



First edition

Directive

Turn-opening restrictor – Additional tests for EN 13126-8

Durability testing of turn-opening restrictor in combination with the bearing components

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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. The contents of the disclaimer on the above-mentioned website apply.

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1 Scope

This directive contains information and mandatory instructions for additional tests that extend beyond the specifications of EN 13126-8. These tests are carried out to assess the durability of turn-opening restrictors (turn-opening restrictors = in German **Dreh-Öffnungs-Begrenzer DOEB**) in conjunction with the bearing points of tilt and turn, tilt first and turn-only hardware. This directive applies

- to turn-opening restrictor on the hinge side with or without continuous braking action,
- which are used on the top and/or bottom side in the corner area of the sash of a turn-only, tilt and turn or tilt first windows
- and which are intended for limiting turn-opening positions of more than 120 mm; the clearance is measured on the lock side in the area of the operating handle.

Comment: All size variants of a turn-opening restrictor are to be assessed accordingly.

However, the application of this directive not only serves to test durability of the turn-opening restrictor, but also to examine and assess the interaction of turn-opening restrictors with the bearing components (hinge-side components) in terms of the reaction forces:

- on impact in the intended turn-opening position, as well as
- by the continuous braking action in the turn-opening restrictor, if present.

The scope of the test according to Section 7.6.8 of EN 13126-8:2017 is replaced by the present directive and significantly expanded; as a result, higher overall requirements are specified for the turn-opening restrictors and bearing components. All further specifications and descriptions of the test procedures in EN 13126-8 remain unchanged, unless separate specifications beyond those in EN 13126-8 are made in this directive.

It is to be applied both by the manufacturer of the turn-opening restrictors (hardware manufacturer) and the manufacturer of the windows fitted with them (manufacturer of the windows and door height windows) and comprises

- Definitions
- Testing of turn-opening restrictors in the respective window elements (specimens)
- Testing of complete windows fitted with this type of turn-opening restrictor.

The scope of this directive does **not** include requirements for limiting devices for bottom- or top-hung windows. For testing/assessment of sash brakes (see under clause 2 for definition) for 'holding a sash in a variable turning position', please refer to the **FBDF** directive of Gütegemeinschaft Schlösser und Beschläge e.V. If this type of sash brake also includes the function of a turn-opening restrictor, thereby limiting the movement of a window sash to an intended maximum turn-opening position, this function must also be assessed according to this directive.

Comment: In the present directive, turn-opening restrictors with and without continuous braking action are tested in the same manner. This approach is based on user behaviour that has been established through various tests. It was found that users achieved approximately the same speeds when moving the sashes towards the turn-opening position, regardless of whether the turn-opening restrictor had a continuously operating braking device or not. For this reason, a differentiation of the test sequences for turn-opening restrictors with and without a braking device did not appear expedient.

Turn-opening turn-opening restrictor within the scope of this directive

- offer no protection against falls from a window
- are not fall protection devices as defined by DIN 18008-4 or TRAV
- are not child restraints
- are initially considered comfort components and not safety devices according to Section 4.8 in EN 14351-1:2006+A2:2016 and not turn-opening restrictors according to EN 13126-5, unless the hardware manufacturer defines its product as such.

According to [press release 15-02-44 from ift \(Institut für Fenstertechnik\) dated 11 February 2015](#), 'the window manufacturer or the system manufacturer must determine whether a safety device according to EN 14351-1 is included in his component. He must then declare this as such in the product documentation and list the protection goals that are to be achieved and what must be observed during operation. (...) If components are used that are not declared as safety devices and with which no protection goals are to be achieved, these are 'comfort components' that do not have to be tested. In this case, a hyphen "-" may be entered in the declaration of performance "(DoP)".'

The hardware manufacturer must also determine whether his product may be used as a safety device; he must also declare his component as such in the product documentation and list the protection goals that are to be achieved and what must be observed during operation. Otherwise, it's a comfort component.

2 Definitions

2.1. Turn-opening restrictors on the hinge side

Device designed to limit the turning movement of the window sash up to a designated turn-opening position and which is used in the area of the hinge side on the upper and/or lower side in the corner area of a tilt and turn, tilt first and turn-only window.

Comment: This directive is only concerned with devices used at the top and/or bottom of the corner of a sash of a tilt and turn, tilt first or turn-only window and which are intended to limit the window clearance of more than 120 mm on the closure side in the area of the operating handle.



Fig. 1: Example of a turn-opening turn-opening restrictor

2.2. Turn-opening restrictors on the closing side

Device that is provided for limiting the turning movement of a window sash up to an intended turning opening of a maximum clearance of 120 mm on the closing side in the area of the operating handle and which is used in the area of the closing side of a tilt and turn, tilt first or turn-only window.

