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Finger protection devices for pedestrian doors – Specification

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 10, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 January 2017. It was prepared by Subcommittee B/538/4, *Building hardware*, under the authority of Technical Committee B/538/1, *Windows and doors*. A list of organizations represented on these committees can be obtained on request to their secretary.

Information about this document

Finger entrapment in doors might result in serious injuries that can have long term effects such as amputation, or in less severe cases, require significant hospital treatment. Preventing such injuries is therefore important. Where automatic swing doors are fitted, it is a requirement of BS EN 16005 that fingertrap protection be used at the hanging stile(s) of the doorset.

This British Standard focuses on the prevention of entrapment at the hanging stile of doors used by pedestrians, by specifying requirements for protective devices.

It is children who suffer a disproportionate number of finger entrapment injuries, though adults are also at risk. Because of their lack of understanding of the dangers presented by doors, young children might put their fingers into the gap between a door and its frame without any awareness of the possible consequences. Older children and adults are likely to be aware of the risks but might inadvertently put their fingers into the gap. This British Standard therefore covers the needs of all age groups.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Requirements in this standard are drafted in accordance with Rules for the structure and drafting of UK standards, subclause J.1.1, which states, "Requirements should be expressed using wording such as: 'When tested as described in Annex A, the product shall ...'". This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This British Standard specifies requirements and test methods for durability, strength and effective function of finger protection devices fitted at the hanging stile of pedestrian doors with the main purpose of preventing inadvertent injury.

NOTE 1 Such finger protection devices might be incorporated into the doorset, or applied to the door and/or frame.

This British Standard is applicable to finger protection devices fitted to side hung and pivoted doors with single or double swing.

It is not applicable to devices fitted to sliding and revolving doors.

This British Standard does not specify requirements for products intended to be fitted by the consumer for use in dwellings.

NOTE 2 Such products are covered by BS EN 16654.

NOTE 3 See Annex A for information on additional attributes.

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.

BS EN 1154, *Building hardware – Controlled door closing devices – Requirements and test methods*

BS EN 1935, *Building hardware – Single-axis hinges – Requirements and test methods*

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 dwelling
building or part thereof used for domestic habitation

3.2 finger protection device
device intended to minimize the risk of crushing injuries to fingers in the gap between the hanging stile of the door leaf and the door frame

3.3 type A device
finger protection device fitted to the door and/or frame to shield the gap between the door and frame

3.4 type B device
finger protection device that is an integral part of or attached to the door and/or frame to reduce the gap between door and frame

Note Type B devices might include the door hanging system.

4 Classification

Finger protection devices shall be classified as follows and tested in accordance with the schedule in Table 1:

Class 1: Products which cover the gap.

Class 2: Products which prevent access to the gap when force is used, or eliminate the gap.

Table 1 **Classification of finger trap devices**

Requirements	5.1	5.2	5.3.1	5.3.2	5.3.3	5.4	5.5
Class 1	X	X	X	—	X	X	X
Class 2	X	X	X	X	X	X	X

NOTE 'X' denotes requirement to be fulfilled.

5 Requirements

5.1 General requirements

The manufacturer shall indicate the type(s) of doors, including the thickness and the materials (e.g. aluminium, PVC, wood), for which the device is suitable.

Where the device is not integral to the doorset (Type A), the manufacturer shall provide fixings with the device to attach it to the door leaf and/or the door frame (e.g. adhesive tape, screws) which are suitable for the intended material(s) described in the accompanying information.

NOTE See Annex A for information on attributes which might be required in particular circumstances.

The manufacturer shall provide the information in accordance with Annex B concerning correct installation and use of the device.

5.2 Mechanical function and structural integrity

When tested in accordance with **7.4.1**, the device shall not break, have any visible cracks or permanent deformation, or disengage. The device shall be fully functional after the test.

5.3 Effectiveness

5.3.1 General requirements

The device shall be operational over the full length of that part which is intended to provide its protective function. That part of the device which is intended to provide its protective function shall extend to within 15 mm of the bottom of the device (see also **A.6**).

A minimum length of 1 800 mm shall be supplied for testing. Operational parameters to include maximum opening angle, minimum and maximum door thicknesses shall be used when testing.

5.3.2 Prevention of finger entrapment requirement

When tested in accordance with **7.4.2.1**, the finger probe shall not be entrapped between the door leaf and door frame device and leaf, device and frame or within the device itself. When the finger probe is removed, the normal operation of the door shall not be impaired, and the device shall not be broken, or have any visible cracks or permanent deformation, or disengage.

NOTE 1 The probe is regarded as trapped when it cannot be removed by a force not exceeding 12 N.

