



Replacement for version
2015-12-04

Directive VHBE

Hardware for windows and balcony doors

Guidelines/advice for end-users (VHBE)

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Offerstraße 12

D-42551 Velbert

Phone: +49 (0)2051 / 95 06 - 0

Fax: +49 (0)2051 / 95 06 - 25

<https://www.guetegemeinschaft-schloss-beschlag.de/Startseite/>

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Note

Technical details and recommendations in this directive are based on the state of knowledge at the time of going to press.

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1 Area of application of this directive

This directive contains important information and binding instructions on handling windows and balcony doors as well as the hardware installed on them.

The information and instructions included in this directive are not based on specific products or product types, but are of general validity.

In addition to this directive, follow the operating/maintenance instructions.

2 Explanation of symbols

2.1 Symbols in this directive

2.1.1 Safety information

In this directive, safety information is indicated by symbols. The safety information is introduced by key words which express the extent of the hazard. Obey safety instructions under all circumstances, and act carefully in order to prevent accidents, personal injury, and material damage.



WARNING!

indicates a potentially dangerous situation, which can result in death or serious injuries, if it is not avoided.

2.1.2 Tips and recommendations



NOTE!

emphasises tips, recommendations, and information.

2.1.3 Descriptions of activities and lists

For descriptions of activities (handling directives) and lists, the following signs are used:

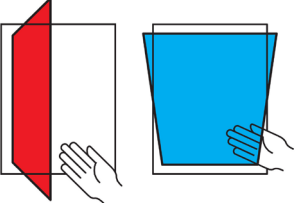


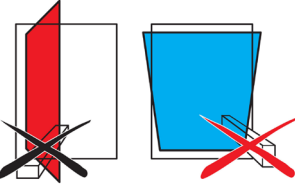


- Handling directives
- List without a specified sequence

2.2 Symbols for windows and balcony doors

Always observe all symbols shown here and their meanings when using the various types of windows and balcony doors in order to avoid accidents, injuries and property damage, regardless of whether these symbols are attached to the building element itself or not.

2.2.1 Turn-Only and Tilt&Turn hardware

2.2.1.1 Safety relevant symbols

Symbol	Meaning
	<p>Danger of injury through trapping of body parts in the opening gap between sash and frame</p> <p>→ When closing windows and balcony doors, never reach between sash and frame, and always act with care.</p> <p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury from falling through open windows and balcony doors</p> <p>→ Behave with care near to open windows and balcony doors.</p> <p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury and material damage from pressing the sash against the opening edge, e.g. wall reveal, structural connectors, adjacent window sashes (especially in opening position), etc.</p> <p>→ Do not press the sash against the opening edge.</p>
	<p>Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame</p> <p>→ Do not insert obstructions into the opening gap between sash and frame.</p>
	<p>Danger of injury and material damage from overloading the sash</p> <p>→ Do not overload the sash.</p>
	<p>Danger of injury from the effect of wind</p> <p>→ Prevent wind from acting on the open sash.</p> <p>→ During wind and drafts, close and lock windows and balcony door sashes.</p>

2.2.1.2 Illustrative symbols

The following symbols illustrate various handle positions and the resulting sash positions of the windows and balcony doors.

Tilt&Turn hardware

Handle/sash position	Meaning
	Opened tilt position of the sash
	Opened turn-position of the sash
	Closed position of the sash

Tilt&Turn hardware with night ventilation opening

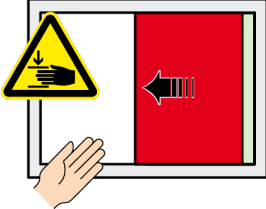


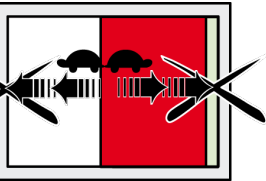
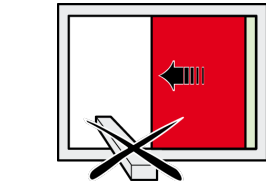
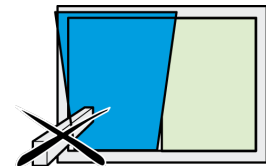
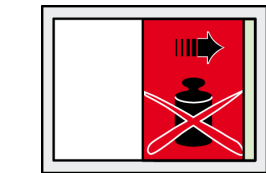
Handle/sash position	Meaning
	Opened tilt position of the sash
	Night ventilation position of the sash
	Opened turn-position of the sash
	Closed position of the sash

