BS EN 16434:2014

BSI Standards Publication

Internal blinds — Protection from strangulation hazards — Requirements and Test methods for safety devices

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National foreword

This British Standard is the UK implementation of EN 16434:2014.

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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ISBN 978 0 580 78578 8

ICS 91.060.50

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2014.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16434

February 2014

ICS 91.060.50

English Version

Internal blinds - Protection from strangulation hazards - Requirements and test methods for safety devices

Stores intérieurs - Protection contre les risques de strangulation - Exigences et méthodes d'essai pour les dispositifs de sécurité

Innere Abschlüsse - Schutz vor Strangulationsgefahren - Anforderungen und Prüfverfahren für Sicherheitseinrichtungen

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Contents

Page

Foreword

This document (EN 16434:2014) 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of an identical text or by endorsement, at the latest by August 2014, and conflicting national standards shall be withdrawn at the latest by August 2014.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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

It is the intention that safety devices used in EN 13120 conform to EN 16434 for component testing and EN 16433 for functionality.

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 requirements and test methods for safety devices to be used for protection from strangulation in internal blinds as specified in EN 13120 and insect screens as specified in EN 13561.

These devices might be fitted to internal blinds and insect screens at the time of manufacture or for retrofitting.

This European Standard applies to any design of device including the following:

— tensioning devices;

— breakaway devices;

— accumulation devices;

— non tangling devices;

— inner cord stops.

Although at the time this standard has been published, no product standard exists for draperies, requirements and test methods specified in the present standard may be applied to safety devices used in such products.

For clarification purpose, the term “internal blinds” used in the present standard should mean “internal blinds and insect screens”.

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 13120, *Internal blinds - Performance requirements including safety*

EN 13561, *External blinds - Performance requirements including safety*

EN 14201, *Blinds and shutters - Resistance to repeated operations (mechanical endurance) - Methods of testing*

EN 71-1, *Safety of toys - Part 1: Mechanical and physical properties*

EN ISO 4892-2, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2)*

EN ISO 4892-3, *Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps (ISO 4892-3)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12216, EN 13561 and EN 13120 apply.

4 General

In the testing of safety devices, all related parts associated with the protection from strangulation shall be included.

For example, a breakaway device for an operating ball-chain should cover the ball-chain and the connector if the connector is dependent on the ball diameter. If an inner cord breakaway device is dependent on the type of fabric used in the internal blind then the fabric should also be considered as a part of the safety device.

The number of samples tested shall be representative of the production run. Testing shall be repeated during the production to ensure that performances of devices are maintained. Testing shall be repeated whenever a change occurs in the design, in the composition, in the raw material or in the supplier of the raw material, or in the method of production.

NOTE Guidance on sampling procedures can be found in ISO 2859-1.

Although weights are used in the figures illustrating test methods, any other mechanical, hydraulic or pneumatic equipment may be used. All weights and forces shall be applied with a tolerance of ± 1 %.

Unless specified otherwise, all tests defined in this standard shall be performed at 23 °C ± 5 °C.

Annex A presents a summary of the tests to be carried out on safety devices.

In the context of this standard, the term “cord(s)” used shall mean “cord(s), chain(s), ball-chain(s), tape(s) and similar”.

5 Artificial ageing

5.1 Exposure to UV

Before testing the safety devices, they shall be subjected to the cycle N°6 according to EN ISO 4892-2 or the cycle N°5 according to EN ISO 4892-3 for 500 h.

5.2 Mechanical endurance

The mechanical endurance test is intended to reproduce the operating cycles of internal blinds.

Before testing the safety devices, they shall be submitted to the following endurance test: a mechanical endurance test shall be carried out either according to EN 14201 on a representative internal blind or using a mechanical test equipment reproducing the load conditions of the representative internal blind. 5 000 cycles of extension/retraction shall be considered. The internal blind considered for the test shall be the maximum size for which the safety device is intended.

5.3 Effect of temperature

Before testing the safety devices, they shall be submitted to the following temperature conditions:

— Low temperature: the safety devices shall be submitted to conditioning at an air temperature of 5 °C ± 3 °C for a minimum of 4 h.

— High temperature: the safety devices shall be submitted to conditioning at an air temperature of 60 °C ± 3 °C for a minimum of 4 h.

