BS EN 13330:2013

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Shutters — Hard body impact and prevention of access — Test methods

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee B/538/3, Domestic shutters and blinds.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Shutters - Hard body impact and prevention of access - Test methods

Fermetures - Chocs de corps dur et protection de l'accès - Méthodes d'essai

Abschlüsse Außen - Aufprall eines harten Stoßkörpers und Widerstand gegen gewaltsames Eindringen - Prüfverfahren

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Foreword

This document (EN 13330:2013) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by 2014-12-10.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13330:2002.

This document is part of a series of standards dealing with blinds and shutters for buildings as defined in EN 12216.

The test method is linked to performance requirements for shutters specified in EN 13659.

The main technical changes incorporated in this new edition are:

— An editorial review of the document has been carried out.

— A clause defining the test methods to apply to evaluate the resistance of shutters and external venetian blinds for the prevention of access has been introduced in line with the requirements defined in EN 13659.

This European Standard is one of a package of inter-related European Standards with a common date of withdrawal (dow) of December 2013:

— EN 1932, *External blinds and shutters — Resistance to wind loads — Method of testing and performance criteria*;

— EN 13330, *Shutters — Hard body impact and prevention of access — Test methods*;

— EN 13561, *External blinds — Performance requirements including safety*;

— EN 13659, *Shutters and external venetian blinds — Performance requirements including safety*.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies test methods for the determination of the resistance of shutters under the application of a conventional hard body impact and test methods of the prevention of access by shutters.

Shutters covered by this European Standard are:

— external venetian blind,

— roller shutter,

— venetian shutter,

— flat closing concertina shutter,

— concertina shutter,

— wing shutter and

— sliding panel shutter.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12216, *Shutters, external blinds, internal blinds — Terminology, glossary and definitions*

EN 13659, *Shutters and external venetian blinds — Performance requirements including safety*

ISO 2380-1, *Assembly tools for screws and nuts — Screwdrivers for slotted-head screws — Part 1: Tips for hand- and machine-operated screwdrivers*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12216 and EN 13659 apply.

4 Hard body impact

4.1 Equipment

4.1.1 Test rig

The test rig consists of a frame in which the shutter is mounted in the vertical position, according to the installation instructions of the manufacturer. It shall allow, if necessary, the locking of the curtain. The frame shall be sufficiently rigid so that the energy absorbed during the impact is not changed.

4.1.2 Principle of the test

The hard body is made of a plain steel spherical ball of 50 mm diameter with a link-bolt, of 0,5 $^{+0,02}_{0}$ kg mass, which is designated as D 0,5.

The impact is provided by pendulum action of the hard body D 0,5. The device used carry out the test is shown in Figure 1.

The steel ball bearing is suspended by its link to a cable C arranged in such a way that:

— in the resting position, the steel ball-bearing is tangential to the test specimen at the predicted point of impact;

— in the test position, cable C is stretched perpendicular to the curtain in the horizontal position, at the anticipated drop height Z. The horizontal position is specified within the tolerance $20\,^{+2}_{0}$ mm.

The cable C shall ensure a pendulum movement of the ball when released.

4.1.3 Measuring equipment

The measurement shall be carried out with a ruler, accuracy 0,5 mm.

4.2 Test conditions

4.2.1 Specifications

The test is carried out for each type of curtain, with its guiding system.

The size of the curtain has no influence on the result of the test.

4.2.2 Preparation of the test

The test specimen is positioned vertically and fully equipped, with its operating system, guiding of the curtain, etc. and projection system when it exists.

The whole is mounted in the test rig, respecting the installation instructions of the manufacturer.

Check the normal functioning of the shutter by completing a total extension/retraction operation, tilting of the slats, or any operation of any other function the product might perform.

4.3 Test procedure

4.3.1 General

Unless specially requested, test specimens shall be tested in the condition as received. Storage and testing shall be carried out in the temperature conditions of (23 ± 5) °C.

4.3.2 Points of impact

The points of impact are restricted to a single side leaf or panel (folding shutter) or at a single side of the curtain (roller shutter).