Tilt-First hardware

Handle/sash position	Meaning
	Opened turn-position of the sash
	Opened tilt position of the sash
	Closed position of the sash

2.2.2 Lift&Slide/Lift&Slide&Tilt hardware

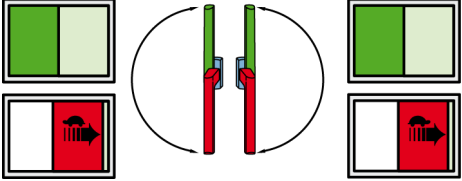

2.2.2.1 Safety relevant symbols

Symbol	Meaning
	<p>Danger of injury through trapping of body parts in the opening gap between sash and frame</p> <p>→ When closing windows and balcony doors, never reach between sash and frame, and always act with care.</p>
	<p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury from falling through open windows and balcony doors</p> <p>→ Behave with care near to open windows and balcony doors.</p> <p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury and material damage from uncontrolled closing and opening of the sash</p> <p>→ Ensure that the sash is guided slowly by hand throughout the entire range of movement as far as the fully opened or closed position (☞).</p>
	<p>Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame</p>
	<p>→ Do not insert obstructions into the opening gap between sash and frame.</p>
	<p>Danger of injury and material damage from overloading the sash</p> <p>→ Do not overload the sash.</p>

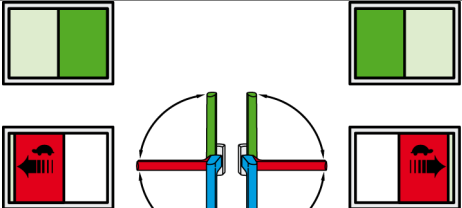
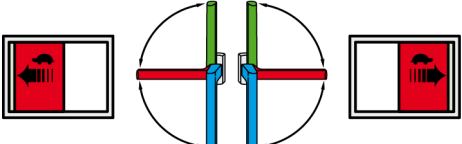

2.2.2.2 Illustrative symbols

The following symbols illustrate various handle positions and the resulting sash positions of the windows and balcony doors.

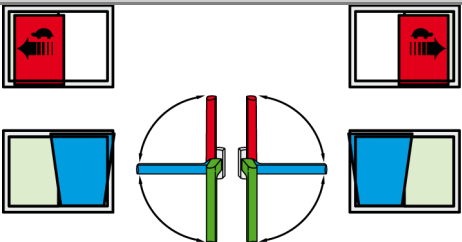
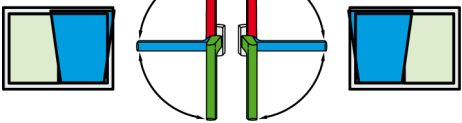

Lift&Slide hardware

Handle/sash position	Meaning
	Closed position of the sash
	Opened sliding position of the sash

Lift&Slide&Tilt hardware

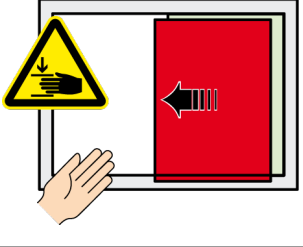

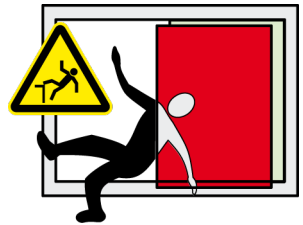
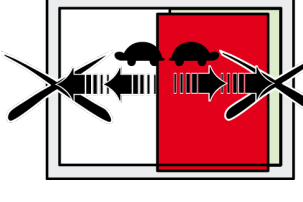
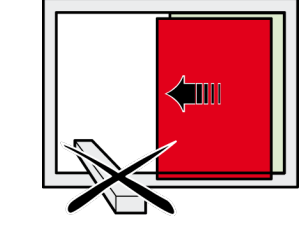
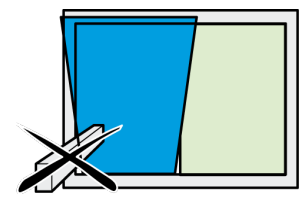
Handle/sash position	Meaning
	Closed position of the sash
	Opened sliding position of the sash
	Opened tilt position of the sash

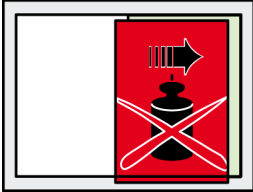
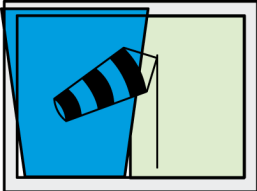
Alternative