The relevant tests of Clauses 6 to 11 shall then start at 23 °C ± 5 °C within 15 min.

6 Tensioning device

6.1 General

This clause applies to safety devices intended to maintain continuous cord(s) forming a loop under tension and secured to a fixed surface (e.g. window frame, wall).

The test shall be carried out on the smallest and the largest diameter of cord(s) for which the tensioning device is designed.

The test shall be carried out on sample(s) as defined in Clause 4:

— in their original condition,

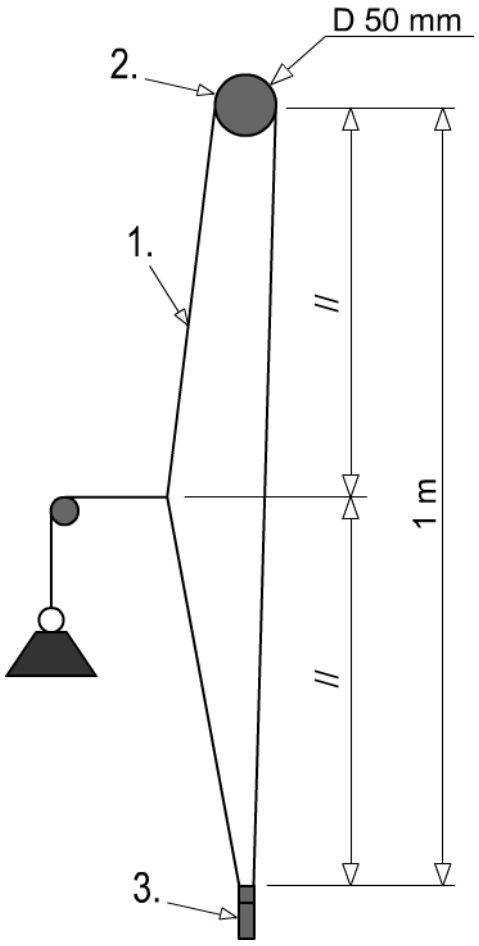
— that have been exposed to UV as specified in 5.1,

— that have been subjected to the mechanical endurance test as specified in 5.2,

— that have been subjected to the effect of temperature as specified in 5.3 (at low temperature and at high temperature).

Where a tensioning device is designed to accept more than one cord, each cord shall be tested separately.

It shall be verified that the fixed retaining device maintaining the cord(s) under tension shall not crack or fracture under the application of a horizontal load applied in the middle of the cord. In addition, it shall be verified that the cord is retained within the device when the device is fixed 10 mm higher than its intended position. The control mechanism shall be made of a pulley of 50 mm diameter. The length of the pull cord shall be 1 m (see Figure 1).



Key

1 pull cord(s)
2 pulley
3 retaining device

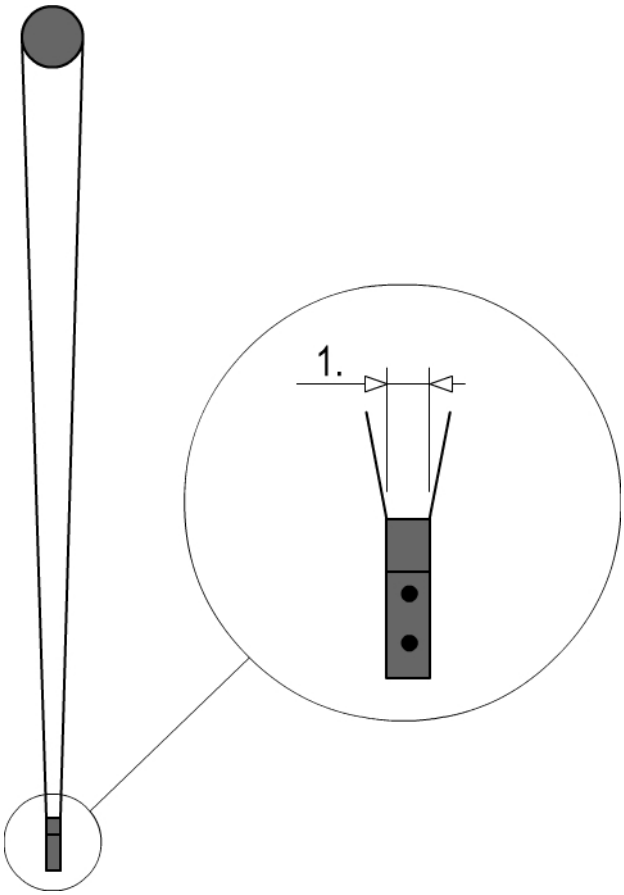
Figure 1 — Principle of the test of tensioning device