They are selected as follows:

a) guide system: at mid-height or mid-width and at (10 ± 1) mm from the edge of the guide system;

b) laths: on the middle line of the lath (single wall lath) or at the wall nearest to the middle line (double walled lath) and at (100 ± 5) mm from the edges (free edges, guide rails edges or from the hinges or strap hinges);

c) panel: as in the case of laths on a side panel;

d) interlocked laths:

   1) laths with slots: between slots at a distance nearest to 100 mm from the guide rails (for roller shutters with ventilated interlocked laths, the curtain is with the slots completely visible);

2) glued laths: directly where the laths join at (100 ± 5) mm from an edge (free edge, guide rails edge, etc.);

e) others: at a distance of (100 ± 5) mm from all assessed weak parts.

All impact points shall be carried out in such a way as to ensure that the impact point does not interfere with a previous impact.

Figure A.1 gives the location of impacts for a roller shutter.

4.3.3 Test

The tests are to be carried out on the face of the curtain which is possibly to be exposed to the exterior. If in doubt, the test shall be carried out on both faces.

The steel ball-bearing is brought to its starting position by raising it pendulum fashion. This is done manually until the cable C is in a horizontal position. While being raised, take care that cable C stays in a plane orthogonal to the plane of the test specimen.

The drop is defined in such a way that the suspension point is at a distance Z from the predicted point of impact. Drop height Z is specified in EN 13659.

Once the drop height Z is reached and the steel ball is motionless, the pendulum fall is achieved by releasing the steel ball (a single drop for each point of impact).

4.3.4 Test result

When, at an impact point, an indentation remains after 2 min, measure the maximum size of the indentation, with an accuracy of 0,5 mm. Check for the presence of cracks or holes. Any variation in the colour at the impact point shall not be considered as a non-conformance.

4.4 Test report

The report shall cover the following:

a) the necessary descriptions to allow identification of the product;

b) results expressed as follows:

1) face or faces submitted to the test;

2) location of the points of impact;

3) deteriorations if they occur and their location;

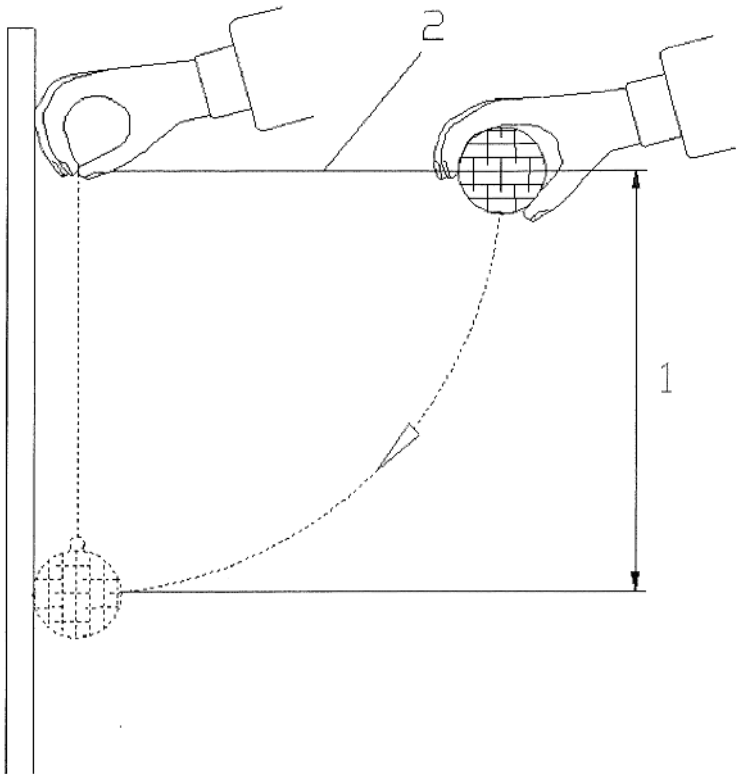
4) maximum size of indentation and the presence of cracks or holes;

5) functioning of the shutter by completing an extension/retraction, tilting cycle of the slats, or any other operation the product might perform;

c) name of the test laboratory (laboratory or firm) and name of the person responsible for the test;

d) date of the test;

e) reference to this standard.



Key

1 drop Z
2 cable C

Figure 1 — Principle of D 0,5 impact test

5 Prevention of access

5.1 General

This clause specifies test methods to be used to characterise the prevention of access for which prescriptions and classifications are given in EN 13659.

NOTE Although a tool (e.g. screwdriver) is sometimes used in the tests, this clause is not intended to reproduce a manual attack. The tool is only used as a part of the test equipment.