Handle/sash position	Meaning
	Opened sliding position of the sash
	Opened tilt position of the sash
	Closed position of the sash

2.2.3 Tilt&Slide hardware

2.2.3.1 Safety relevant symbols


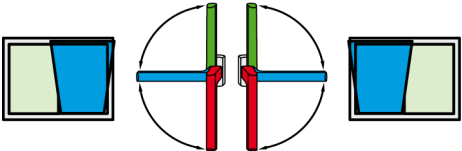

Symbol	Meaning
	<p>Danger of injury through trapping of body parts in the opening gap between sash and frame</p> <p>→ When closing windows and balcony doors, never reach between sash and frame, and always act with care.</p>
	<p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury from falling through open windows and balcony doors</p> <p>→ Behave with care near to open windows and balcony doors.</p> <p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury and material damage from uncontrolled closing and opening of the sash</p> <p>→ Ensure that the sash is guided slowly by hand throughout the entire range of movement as far as the fully opened or closed position (👤).</p>
	<p>Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame</p> <p>→ Do not insert obstructions into the opening gap between sash and frame.</p>
	

Symbol	Meaning
	<p>Danger of injury and material damage from overloading the sash</p> <p>→ Do not overload the sash.</p>
	<p>Danger of injury from the effect of wind</p> <p>→ Prevent wind from acting on the open sash.</p> <p>→ During wind and drafts, close and lock windows and balcony door sashes.</p>


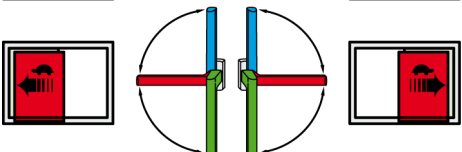

2.2.3.2 Illustrative symbols

The following symbols illustrate various handle positions and the resulting sash positions of the windows and balcony doors.

Tilt&Slide hardware

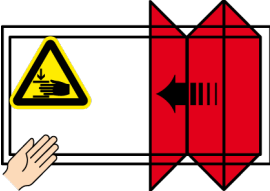
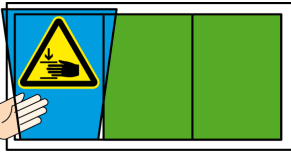
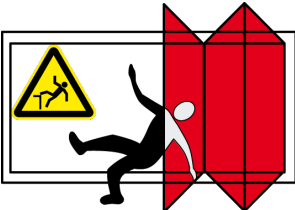
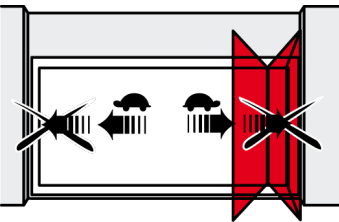
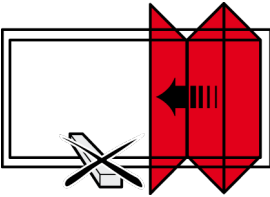
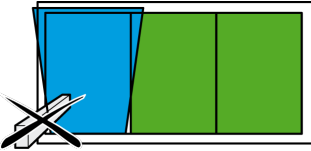
Handle/sash position	Meaning
	Closed position of the sash
	Opened tilt position of the sash
	Opened sliding position of the sash

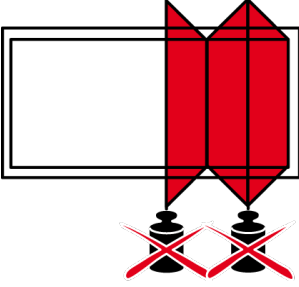
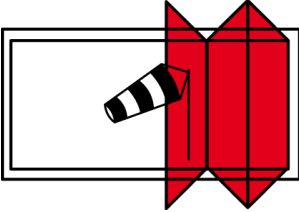
Alternative

Handle/sash position	Meaning
	Opened tilt position of the sash
	Opened sliding position of the sash
	Closed position of the sash