6.2 Test methods

6.2.1 Resistance of the retaining device

The tensioning device shall be installed according to the installation instructions of the manufacturer. The retaining device shall be installed at the maximum distance possible from the pulley (original position).

The distance between the two strands of the loop shall be measured at the point of exit from the tensioning device (see Figure 2).



Key

1 distance between the two strands

Figure 2 — Measurement of the distance between the two strands

A horizontal force shall be applied in the plane and at mid-point of the height of the loop (see Figure 1) in a progressive way over a period of maximum 5 s until the load defined in 6.3 is applied to one cord. The load shall be then maintained for 10 s.

The test shall be carried out with the load defined in 6.3.

The test shall be repeated with the force being applied in the direction perpendicular to the plane of the cord.

6.2.2 Retention of cords

The retaining device shall be installed at 10 mm above its original position (see 6.2.1). The cord shall then be pulled with the force defined in 6.3 in all possible directions.

6.3 Requirements

The distance between the two strands of the loop shall be less than 50 mm at the point of exit from the tensioning device.

When tested according to 6.2.1, no part of the fixed tensioning device shall crack or fracture under the application of a load of 60 N to the pull cord(s). The fixed tensioning device shall continue to function as intended.

When tested according to 6.2.2, the cord shall remain in the retaining device when pulled with a force of 60 N in all possible directions.

7 Breakaway device

7.1 General

This clause applies to device(s) intended to connect:

— Case N°1: two ends of the same cord,

— Case N°2: several cords together at any point below the headrail, or

— Case N°3: a cord to a curtain,

and to break away under the application of a load.

As these devices are made of minimum two parts that separate under a specific load, all these parts shall be considered during the tests. As a consequence, these devices shall be considered as a whole and cannot be used separately.

This test shall be carried out on sample(s) as defined in Clause 4:

— in their original condition,

— that have been exposed to UV as specified in 5.1,

— that have been subjected to the following mechanical endurance test:

  The breakaway element shall be engaged and disengaged 20 times at a maximum of 3 min intervals, to ensure that the reengagement of the element is still possible. Engagement and disengagement may be carried out manually.

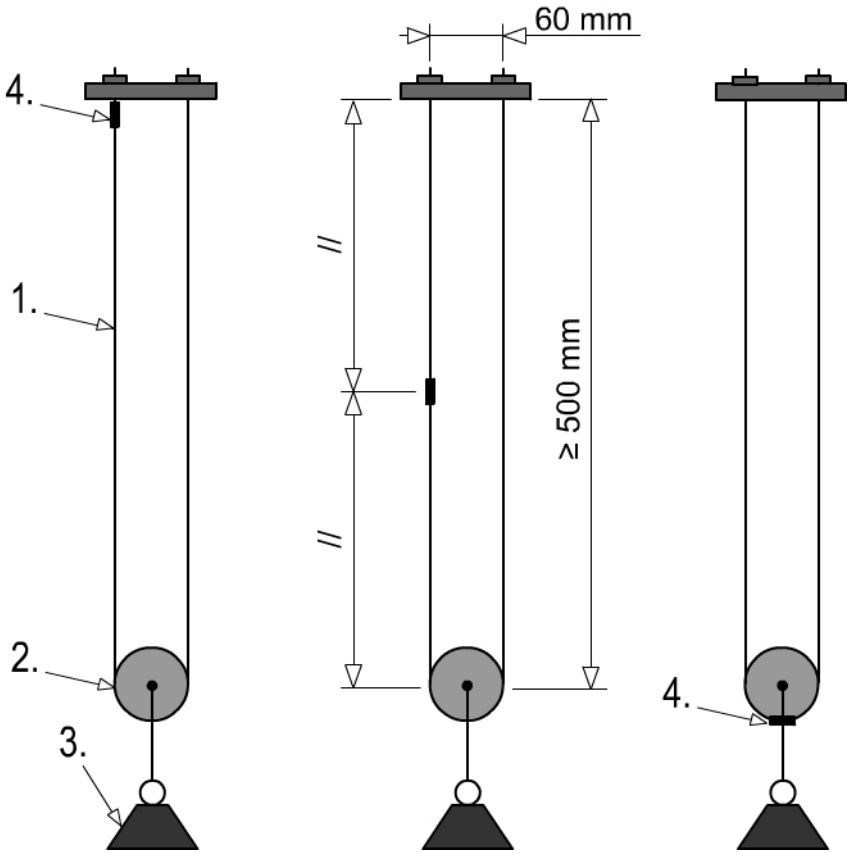
— that have been subjected to the effect of temperature as specified in 5.3 (at low temperature and at high temperature).

