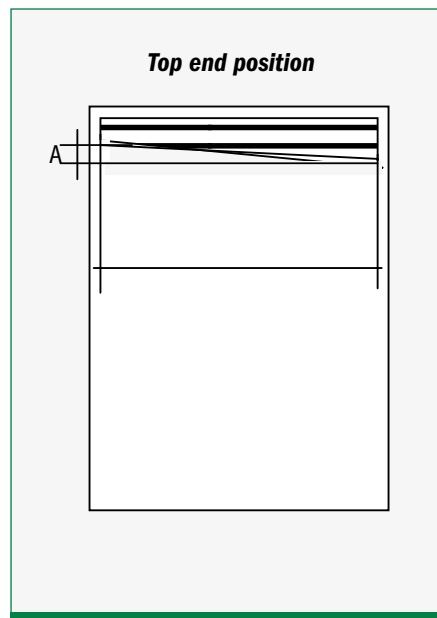
Pane width		Maximum slat offset
from	to	
0	1,000	6
1,001	2,000	8
2,001		10

Table 1 Dimensions in mm




3.3 Squareness tolerance/skew blind

The maximum squareness tolerance A in the top and bottom end positions is 6 mm per metre of slat length L, but no more than 15 mm.





3.4 Form tolerances

3.4.1 Twist/distortion tolerances

<p>Twist/distortion (EN 13120):</p>  <p>Angular deviation V between one end of a slat or louvre and the other end</p>	<p>2 mm/m</p>
<p>Local distortion</p>	<p>Permissible in punched area</p>
<p>Table 2</p>	

3.4.2 Deflection tolerances

The deflection of the slats is assessed with the blind in the closed position.

<p>Deflection D (EN 13120):</p>  <p>Bottom rail: 4 mm Slat (measured with blind in closed position)</p>	<table border="1" data-bbox="1074 1077 1469 1375"> <thead> <tr> <th>Length of slats in m</th> <th>Maximum value of deflection of slats in mm</th> </tr> </thead> <tbody> <tr> <td>$L \leq 1.5$</td> <td>5</td> </tr> <tr> <td>$1.5 < L \leq 2.5$</td> <td>10</td> </tr> <tr> <td>$2.5 < L \leq 3.5$</td> <td>15</td> </tr> <tr> <td>$L > 3.5$</td> <td>20</td> </tr> </tbody> </table>	Length of slats in m	Maximum value of deflection of slats in mm	$L \leq 1.5$	5	$1.5 < L \leq 2.5$	10	$2.5 < L \leq 3.5$	15	$L > 3.5$	20
Length of slats in m	Maximum value of deflection of slats in mm										
$L \leq 1.5$	5										
$1.5 < L \leq 2.5$	10										
$2.5 < L \leq 3.5$	15										
$L > 3.5$	20										
<p>Camber C of slat (EN 13120):</p> 	<p>L = length of slat $C = \frac{1}{2} L^2$</p>										
<p>Table 3</p>											

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3.5 Tolerances for incomplete slat tilting

The slats are permitted to catch during downward travel so that they flip into the intended position only when the slats are tilted. The slats must not catch permanently. Tilting may require an additional switching operation depending on the system.

3.6 Minimum closing angle

The closing angle of the slat system must comply with the system description. Viewing is carried out 100 mm from the top edge and 100 mm from the bottom edge of the visible area.

3.7 Irregular light penetration

Irregular light penetration between the slats is allowed, provided

- this is a result of the above tolerances for the individual components,
- the other tolerances for blinds are complied with

Irregular light penetration may be caused by such things as:

- the irregular deflection of individual slats
- closing angle tolerances

3.8 Closing angle tolerances in the plane

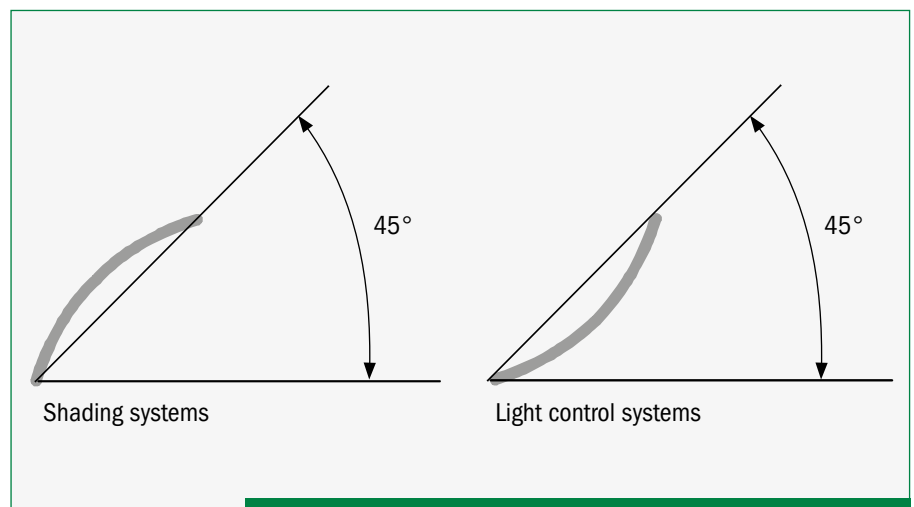
The assessment covers:

- the average value of 3 successive slats
- 100 mm from the top, the centre, 100 mm from the bottom of the visible area of the blind height

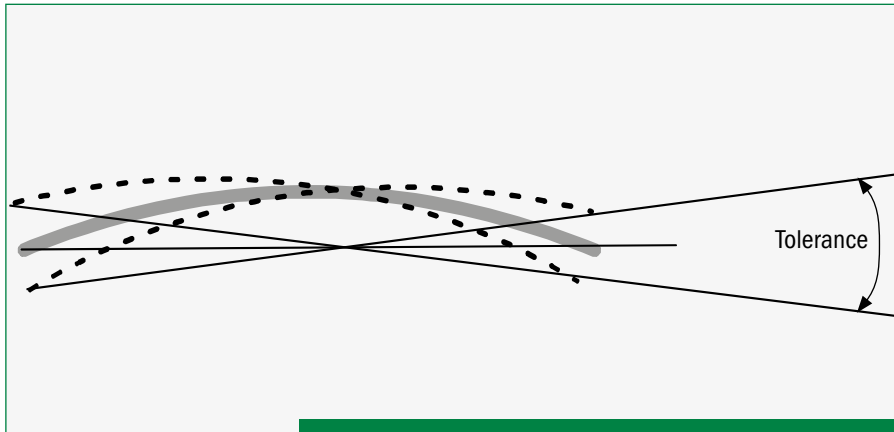
The maximum angular displacement from the blind centre may be:

Systems	up to a height of	from a height of	Tolerance
Shading systems	1000 mm		$\pm 8^\circ$
		1001 mm	$\pm 12^\circ$
Light control systems	1000 mm		$\pm 10^\circ$
		1001 mm	$\pm 12^\circ$

Table 4



3.9 Accuracy of the opening angle of slat systems, that close on one side only



After maximum opening of the slat system, the slats in the vertical central third of a vertical pane may deviate from the horizontal according to the following table:

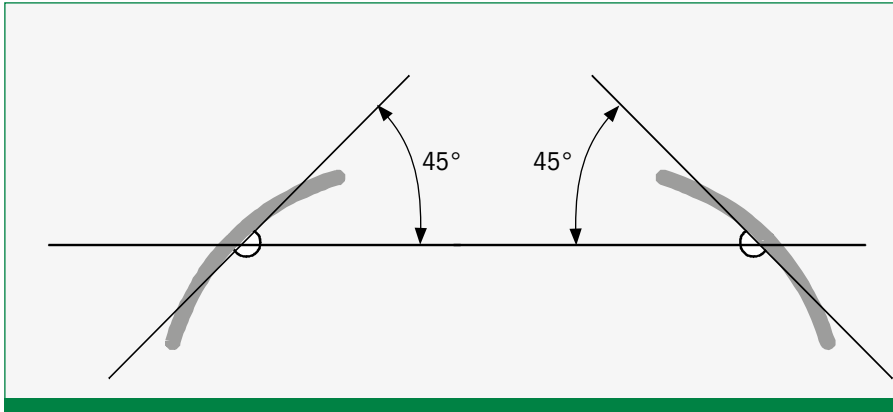
Pane height in mm		Tolerance
from	to	
	1000	$\pm 7^\circ$
1001	2000	$\pm 8^\circ$
2001	3000	$\pm 9^\circ$
3000		$\pm 10^\circ$