2.2.4 Fold&Slide hardware


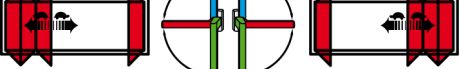

2.2.4.1 Safety relevant symbols

Symbol	Meaning
	<p>Danger of injury through trapping of body parts in the opening gap between sash and frame</p> <p>→ When closing windows and balcony doors, never reach between sash and frame, and always act with care.</p>
	<p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury from falling through open windows and balcony doors</p> <p>→ Behave with care near to open windows and balcony doors.</p> <p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury and material damage from pressing the sash against the opening edge (reveal) and uncontrolled closing and opening of the sash</p> <p>→ Do not press the sash against the opening edge (reveal).</p> <p>→ Ensure that the sash is guided slowly by hand throughout the entire range of movement as far as the fully opened or closed position (👉).</p>
	<p>Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame</p>
	<p>→ Do not insert obstructions into the opening gap between sash and frame.</p>

Symbol	Meaning
	<p>Danger of injury and material damage from overloading the sash</p> <p>→ Do not overload the sash.</p>
	<p>Danger of injury from the effect of wind</p> <p>→ Prevent wind from acting on the open sash.</p> <p>→ During wind and drafts, close and lock windows and balcony door sashes.</p>

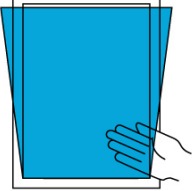
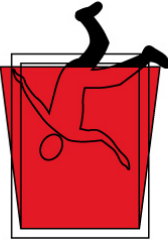
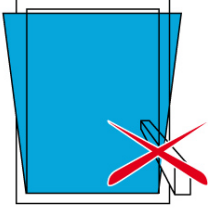

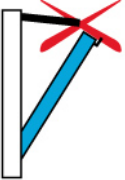

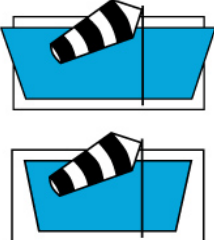
2.2.4.2 Illustrative symbols

The following symbols illustrate various handle positions and the resulting sash positions of the windows and balcony doors.

Handle/sash position	Meaning
	<p>Opened tilt position of the sash</p>
	<p>Fold&Slide and opened turn-position of the sash</p>
	<p>Closed position of the sash</p>

2.2.5 Fanlight openers



2.2.5.1 Safety relevant symbols

Symbol	Meaning
	<p>Danger of injury through trapping of body parts in the opening gap between sash and frame</p> <p>→ When closing windows, never reach between sash and frame, and always act with care.</p> <p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury from falling through open windows and balcony doors</p> <p>→ Behave with care near to open windows and balcony doors.</p> <p>→ Keep children and people who cannot estimate the dangers away from the point of danger.</p>
	<p>Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame</p> <p>→ Do not insert obstructions into the opening gap between sash and frame.</p>
	<p>Danger of injury and material damage from overloading the sash</p> <p>→ Do not overload the sash.</p>
	<p>Danger of injury through incorrect hingeing after cleaning</p> <p>→ After cleaning, carefully hinge and engage the sash according to the manufacturer's instructions.</p>
	<p>Danger of injury through disabling the safety stays</p> <p>→ Ensure that the safety stays are operating safely.</p>
	<p>Danger of injury from the effect of wind</p> <p>→ Prevent wind from acting on the open sash.</p> <p>→ During wind and drafts, close and lock windows.</p>



2.2.5.2 Illustrative symbols

The following symbols illustrate various handle positions and the resulting sash positions of the windows and balcony doors.


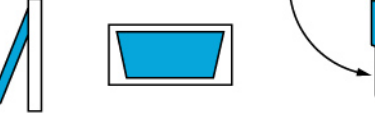
Tilting sashes

Handle/sash position	Meaning
	Closed position of the sash
	Opened tilt position of the sash

Alternative

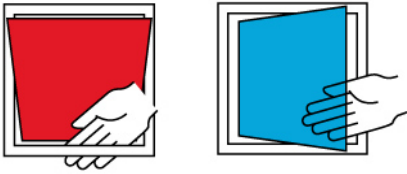
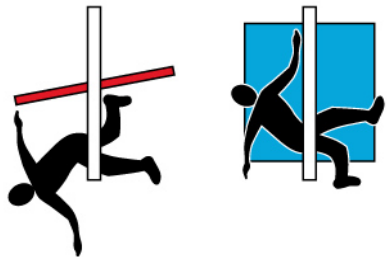
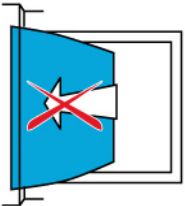
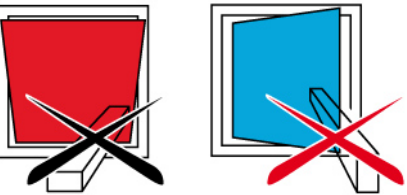
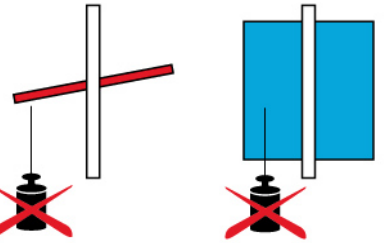
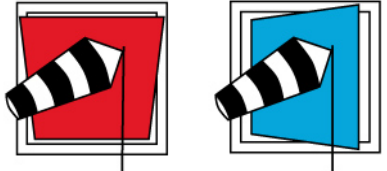
Handle/sash position	Meaning
	Opened tilt position of the sash
	Closed position of the sash