*NOTE 2 Additional safety measures might be needed to prevent entrapment in exposed areas above and below the device (see **A.6**).*

5.3.3 Deformation of the device

When tested in accordance with **7.4.2.2**, when the finger probe is removed the normal operation of the door shall not be impaired.

5.4 Small parts

If any part becomes detached during testing it shall not fit wholly in the small parts cylinder described in **7.2.4** when tested in accordance with **7.4.2.3**.

5.5 Sharp edges

Edges and protruding parts accessible during use shall be rounded or chamfered and free of burr and sharp edges.

6 Marking

Devices shall be marked clearly and legibly with the following information:

a) the manufacturer's name, trademark or other means of identification;

b) the product model identification;

c) the number of this standard (i.e. BS 8613:2017) [1)];

d) the classification according to Clause **4**; and

e) the week and year of manufacture (can be coded).

Where applicable, packaging in which the device is supplied shall clearly denote on the outside label all of the above.

7 Test methods

7.1 General test conditions

The tests shall be conducted at a temperature between 15 °C and 30 °C. The test sample shall be installed in accordance with the manufacturer's instructions using a test door in accordance with **7.2.1**.

7.2 Test equipment

7.2.1 *Test door and frame for type A devices,* with:

a) a test door leaf:

   1) (2 100 ±100) mm high;

   2) with a thickness of (44 ±2) mm;

   3) with a mass of (60 ±5) kg; and

   4) with an overhead door closer to power size 3, in accordance with BS EN 1154;

[1)] Marking BS 8613:2017 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

b) three single axis hinges:

1) conforming to hinge grade 13 of BS EN 1935;

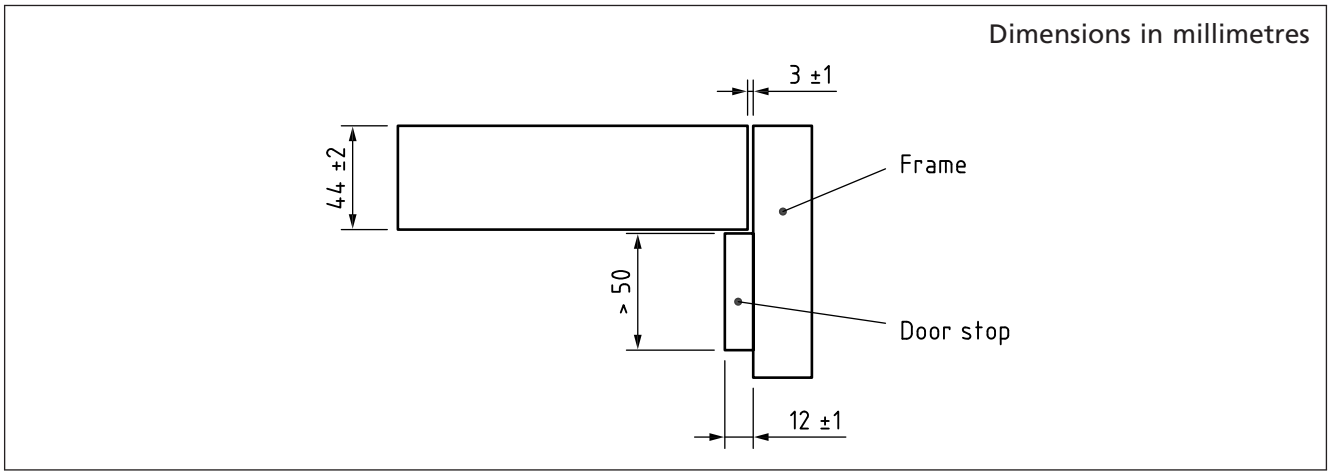
2) with a minimum size of (89 × 89 × 3) mm and a knuckle size of minimum Ø12 mm; and

3) with their centres mounted at (250 ±5) mm, (450 ±5) mm and (1 850 ±5) mm from the top of the door; and

NOTE Devices only for use on doors with specific types of hinges may be tested, mounting these hinges on a test door with the mass and dimensions specified in a).

c) the gap between the back of the door and the face of the jamb (3 ±1) mm (see Figure 1).

Figure 1 **Gap between door frame and jamb**



For single action doors, a frame stop shall be provided (see Figure 1). If the manufacturer specifies a different size of frame stop then this shall be used, recorded and limited to this size.

7.2.2 *Test door and frame for Type B devices*:

a) with a test door leaf:

1) (2 100 ±100) mm high;

2) (900 ±100) mm wide;

3) with a thickness of (44 ±2) mm, and

4) a mass of (60 ±5) kg;

NOTE Where this door leaf thickness does not suit the product being tested, a door and frame of suitable dimensions should be used.