Table 5

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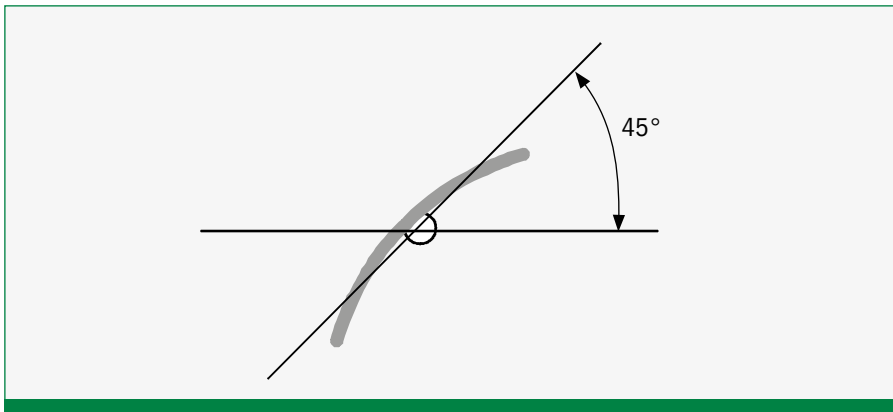
3.10 Tilt of bidirectional closing slat systems with central pivot

The slat tilt is specified in DIN 18 073 and must be at least 90° about the longitudinal axis.



3.11 Tilt of unidirectional closing slat systems with central pivot

The slat tilt is assessed only on the closing side and must be at least 45° about the longitudinal axis.



3.12 Slat closure

With the closed blind viewed horizontally (90° to blind) there should be no direct view through the slats.

4.0 Roller blind systems and pleated blind systems

4.1 Identifiable surface defects

(the blind surface area to be assessed is specified in Section 2.3)

Edge zone: 1. Inclusions, bubbles, spots, stains, stamping defects, residues, coating defects, etc.

Blind surface $\leq 1 \text{ m}^2$, max. 4 defects each $\leq 3 \text{ mm}$

Blind surface $\geq 1 \text{ m}^2$, max. 4 defects / m^2 each $\leq 3 \text{ mm}$

2. Scratches

Total of individual lengths: max. 90 mm

Individual length: max. 30 mm

Main zone: 1. Inclusions, bubbles, spots, stains, stamping defects, residues, coating defects, etc.

Blind surface $< 1 \text{ m}^2$, max. 2 defects each 2 mm

Blind surface $> 1 \text{ m}^2$, max. 3 defects each 2 mm

Blind surface $> 2 \text{ m}^2$, max. 5 defects each 2 mm

2. Scratches

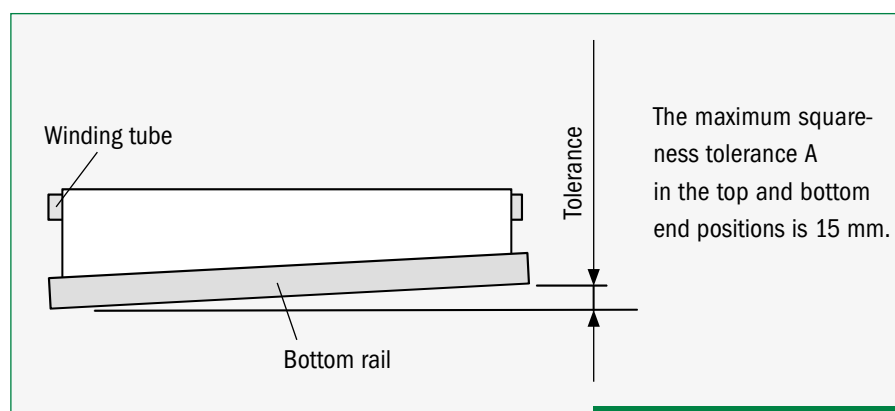
Total of individual lengths: max. 45 mm

Individual length: max. 15 mm without cluster.

4.2 Squareness tolerance

The squareness tolerances are assessed in the following positions

- top end position (roller blind/pleated blind open)
- bottom end position (roller blind/pleated blind closed)