Top-hung sashes

Handle/sash position	Meaning
	Closed position of the sash
	Opened top-hung position of the sash

2.2.6 Horizontal and vertical pivoting hardware

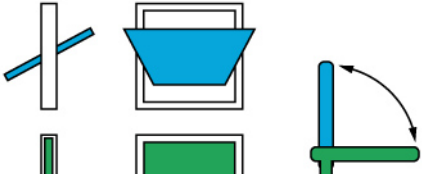

2.2.6.1 Safety relevant symbols

Symbol	Meaning
	<p>Danger of injury through trapping of body parts in the opening gap between sash and frame</p> <ul style="list-style-type: none"> → When closing windows and balcony doors, never reach between sash and frame, and always act with care. → Keep children and people who cannot estimate the dangers away from the point of danger.
	<p>Danger of injury from falling through open windows and balcony doors</p> <ul style="list-style-type: none"> → Behave with care near to open windows and balcony doors. → Keep children and people who cannot estimate the dangers away from the point of danger.
	<p>Danger of injury and material damage from pressing the sash against the opening edge (reveal)</p> <ul style="list-style-type: none"> → Do not press the sash against the opening edge (reveal).
	<p>Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame</p> <ul style="list-style-type: none"> → Do not insert obstructions into the opening gap between sash and frame.
	<p>Danger of injury and material damage from overloading the sash</p> <ul style="list-style-type: none"> → Do not overload the sash. → Do not overload in restricted opening positions.
	<p>Danger of injury from the effect of wind</p> <ul style="list-style-type: none"> → Prevent wind from acting on the open sash. → During wind and drafts, close and lock windows and balcony door sashes.

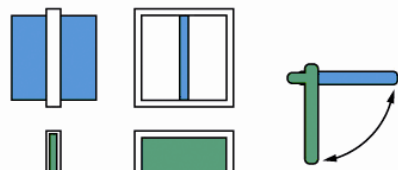

2.2.6.2 Illustrative symbols

The following symbols illustrate various handle positions and the resulting sash positions of the windows and balcony doors.



Horizontally pivoting sash hardware

Handle/sash position	Meaning
	Opened horizontal pivoting position of the sash
	Closed position of the sash

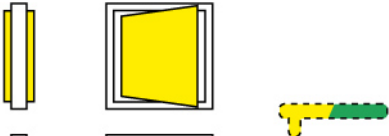

Vertically pivoting sash hardware

Handle/sash position	Meaning
	Opened vertical pivoting position of the sash
	Closed position of the sash

Horizontally pivoting sash hardware, night ventilation position

Handle/sash position	Meaning
	Night ventilation position of the sash
	Closed position of the sash

Night ventilation position for vertically pivoting sash hardware

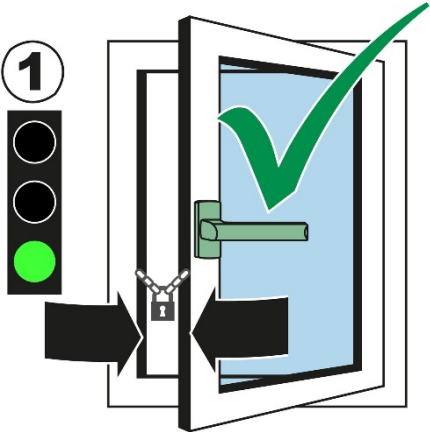
Handle/sash position	Meaning
	Night ventilation position of the sash
	Closed position of the sash