Comment: These devices are not covered by this directive; a separate directive is planned for this purpose (currently being prepared by the Institut für Fenstertechnik – ift Rosenheim).



Fig. 2: Turn-opening restrictor on the closing side

2.3. Integrated turn-opening restrictor

Device for limiting the turning movement of a window sash up to an intended turn-opening position, which is firmly integrated in a bearing component (for example, a corner-bearing component).

Comment: A concealed hinge side which, due to its kinematics, itself restricts turning is not a turn-opening restrictor for the purpose of this directive.

2.4. Turn-opening restrictor with continuous braking action

Device in which a braking action is applied over the whole range of rotational movement of the sash in order to reduce the resulting reference speed as far as possible; the braking action may be adjustable.

2.5. Turn-opening restrictor without continuous braking action

Device in which the sash can be moved over most of the rotary movement range without braking action.

2.6. End position damping

Part of the turn-opening restrictor that slows down (or further slows down) the reference velocity of the sash just before reaching the intended limited turn-opening position and/or dampens the impact when the limited turn-opening position is reached.

2.7. Intended limited turn-opening position

End position of the window sash provided by the use of the turn-opening restrictor, if necessary, after passing through an end position damping, if available.

2.8. Sash brake

Device according to the FBDF directive of the Gütegemeinschaft Schlösser und Beschläge quality association: 'Sash brakes for variable pivoting position', controlled by the window handle and the associated central lock, used in turn-only and tilt and turn sashes; they are used to hold a sash in a defined pivoting position and to help prevent the unintentional closing or bumping of a sash.

These 'sash brakes for variable rotational position of sashes' are not covered by this directive.

Note: Standard quotations are italicised.

3 Testing

3.1. Turn-opening restrictors/testing of hardware

3.1.1. Sample

- In order to evaluate the interaction of turn-opening restrictors with the entire hardware, in particular the bearing components (hinge-side components), the sample is prepared according to the specifications in EN 13126-8.
- The installation of the hardware – turn-opening restrictors in combination with the bearing components (hinge-side components) – on the sample must be carried out in accordance with the specifications in the hardware manufacturer's installation instructions (technical documentation).

Comment: The approved potential combinations of turn-opening restrictors and bearing components must be sufficiently described in the technical documentation (matrix with the approved combinations; with the specification of the respective class H1 to H3, as well as the maximum sash masses and formats).

- The selection of the class for long-term durability, maximum sash mass, corrosion resistance and test values is made according to the specifications in EN 13126-8, depending on the intended areas of application of the components (turn-opening restrictors in combination with the bearing components/hinge-side components).

3.1.2. Installation in test bench/further specifications

- The installation of the sample in the test bench is carried out according to Section 6 of EN 13126-8:2017.
- After installation in the test bench:
 - *In accordance with 7.5 in EN 13126-8:2017, hardware must be lubricated for the first time in accordance with the installation and product information (initial lubrication), unless initial lubrication is not required per the manufacturer's instructions.*
 - *Before testing begins, the testing body shall check the mobility of the sample and make any necessary adjustments, including adjustment of the braking device (if fitted and adjustable) according to the manufacturer's specifications. The window sash should always close freely (force-free).*

Comment: 'Closing freely (force-free)' means that when the closed position is reached, the sash must not touch an obstruction, e.g. the tilt lock bearing.
- It is not permitted to adjust the braking device if the technical documentation describes the turn-opening restrictor as maintenance-free.
- The first 5 000 cycles are then carried out in full without any readjustment of the bearing components or the turn-opening restrictor (including the braking device if present and adjustable) and without further lubrication.
- *According to 7.5 in EN 13126-8:2017, the sample may be readjusted during the endurance functional testing after every 5 000 test cycles, including the braking device of the turn-opening restrictor (if present and adjustable), unless the hardware is specified as maintenance-free.*
- *According to 7.5 in EN 13126-8:2017, all installed and accessible moving and locking parts may also be re-lubricated by the testing body after every 5 000 test cycles, unless the hardware is specified by the manufacturer as maintenance-free. If no information on lubrication is given, the hardware must be tested without lubrication.*
- *The lubrication and adjustment carried out must be included in the test report.*

3.1.3. Description of the test (Endurance functional testing)

- In the case of bearing components intended for use in tilt and turn windows, the tilting cycles according to 7.6.1 or 7.6.2 in EN 13126-8:2017 in the specified classes H1 to H3 are carried out first, unless overall cycles according to 7.6.4 in EN 13126-8:2017 are applied in the tests.

For bearing components that are strictly intended for use in pivot windows, the test with tilting cycles is not applicable.

- After testing the tilting cycles – if necessary – the turning cycles are tested according to test sections 1 and 2 described below instead of Section 7.6.3 in EN 13126-8:2017.