5.2 Retraction of the curtain

A force exerted in the direction of retraction shall be applied to the middle of the bottom rail or of the primary closing edge, with the shutter in the vertical position.

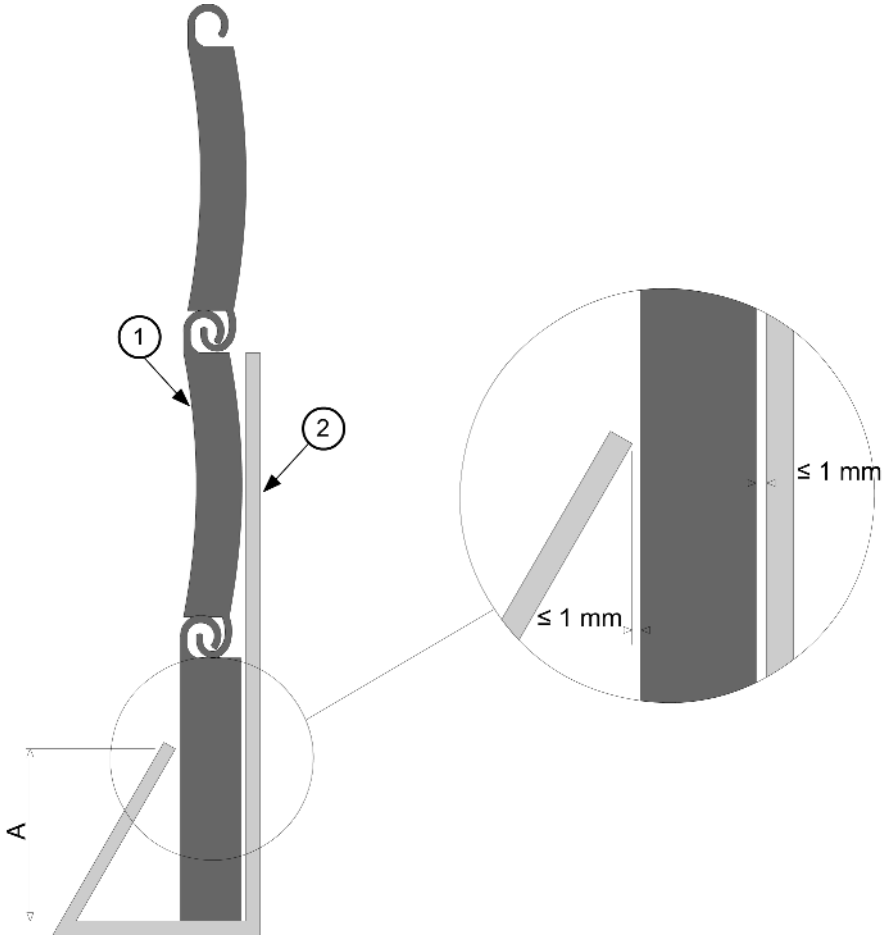
The curtain shall be in the complete extended position. The force of retraction is achieved by use of a hook which shall have the following characteristics (see Figure 2):

— it shall cover at least the bottom rail and the first lath,

— its width shall be 30 mm,

— the gap between the bottom rail and the hook shall be 1 mm maximum to avoid a rotation of the bottom rail,

— the distance A (see Figure 2) shall be at least 2/3 of the height of the bottom lath.