2.2.7 Hardware for openable, fall-protection building elements

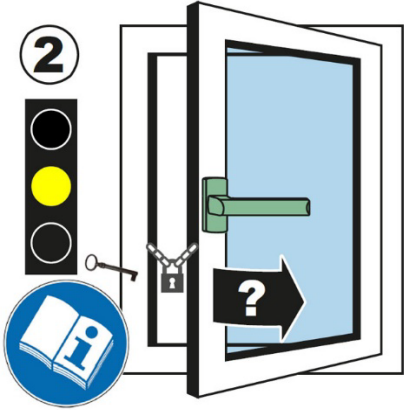
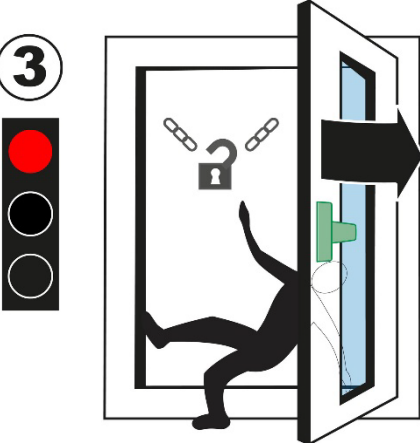

The following symbols are only to be understood as examples of a possible design of an openable, fall-protection building element; shown here is a tilt&turn window with an opening limitation that can be deactivated in compliance with a specified safety concept.

However, the operating method of openable, fall-protection structural elements can be designed very differently, whereby the type of opening and also the lever position may vary greatly.

2.2.7.1 Illustrative symbols

Symbol	Meaning
	<p>The opening limitation is activated</p> <p>The window sash can be opened only up to the agreed gap dimension, which prevents falling out</p>

2.2.7.2 Safety relevant symbols

Symbol	Meaning
	<p>Danger due to non-observance of the safety concept and/or the product information</p> <ul style="list-style-type: none"> → Read the product information before deactivating the opening limitation → Observe all specifications of the safety concept → Deactivation only by instructed persons
	<p> Danger to life and limb due to falling out of open windows and balcony doors</p> <ul style="list-style-type: none"> → After deactivation, approach the window opening only when using temporary safety fences or personal protective equipment (PPE) → Only instructed persons are allowed to stay near the window opening

3 Stipulated application

The stipulated application of windows and balcony doors with Turn-Only and Tilt&Turn hardware and with sliding hardware for which they are exclusively designed and built is explained below.

Stipulated application includes compliance with all requirements in the operating/maintenance instructions.

3.1 Windows and balcony doors with Turn-Only and Tilt&Turn hardware

For windows and balcony doors with Turn-Only and Tilt&Turn hardware, windows and balcony door sashes can be brought, by activation of a handle, into a turn position or into a tilting position limited by means of the scissor stay.

When a sash is closed, and the hardware is locked, the resistance of a gasket usually needs to be overcome.

**WARNING!****Danger of injury and material damage from incorrect closing and opening of sashes!**

Incorrect closing and opening of sashes can result in serious injuries and significant material damage.

Therefore:

- Ensure that the sash does not hit the opening edge, e.g. wall reveal, structural connectors, adjacent window sashes (especially in the open position), etc., when opening
- Ensure that when closing the sash, it does not collide with the frame or with another sash.
- Ensure that the sash is guided slowly by hand throughout the entire range of movement as far as the fully closed position, and that it is brought very slowly towards the frame.
- Ensure that the sash never slams closed or swings open in an uncontrolled manner.

3.2 Windows and balcony doors with sliding hardware

For windows and balcony doors with sliding hardware, windows and balcony door sashes can be pushed horizontally or vertically through operation of a handle.

For special designs, the sashes can also be folded together into pleats (similar to a concertina - Fold&Slide windows).

For special designs, various sashes can also be brought into a turning and/or tilting position limited by means of the scissor stay.

When a sash is closed, and the hardware is locked, the resistance of a gasket usually needs to be overcome.

**WARNING!****Danger of injury and material damage from incorrect closing and opening of sashes!**

Incorrect closing and opening of sashes can result in serious injuries and significant material damage. Therefore:

- Ensure that the sash does not collide with the frame, the opening limitation stop (buffer), or other sashes due to the motion in reaching the fully opened or closed position.
- Ensure that the sash is guided by hand throughout the entire range of movement as far as the fully opened or closed position, and that it is brought very slowly towards the frame, the opening limitation stop (buffer), or other sashes (technical value - maximum reference velocity of the closing edge $v \leq 0.2$ m/s).