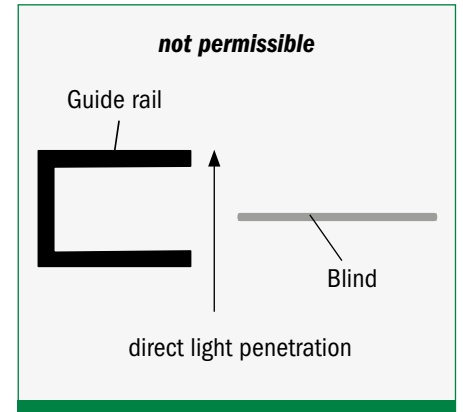
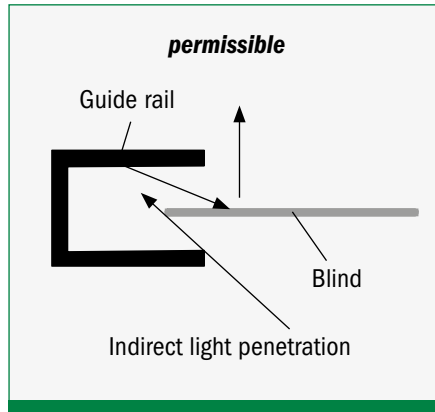
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4.3 Wave and crease formation

Waves and creases are no defects provided they do not impair the operation of the system.

4.4 Light penetration

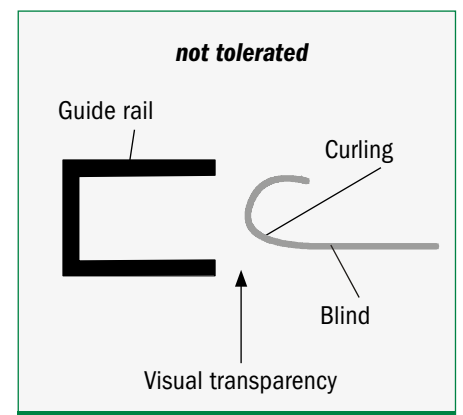
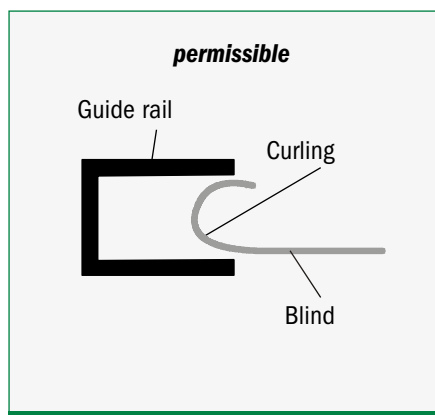
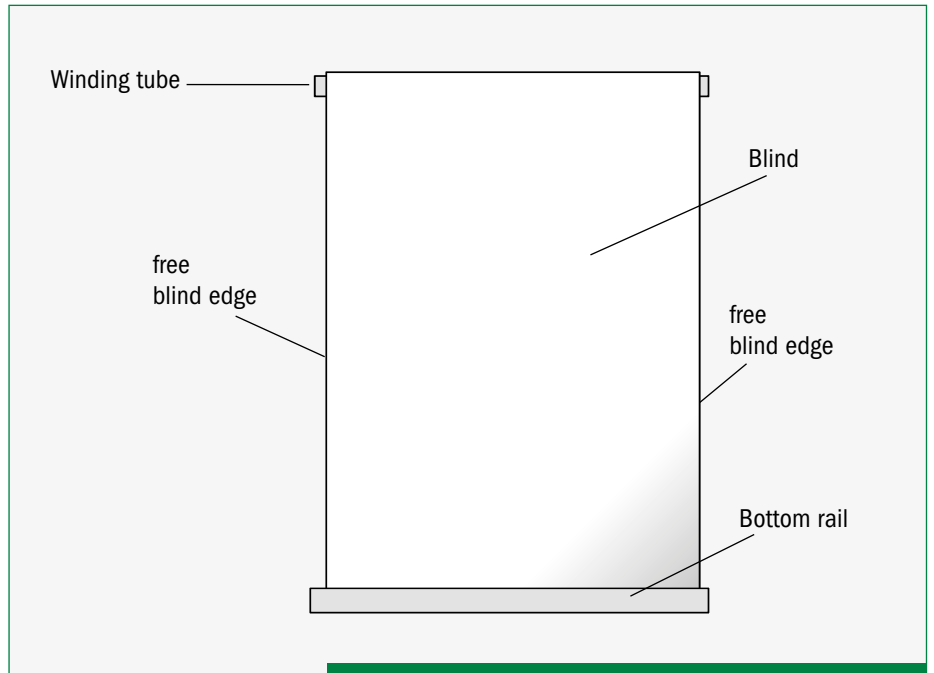
- Direct light penetration (light passes through the blind unimpeded, etc.) is not permitted.
- Indirect light penetration (e.g. through reflections) is permissible