Key

1 curtain
2 hook

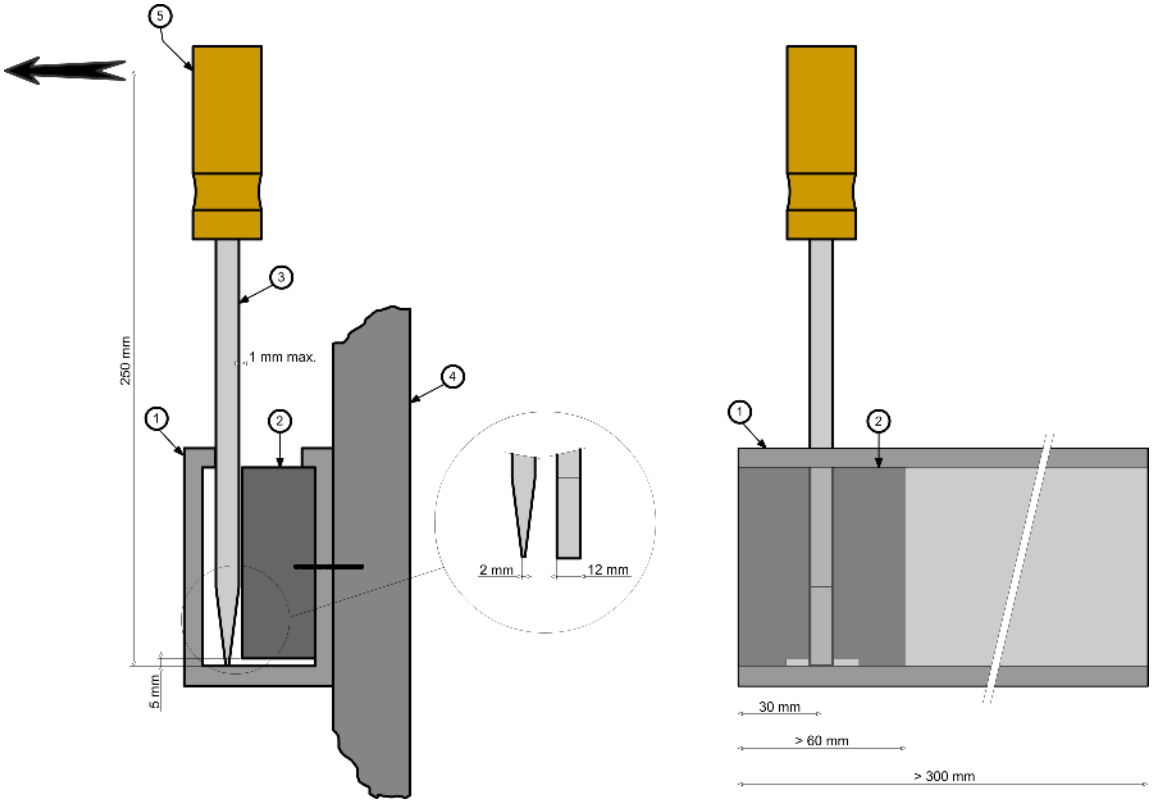
Figure 2 — Hook for lifting test

5.3 Resistance of the guide rail against splaying

The test is carried out at 30 mm from the end of the guide rail which shall be at least 300 mm long. The seal of the guide rail shall be taken out. The guide rail shall be installed, so that only one leg of the guide rail is fixed to the support (see Figure 3).

A block shall be inserted into the guide rail. This block is used to avoid slippage of the screwdriver when the force is applied. It shall be at least 60 mm long and shall be positioned 5 mm from the bottom of the guide rail. The width of the block shall be determined in order to allow a space of maximum 1 mm between the screwdriver and the block (see Figure 3).

A screwdriver with a tip model A 2 mm x 12 mm according to ISO 2380-1 shall be inserted into the guide rail. The force of the foreseen class shall be applied at 250 mm from the extremity of the screwdriver, perpendicularly to the guide rail, for at least 10 s (see Figure 3).



Key

1 guide rail piece
2 block
3 screwdriver
4 support
5 point where the force is applied