3.3 Windows with fanlight openers

For windows with fanlight openers, window sashes can be brought into a limited open position in tilt, top-hung, or turn position, through operation of a handle.

When a sash is closed, and the hardware is locked, the resistance of a gasket usually needs to be overcome.

**WARNING!****Danger of injury and material damage from incorrect closing and opening of sashes!**

Incorrect closing and opening of sashes can result in serious injuries and significant material damage. Therefore:

- Ensure that when using the handle, the sash is guided slowly throughout the entire range of movement as far as the fully closed position, and that it is brought very slowly towards the frame.
- Ensure that the sash never slams closed or swings open in an uncontrolled manner.

3.4 Windows with horizontal and vertical pivoting hardware

For windows with horizontal and vertical pivoting hardware, window sashes can be brought into a horizontal or vertical pivoting position, through operation of a handle.

When a sash is closed, and the hardware is locked, the resistance of a gasket usually needs to be overcome.

**WARNING!****Danger of injury and material damage from incorrect closing and opening of sashes!**

Incorrect closing and opening of sashes can result in serious injuries and significant material damage. Therefore:

- Ensure that when using the handle, the sash is guided slowly throughout the entire range of movement as far as the fully closed position, and that it is brought very slowly towards the frame.
- Ensure that the sash never slams closed or swings open in an uncontrolled manner.

3.5 Openable, fall-protection building elements

Openable building elements with fall protection are windows or balcony doors which are installed below the parapet/breastwork height or at floor level. They are designed to be openable to such a limited extent that fall-preventing devices (such as breastwork or railings) are not used.

The purpose of the hardware used for this is to prevent these windows from opening completely, and to limit them to a previously agreed gap size, so falling through will be prevented.

As an additional function, if necessary, the deactivation of the opening limiters with special tools or keys by instructed personnel, for cleaning the windows, for example, can be provided.

**WARNING!****Danger to life in the event of improper use of limiting components in openable, fall-protection building elements**

The use of limiting components with a simultaneous omission of safety devices (e.g. guardrails) can lead to dangerous situations and cause serious accidents or even death. Therefore:

- Ensure observance of all instructions and warnings of the manufacturer of windows and balcony doors.
- Ensure observance of the safety concept specified by the manufacturer of windows and balcony doors, including safety instruction of the persons authorised to deactivate the opening limiters.
- Ensure professionally performed maintenance/servicing and inspection in accordance with Section 7 | 7.3.1

4 Notice on restriction of use

Open sashes of windows and balcony doors, as well as sashes of windows and balcony doors which are not locked or are in a ventilation position (e.g. tilted position) achieve only a protective function.

They do not fulfil the requirements for:

- air permeability
- watertightness
- sound insulation
- thermal insulation
- burglary inhibition

5 Misuse

Any use beyond or other than the stipulated application and installation of the products is deemed to be misuse, and can result in dangerous circumstances.



WARNING!
Danger through misuse!

Misuse of windows and balcony doors can result in dangerous circumstances.

In particular, avoid the following applications:

- Insertion of obstacles in the opening area between the frame and the windows and balcony door sashes.
- The deliberate or negligent application of excessive loads on windows and balcony doors.
- The intentional or uncontrolled slamming or pressing of the window and balcony door sashes against the opening edge, e.g. the wall reveal, structural connectors, adjacent window sashes (especially in the open position), etc. This can destroy the hardware, frame materials, or other individual components of the windows or balcony doors.

Claims for damages of any type whatsoever resulting of operation other than that stipulated are excluded.

6 General instructions on use and operation

- During wind and drafts, close and lock windows and balcony door sashes. Wind and draught movements occur when open windows or balcony doors open or close of their own accord in an uncontrolled manner because of positive or negative air pressure.



NOTE!

A fixed open position for windows and balcony doors can be achieved with additional hardware which must be determined.

Windows and balcony doors always constitute a danger area.



WARNING!
Danger of injury when closing windows and balcony doors!

There is a danger of crushing when reaching between sash and frame when closing the window or balcony door. Therefore:

- When closing windows and balcony doors, never reach between sash and frame, and always act with care.
- Keep children and people who cannot estimate the dangers away from the point of danger.

**NOTE!**

Depending on the external temperature, relative humidity of the air, and application of the sliding element, temporary condensation water formation may occur on the aluminium tracks on the indoor side. This is encouraged particularly by impediments to air circulation, e.g. deep reveal, curtains, and poor positioning of radiators or similar.