Comment 1: Test sections 1 and 2 described below can also be performed in overall cycles according to 7.6.4 in EN 13126-8:2017. The turning movements at reference velocity in the limited turn-opening position in accordance with test section 1 shall then be performed at the beginning of the specified number of cycles.

Test section 1 – Turning cycles with reference velocity in the limited turn-opening position

- In test section 1, 10 % of the cycles corresponding to the selected classes H1 to H3 are first performed **at a reference velocity of 0.6 m/s** to the intended limited turn-opening position:

Selected class H1	=	5 000 cycles	of which 10% of the number of cycles	=	500 cycles
Selected class H2	=	10 000 cycles	of which 10% of the number of cycles	=	1 000 cycles
Selected class H3	=	20 000 cycles	of which 10% of the number of cycles	=	2 000 cycles

- *The turn cycles in test section 1 shall be in accordance with Section 7.6.3 of EN 13126-8:2017 with deviations as described below, whereby the reference velocity shall be 0,6 m/s 200 mm before reaching the intended limited turn-opening position:*
- **Initial position** *The initial position is the locked, closed position. The hardware is locked (as described in 7.6.3 a)).*
 - **Standby turning position:** *The hardware is brought into the 'standby turning position' by means of the window handle attached to the control unit of the test bench. This is followed by a rest period (as described in 7.6.3 b)).*
 - **Opening cycle:** *The reference velocity of 0,6 m/s must be reached 200 mm before the intended limited turn-opening position is reached. The distance of 200 mm is measured at the closing edge of the sash.*
The sash is released by the testing device 200 mm before the intended limited turn-opening position is reached. After passing through the remaining 200 mm, the reference velocity results when the intended limited turn-opening position is reached, depending on the effect of a possible braking device and/or end position damping.
 - **Closing cycle; turning:** *After the rest period has ended, the window sash is set into motion smoothly and without jolts using the window handle connected to the control unit. The reference velocity of 0,5 m/s must be reached 5_{-0}^{+5} mm before reaching the closed position. The window sash must then move freely to the closed position (for example, the control unit of the test bench can be released in a suitable manner: 5_{-0}^{+5} mm before reaching the closed position). This is followed by a rest period (as described in 7.6.3 d)).*
 - **Locking cycle; turning:** *After the rest period, the window sash must be moved to a distance of (3 ± 1) mm from the closed position (measured near the window handle). To reach the locked, closed position, the hardware must be locked via the window handle connected to the control unit of the test bench. This is followed by a rest period (as described in 7.6.3 e)).*
 - *After the rest period has ended, the next turning cycle must begin (as described in 7.6.3 f)).*

Test section 2 – Turning cycles without reference velocity in the limited turn-opening position

- In test section 2, the remaining 90 % of cycles corresponding to the selected classes H1 to H3 shall be performed **without reference velocity** to the intended limited turn-opening position:

Selected class H1	=	5 000 cycles	of which 90% of the number of cycles	=	4 500 cycles
Selected class H2	=	10 000 cycles	of which 90% of the number of cycles	=	9 000 cycles
Selected class H3	=	20 000 cycles	of which 90% of the number of cycles	=	18 000 cycles

- *The turning cycles in test section 2 are performed in accordance with Section 7.6.3 of EN 13126-8:2017 with deviations as described below, in which the intended limited turn-opening position is reached without reference velocity:*
 - *Initial position: The initial position is the locked, closed position. The hardware is locked (as described in 7.6.3 a)).*
 - *Standby turning position: The hardware is brought into the 'standby turning position' by means of the window handle attached to the control unit of the test bench. This is followed by a rest period (as described in 7.6.3 b)).*
 - *Opening cycle; turning: After the rest period has ended, the window sash is set into motion smoothly and without jolts using the window handle connected to the control unit of the test bench. The reference velocity of 0,5 m/s must be reached at an opening of 60° and maintained up to an opening of 70°. The sash must then be stopped slowly, without shock or jolts, by means of the window handle connected to the control unit of the test bench, until it reaches the open turning position of (90 ± 0) ° or until the intended limited turn-opening position is reached or until the start of end position damping, if any. This must be followed by a rest period.*
 - *Closing cycle; turning: After the rest period has ended, the window sash is set into motion smoothly and without jolts using the window handle connected to the control unit. The reference velocity of 0,5 m/s must be reached 5 ± 5 mm before reaching the closed position. The window sash must then move freely to the closed position (for example, the control unit of the test bench can be released in a suitable manner: 5 ± 5 mm before reaching the closed position). This is followed by a rest period (as described in 7.6.3 d)).*
 - *Locking cycle; turning: After the rest period, the window sash must be moved to a distance of (3 ± 1) mm from the closed position (measured near the window handle). To reach the locked, closed position, the hardware must be locked via the window handle connected to the control unit of the test bench. This is followed by a rest period (as described in 7.6.3 e)).*
 - *After the rest period has ended, the next turning cycle must begin (as described in 7.6.3 f)).*