Figure 3 — Resistance of the guide rail against splaying

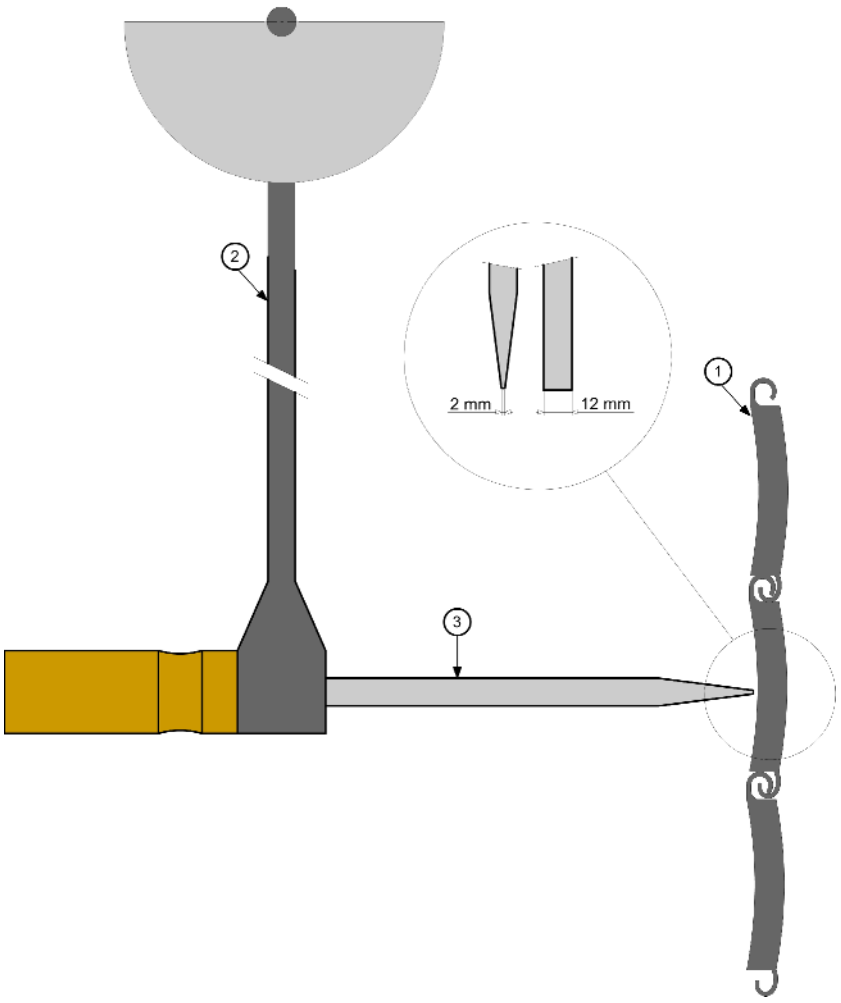
5.4 Perforation of a lath or of a panel

The test is carried out using the following test equipment:

— A screwdriver is attached to an axle. This axle can rotate at its extremity (see Figure 4).

— The screwdriver shall have the same characteristics as in 5.3 (tip model A 2 mm x 12 mm according to ISO 2380-1).

— In order to reach the energy level of the class foreseen, an additional load may be attached to the screwdriver.



Key

1 curtain
2 axle
3 screwdriver

Figure 4 — Test equipment for perforation of a lath

The energy developed by the test equipment (axle, screwdriver and, if any, the additional load) is determined by the following formula:

$$E = m \times g \times h \quad (1)$$

where

m is the sum of the weights of the axle, the screwdriver and, if any, the additional load, in kg;

g is equal to 9,81, m/s²;

h is the dropping height, m.

The axle shall be rotated so that the dropping height corresponds to the energy of the class foreseen, using Formula (1). It is then released (see Figure 4).

The point of impact shall be the concave side of the curtain.