7 Maintenance/care and inspection

7.1 Concluding maintenance agreements

**NOTE!**

Hardware, windows, and balcony doors require suitable systematic maintenance/care and inspection in order to ensure intrinsic value, fitness for use, and security. It is therefore recommended to conclude an appropriate maintenance agreement with the manufacturer of windows and balcony doors.

7.2 Safety

Incorrectly conducted maintenance work

**WARNING!****Danger of injury through incorrectly conducted maintenance work!**

Incorrect maintenance can result in serious personal injury or material damage. Therefore:

- Before starting work, ensure that there is sufficient installation room.
- Maintain order and cleanliness at the installation location! Loose components and tools lying around or on top of each other are sources of accidents.
- Get a specialist company to carry out adjustment work on hardware - especially in the area of pivot rests or bogies and of hinges - as well as replacement of parts and hingeing, and removal of sashes.

7.3 Maintaining surface finish

To permanently maintain surface finish of hardware components, and to avoid damage, always observe the following points:

7.3.1 Corrosion protection



NOTE!

In a normal room climate – i.e. when no condensation water forms on the hardware components, or when condensation water which forms occasionally can quickly evaporate – the electrolytically applied zinc coating of the hardware is not attacked.

If the environmental conditions are too damp, and condensation water cannot evaporate, corrosion can occur which attacks the surface of the hardware.

- Ventilate the hardware and the rebate areas in the frames – especially in the storage and construction phases – so that they are neither exposed to direct contact with water nor to formation of condensation water.
- Ensure that (permanently) damp spatial air cannot condense in the hinge and rebate areas.



NOTE!

To avoid the formation of condensation water especially during the construction phase:

- *Ventilate intensively several times each day (open all windows for approx. 15 minutes), so that a complete exchange of air can take place.*
- *Also ventilate sufficiently during holidays and absences.*
- *For more complex buildings, prepare a ventilation plan if necessary.*

7.3.2 Protection against dirt

- Keep hardware free from deposits and contamination. During the building phase, use water to remove dirt arising from plaster, mortar, or similar, before it binds.

7.3.3 Protection from aggressive acidiferous cleaning materials

- Clean hardware exclusively with mild, pH-neutral cleaning materials in diluted form. Never use aggressive acidiferous cleaning materials or scouring agents.

7.3.4 Protection from materials for surface treatment

- When applying surface treatments – e.g. when varnishing or painting windows and balcony doors – exclude all hardware components from this treatment, and thus protect against contamination.

7.4 Maintenance work and care instructions

7.4.1 Maintenance

The following minimum requirements must be observed in general, also when concluding maintenance agreements in accordance with 7.1, unless otherwise specified by the respective hardware manufacturer.

- Grease all moving parts and all locking points of the hardware according to the operating/maintenance instructions and check for proper functioning.
- Check hardware parts for tight fit and signs of wear.
- If necessary, have a specialist company retighten fastening screws, carry out adjustment work on the hardware, rotating hinges and closures and replace worn components, see 7.2.

Use of hardware	Safety relevant components	General components
Schools, hotels, hospitals openable, fall-protection building elements*	A	A / B
Office or public building	A / B	B
General residential construction	B / C	B / C / D

* applicable to openable, fall-protection building elements:

- they are generally classified as safety-relevant components
- the maintenance concept specified by the manufacturer of the building elements must be observed, with interval A as the longest

A = ½-yearly interval

B = Yearly interval

C = 2-yearly interval

D = Measures as agreed

7.4.2 Cleaning

- Clean hardware exclusively with a soft cloth and mild, pH-neutral cleaning materials in diluted form. Never use aggressive acidiferous cleaning materials or scouring agents. These can cause damage to the hardware.

8 Removal and disposal

- Windows may only be removed by trained specialists in window construction.
- When disposing of fittings, recycle them as mixed scrap in an environmentally friendly manner.

This directive was developed in cooperation with:

Fachverband Schloss- und Beschlagindustrie e.V.
Offerstrasse 12
D-42551 Velbert



Prüfinstitut Schlösser und Beschläge PIV Velbert
Wallstrasse 41
D-42551 Velbert



Institut für Fenstertechnik e.V.
Theodor-Gietl-Straße 7-9
D-83026 Rosenheim



Technischer Ausschuss des VFF
Verband Fenster + Fassade
Walter-Kolb-Strasse 1-7
D-60594 Frankfurt am Main