3.1.4. Endurance functional testing – acceptance criteria

- **on the hardware parts/bearing components** – during and after testing the endurance function:
 - all acceptance criteria according to 7.6.5 in EN 13126-8:2017 apply
- **on the turn-opening restrictor** – during and after testing the endurance function:
 - The originally intended limited turn-opening position must be maintained; however, changes in the opening angle of max. $\pm 10^\circ$ are permissible (measured without force).
 - Deformations and damage are permitted, provided the intended function is maintained
 - No broken or torn-off screws at the fastening, especially after checking the complete window system (see 3.2)
 - No damage to the connections on the sash or window frame side (e.g. bursting of the corner angles, etc.), especially after testing the complete window system (see 3.2)

3.2. Testing of the complete sample/window testing

For the testing of complete windows with turn-opening restrictors, the intended hardware assembly must be installed in a sample according to the hardware manufacturer's product documentation; the dimensions should correspond to those for windows in EN 13126-8:2017. During this test, the complete sample with the built-in turn-opening restrictor is tested, in particular its connection on the sash and frame side and interplay with the bearing positions used.

For this purpose, the sample is to be produced in accordance with the production method of the manufacturer of windows and French doors and/or the respective system description. The samples selected must be representative of the manufacturing method; the most unfavourable manufacturing method must be taken into account with respect to absorption of the forces generated.

A separate test must be carried out for each size of turn-opening restrictor. The test itself shall be carried out according to 3.1.3; the acceptance criteria according to 3.1.4 shall be applied.

Comment: The fastening of the bearing components must comply with the TBDK directive.

4 Test report

The test report on testing carried out in accordance with this directive must include the following information:

4.1. General

- Name and address of the test laboratory
- Abbreviation, title, and date of issue of the directive at hand
- Date and clear identification of the test report
- Name and address of the customer
- Date of the test report

4.2. Tests according to 3.1 (Testing of hardware)

- Detailed description of sample and classification according to EN 13126-8
- Detailed description of all tested hardware components and the turn-opening restrictor
- Results of the tests/requirements according to EN 13126-8
- Results of the test according to 3.1.3 and assessment according to 3.1.4

4.3. Tests according to 3.2 (Testing of windows)

- Detailed description of the sample tested
- (Profile geometry, dimensions, sash mass, material, hardware and their fastenings, in particular the bearing points and the turn-opening restrictor)
- Results of the tests/requirements according to EN 13126-8
- Results of the test according to 3.1.3 and assessment according to 3.1.4

5 Intended use

For the purposes of this directive, the intended use of turn-opening restrictors is to limit the turning movement of a window sash of tilt and turn, tilt first and turn-only windows up to an intended limited turn-opening position.

The intended use includes compliance with all specifications in the product-specific documents of the hardware manufacturer such as:

- Product catalogues
- Application diagrams (max. sash sizes and weights)
- Limit stop instructions
- Operating/maintenance instructions as well as
- VHBH and VHBE directives
Please refer to www.guetegemeinschaft-schloss-beschlag.de/Pruefen-Zertifizieren/Richtlinien
- and applicable national laws and directives.

The following warning applies to manufacturers of windows and French doors:

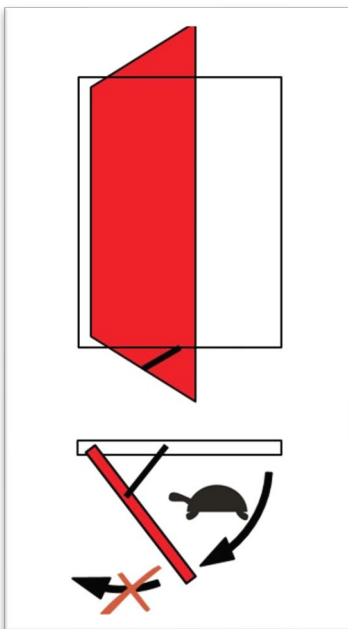
**WARNING!****Risk of injury and death due to sashes falling out if operating speeds/forces are too high!**

If operating speeds are too high, very powerful forces may be exerted on the bearing components (on the hinge side), which can lead to their failure.

Therefore:

- Observe the obligation to provide instructions in accordance with Section 6.2 of VHBH and the general instructions for operation and use in Section 6 of VHBE.
- Apply operating labels (see Fig. 3) near the window handle to avoid excessive operating speeds.

Fig. 3: Operating labels

**Comment:**

If no warning is given, in the case of applications where the sash is limited to a maximum turn-opening position between 120 mm and 70°, the user will reach the highest operating speeds when reaching the intended limited turn-opening position. This has been established in trials. The sticker, as shown in Fig. 3, instructs the user to move the sash slowly (tortoise symbol).

This directive was developed in cooperation with:



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