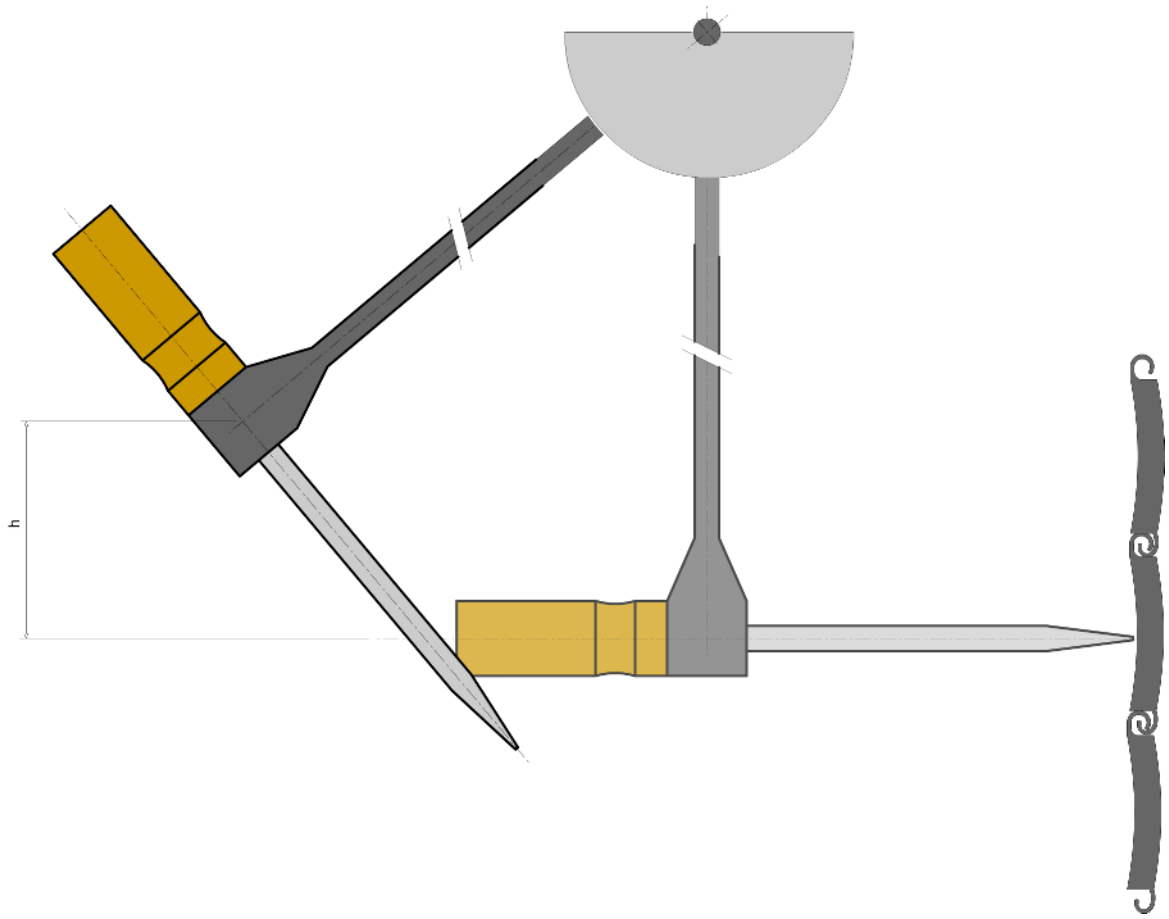


Figure 5 — Illustration of the test for a roller shutter

In order to exclude the elasticity of the lath or of the panel, the test shall be carried out at 50 mm from the guide rail or the primary closing edge (see Figure 6). In case of roller shutter, the screwdriver shall be positioned at the middle of a lath but shall not coincide with an internal wall of the lath.

For roller shutters, in case the impact causes a deformation of the guide rail, the guide rail shall be reinforced so that only the resistance of the curtain is evaluated.