4.5 Curling of free blind edges

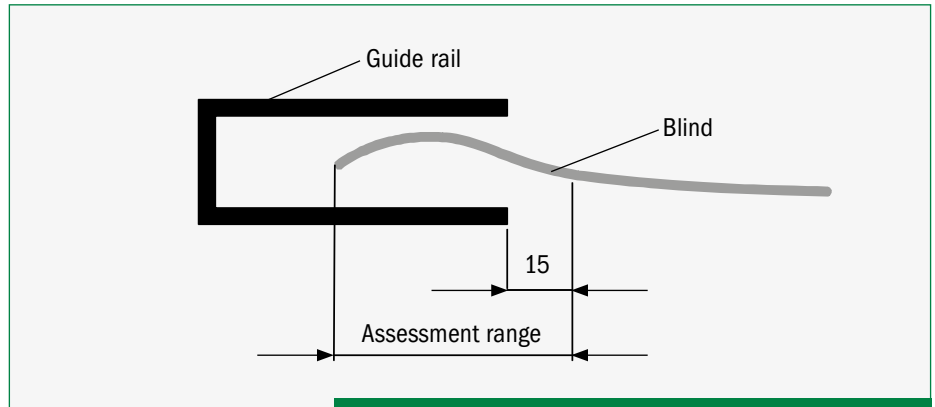
Free blind edges are cut edges that are not fastened to any other component (bottom rail, winding tube, etc.)

- Curling of free blind edges is permitted if
- there is no direct light penetration when viewed at right angles
 - the operation of the roller blind is not impaired



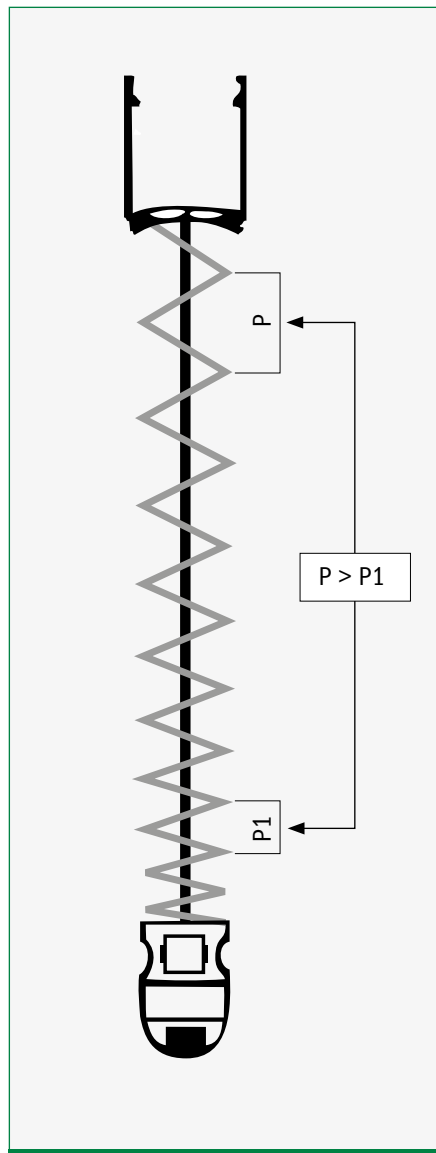
4.6 Blind changes in the area of guides

Blind changes such as wear in the area of the guides are permissible if visual transparency does not change by more than 20 %.



4.7 Pleated blind systems

The weight of the fabric changes the depth of the pleat width between the first and last pleats. This phenomenon has a more significant effect on blinds exceeding 1 m in length than on shorter ones. The difference in the depth does not provide any cause for complaint because it is due to the nature of the fabric. The first pleats naturally tend to flatten slightly, partly due to the effect of heat, but the pleats are always retained. The fabric must ensure proper folding of the pleats during each raising operation.



5.0 General instructions

This Guideline applies to the assessment of the visual quality of slats, roller blinds and pleated blind systems in IGUs. For the assessment it is assumed on principle that, in addition to the visual quality, the essential characteristics of the product required to fulfil its function must also be taken into account.

6.0 Special instructions

6.1. With all systems, a light gap may appear on the left and/or right side of the head rail for technical reasons. The effect of temperature-induced changes in length cannot generally be ruled out and do not provide any grounds for complaint.

6.2. The individual slats are held in place by what are known as ladder braids. These ladder braids may change their position depending on the system. In addition, these ladder braids may fold irregularly.

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