7.2 Test method

The safety device shall be installed according to the installation instructions of the manufacturer.

In the case N°1 of 7.1, the two ends of the pull cord shall be permanently secured to the test rig 60 mm apart. The length of the loop shall be at least 500 mm.

The test shall be carried out on the breakaway device, so that each breaking point is successively located at the highest possible position, at the lowest position (at the bottom of the loop) and in the middle of the loop (see Figure 3).

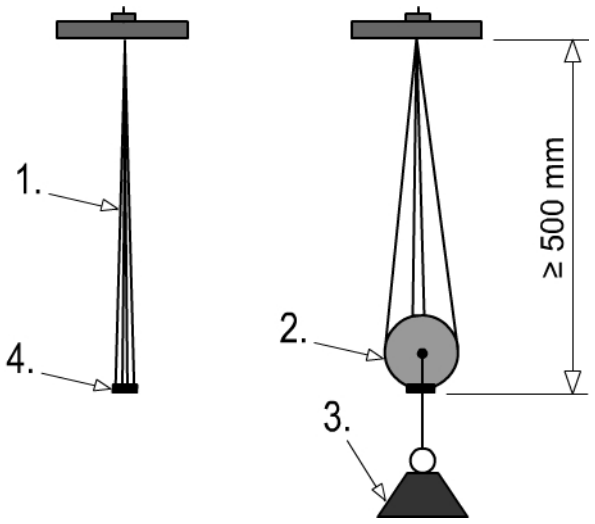


Key

1 looped pull cord
2 test cylinder
3 load
4 breakaway device

Figure 3 — Illustration of the test of a breakaway device on a looped cord

In the case N°2 of 7.1, the test shall be carried out with the breakaway device being positioned at least at 500 mm from the test rig, all cords being secured at the same starting point (see Figure 4). In case more than two cords are connected together, all possible loop combinations shall be tested.

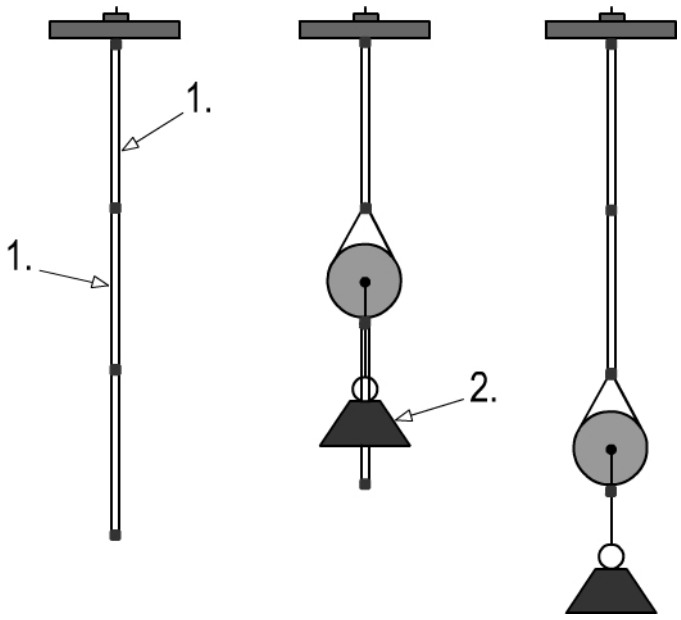


Key

1 pull cord connected
2 test cylinder
3 load
4 breakaway device

Figure 4 — Illustration of the test of a breakaway device on hanging pull cords connected together

In the case N°3 of 7.1, the test shall be carried out on two elements representing the penultimate and the last panel (see Figure 5). The test shall be carried out with two lifting cords defined by the manufacturer, one cord intended to simulate the curtain. The breakaway device shall be connected according to the manufacturer specification.