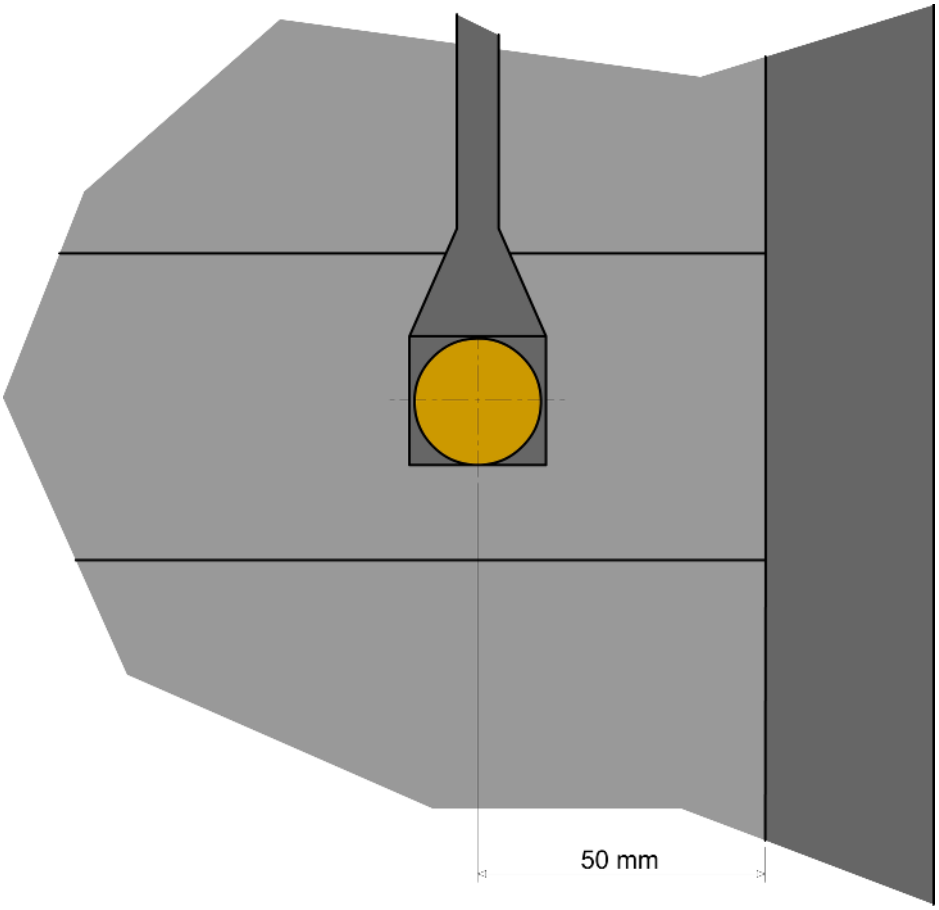


Figure 6 — Position of the screwdriver for a roller shutter

5.5 Resistance of the bottom lath

The horizontal force shall be applied at the middle of the bottom lath, for the maximum width declared by the manufacturer.

The test shall be carried out with the curtain raised 12 mm from the floor. Static force shall be applied.

5.6 Installation of the shutter

The test of 5.3 shall be repeated, with the following modifications:

— The guide rail is fixed according to the manufacturer recommendations specified in the installation instructions,

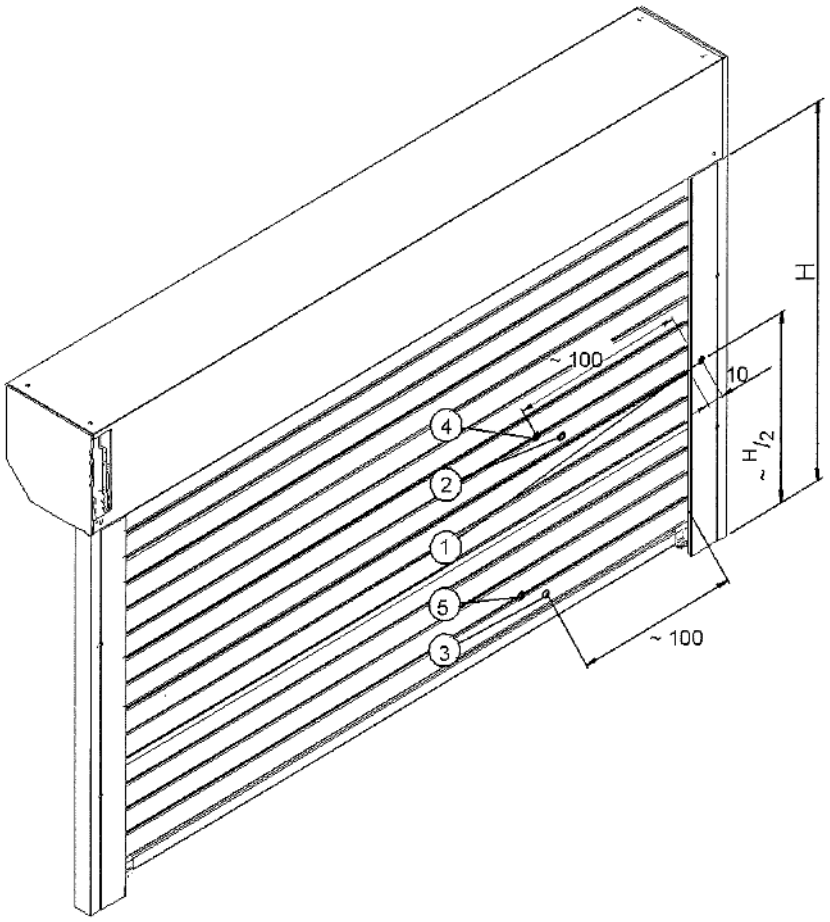
— The test is carried out at the fixation height.

The maintain shall be verified by applying the force in the direction of the fixing (passage of the head screw through the wall of the guiderail, sticking,...).

Annex A
(informative)

Location of impacts D 0,5 for roller shutters

Dimensions in millimetres



Key

1 impact guide rail
2, 3 impact slat: at the level of the middle wall of the lath (double walled lath) or at mid-height of slat (single wall lath)
2 median lath
3 lath (over the bottom rail)
4, 5 impact slats assembly (between two slots)
4 sloth of the median lath
5 slot of the last lath

Figure A.1 — Location of impacts for a roller shutter

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