Key

1 inner cord
2 load

Figure 5 — Illustration of the test of a breakaway device on an inner cord

A test cylinder of 60 mm diameter shall be inserted into the loop and shall be applied downwards in a progressive way over a period of 5 s until the vertical force specified in 7.3 is applied.

NOTE The test cylinder is intended to represent the neck of a child.

7.3 Requirements

The breakaway device shall eliminate the hazardous loop when a vertical mass of 6 kg is applied to the pull cord(s).

NOTE The load has been defined taking into account the weight of the 5 percentile of 6 months old children according to the standard BS 7231–1:1990.

The hazardous loop shall be eliminated during the progressive application of the load or, at the latest, 5 s after full application of the force.

8 Accumulation device

8.1 General

This clause applies to safety devices intended to be used where extension and retraction of the curtain leads to a change in length of the lifting cord(s). These devices are intended to accumulate the full length of cord(s) at any position of the curtain, including fully retracted.

The test shall be carried out on sample(s) as defined in Clause 4 in their original condition, For accumulation devices which have moving parts, sample(s) shall be subjected to the mechanical endurance test according to 5.2.

8.2 Test method

It shall be verified that the maximum length of cord declared by the manufacturer is accumulated:

— Install the accumulation device as per the manufacturer’s instruction.

— Accumulate available cord.

— Visually check for complete accumulation.

8.3 Requirements

The manufacturer shall declare the length of cord that can be accumulated by the device depending on the cord properties (diameter, ...).

No more than 100 mm of cord(s) shall be released after a force of 60 N is applied to any of the cord(s) on either side of the accumulation device.

9 Non tangling device

9.1 General

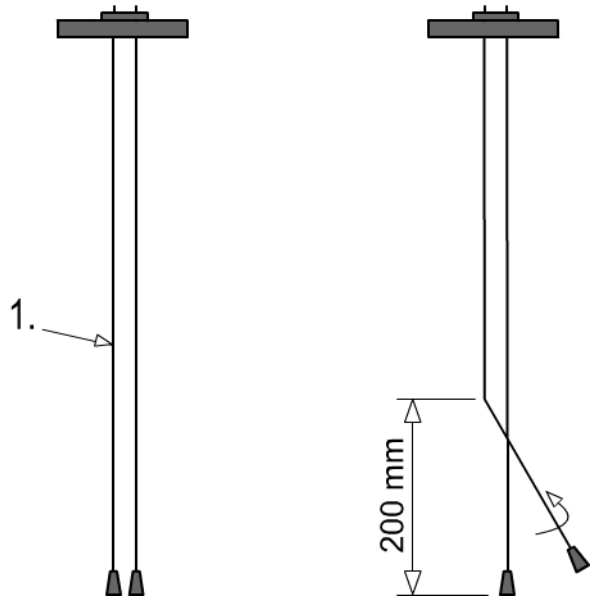
This clause applies to safety devices to be used where the operating device consists of two free hanging cords. These devices are intended to prevent tangling leading to formation of a hazardous loop.

The test shall be carried out on sample(s) as defined in Clause 4 in their original condition

9.2 Test method

The safety devices shall be installed according to the installation instructions of the manufacturer on two separate cords of 500 mm length.

One cord shall be twisted around the other 5 times. This shall be carried out by rotating one cord around the other, commencing 200 mm from their respective ends towards the open end (see Figure 6).



Key

1 pull cords

Figure 6 — Illustration of the test of a non tangling device

The cords shall then be released. If the cords do not separate, a cylinder of 60 mm diameter shall be inserted into the loop. The mass defined in 9.3 shall be gradually applied to the cord. Gradually means there shall be no dynamic effect on the cord. This mass shall include the mass of the cylinder.

This test shall be carried out with the ends of the cords being at the same level. It shall be repeated 5 times.

9.3 Requirements

The cords shall not tangle. If they do so, the hazardous loop shall be eliminated during the progressive application of a mass of 6 kg or, at the latest, 5 s after full application of the force.

10 Inner cord stop

10.1 General

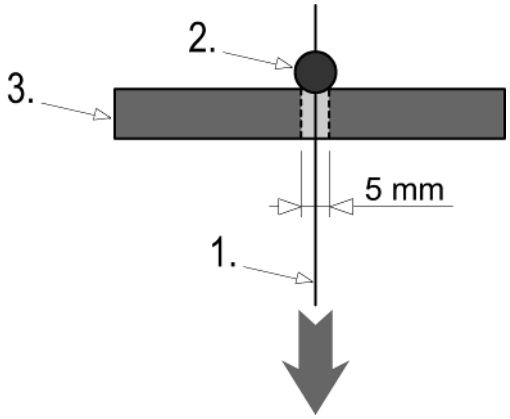
This clause applies to safety devices intended to prevent the formation of a hazardous loop by pulling inner cords.

The test shall be carried out on sample(s) as defined in Clause 4 that have been exposed to UV as specified in 5.1

10.2 Test method

The safety device shall be installed on a cord according to the installation instructions of the manufacturer.

The cord shall be inserted into a fixed opening of 5 mm representing the locking device of the internal blind (see Figure 7). After having identified its original position, the cord shall then be pulled with the force stated in 10.3. The load shall be applied for 10 s.



Key

1 pull cords
2 inner cord stop
3 fixed test rig

Figure 7 — Illustration of the inner cord stop test

The measurement of the inner cord stop position shall be carried out after the force is released.

10.3 Requirements

The inner cord stop shall not move more than 5 mm from its original point of attachment on the cord when a force of 50 N is applied to the cord.

11 Additional requirements

11.1 General

This clause gives additional requirements that all safety devices shall fulfil.

11.2 Release of small components

No small component which becomes detached during the testing specified in 6 to 10 shall fit entirely within the small part cylinder defined by EN 71-1 (see Figure 8).

The component shall be placed without compressing in any orientation in a cylinder having dimensions indicated in Figure 8.

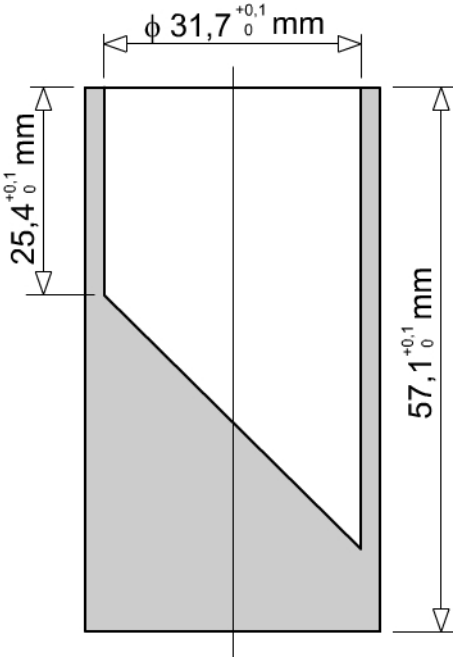


Figure 8 — Small part cylinder

11.3 Impact resistance

This subclause applies to all safety devices intended to be attached to a fixed surface, such as tensioning and accumulation devices.

Place the safety device, in its most onerous position on a plane horizontal steel surface and drop a metallic weight with a mass of (1 ± 0,02) kg, distributed over an area with a diameter of (80 ± 2) mm, through a distance of (100 ± 2) mm on to the device.

Perform the test once.

After the impact, there shall be no cracking or separation into parts of the safety device.

The test shall be carried out on sample(s) as defined in Clause 4:

— that have been exposed to UV as specified in 5.1,

— that have been subjected to the effect of temperature as specified in 5.3 (at low temperature and at high temperature).

12 Information and instruction for installation, use and maintenance

12.1 General

All information in relation to installation, use and maintenance shall be provided in the language(s) of the country of sale.

12.2 Information

The following information shall be given:

— the name or trademark of the manufacturer or importer,

— the type of internal blind for which the safety device is designed and tested,

— information on the use: purpose and possible limitations of the safety device,

— a warning that the release of small parts could result in the internal asphyxiation of the child.

In addition, the following specific information shall be given depending on the safety device concerned:

— tensioning device: the suitability of the device for either a single cord loop, a single ball-chain loop, dual or any other combination,

— breakaway device: the limits, if any, of the cord or ball-chain properties and characteristics (e.g. diameter) to be used in conjunction with a connector and the limits, if any, of the fabric properties and characteristics (e.g. thickness) which may affect the efficiency of the device,

— accumulation device: the length of cord that can be accumulated by the device depending on the cord properties,

— non tangling device: the limits, if any, of the cord properties and characteristics to be used in conjunction with the device,

— inner cord stops: the limits, if any, of the cord properties and characteristics (e.g. diameter) to be used in conjunction with the device.

12.3 Instructions (for retrofitting purpose only)

The safety devices dedicated to retrofitting shall be accompanied by the following instructions:

— the following sentence: “Read these instructions carefully before installing and using the safety device. Children can be strangled if the device is not installed correctly. This safety device shall be correctly installed for the protection from strangulation of young children and the proper operation of the blind. Keep the instructions for future reference. Use of safety devices helps reduce the risk of strangulation but cannot be considered entirely foolproof”;

— in the case of tensioning and accumulation devices, the following sentence: “Check the condition of the device if not used regularly” and “Replace the device if it is faulty”;

— precise instructions on correct installation and location of the device(s). If a special assembly tool is needed, it shall be provided by the supplier of the device(s);

— any other information for safe use.

The instructions may be accompanied by pictograms to facilitate understanding.

In addition, the following specific instructions shall be given depending on the safety device concerned:

— Tensioning device: the installation instructions shall state that the fixed tensioning device shall be installed so that the cord or chain is under constant tension.

— Accumulation device: the installation instructions shall state that it shall be installed as close to the headrail as possible and, in all cases, not less than 1,5 m from the floor.

— Inner cord stops: the following sentence “One inner cord stop shall be installed on each pull cord as close to the headrail as possible and not more than 50 mm away, the blind being in the fully extended position”.

12.4 Marking

The safety device shall be marked to allow for traceability of the product in the event of a safety issue.

For those safety devices where, due to their physical size, it is not practicable to apply markings, accompanying labels shall provide the information outlined in 12.2.

13 Factory Production Control (FPC)

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market conform with the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and the use of the results to control, raw and other incoming materials or components, equipments, the production process and each type of product.

NOTE An FPC system conforming with the requirements of the relevant part(s) or EN ISO 9000, and specific to the requirements of this standard, is considered to satisfy the above requirements.

The results of inspections, tests, requiring action, shall be recorded, as well any action taken. The action to be taken when control values or criteria are not met shall be recorded.

Annex A
(informative)

Tests to be carried out on safety devices

The following table presents a summary of the tests to be carried out on safety devices.

Table A.1—Test samples to be tested depending on artificial ageing conditions

Artificial ageing before tests	**Safety devices (sample(s) defined according to Clause 4)**				
	Tensioning device	Breakaway device	Accumulation device	Non tangling device	Inner cord stop
	Functional test (see Clauses 6 to 10)				
Original condition	X	X	X	X	–
Exposure to UV (see 5.1)	X	X	-	–	X
Mechanical endurance (see 5.2)	X	X [a]	X [b]	–	–
Effect of low temperature (see 5.3)	X	X	–	–	–
Effect of high temperature (see 5.3)	X	X	–	–	–
Release of small components (see 11.2)					
After all functional tests	X	X	X	X	X
Impact resistance (see 11.3)					
Exposure to UV (see 5.1)	X	–	X	–	–
Effect of low temperature (see 5.3)	X	–	X	–	–
Effect of high temperature (see 5.3)	X	–	X	–	–

[a] The mechanical endurance test defined in 7.1 is considered in this case.
[b] For safety devices with moving parts.

Bibliography

[1] BS 7231-1:1990, *Body measurements of boys and girls from birth up to 16.9 years - Part 1: Information in the form of tables*

[2] ISO 2859-1, *Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

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