5) with an overhead door closer to power size 3, in accordance with BS EN 1154;

b) fitted with the hanging device specified for use with the product. Where a hanging device incorporates self-closing action, such as a floor spring or transom closer, the overhead closer is omitted;

c) with a gap between the back of the door and the face of the jamb (3 ±1) mm in accordance with Figure 1.

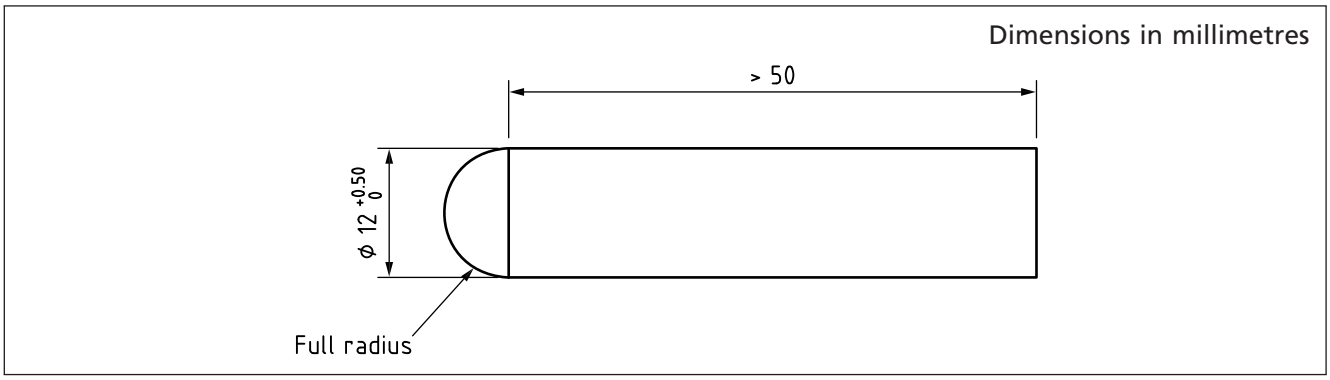
For single action doors, a frame stop shall be provided (see Figure 1). If the manufacturer specifies a different size of frame stop then this shall be used, recorded and limited to this size.

7.2.3 *Finger probe*:

a) made from plastics or other hard, smooth material of a diameter of (12.0 ±0.5) mm; and

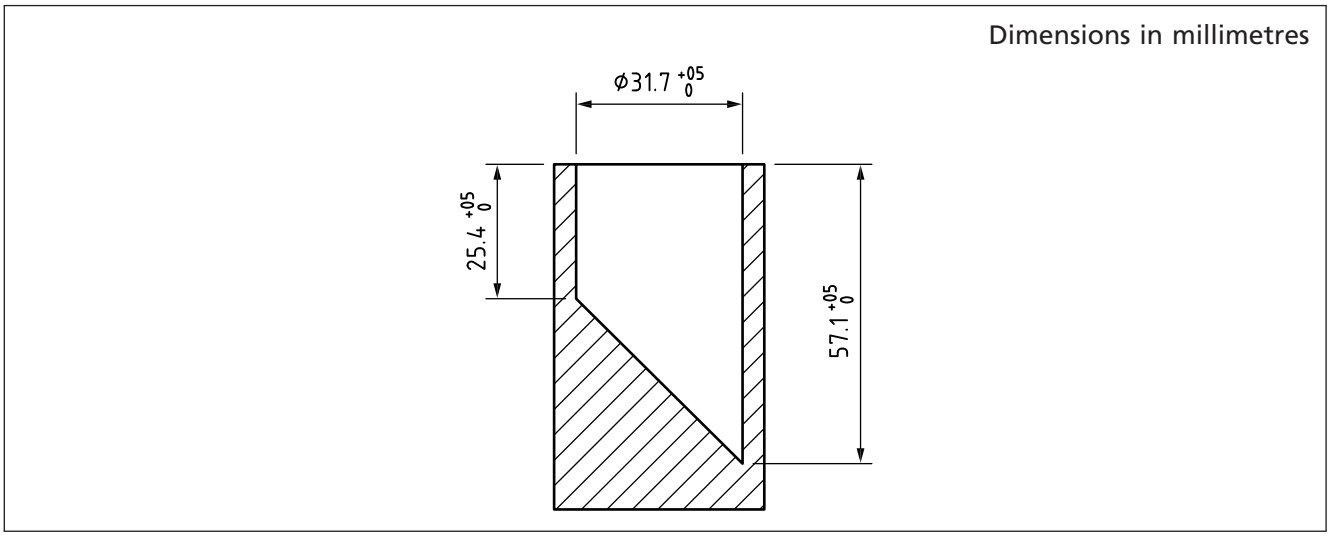
b) a full hemispherical end that can be mounted on a force-measuring device in accordance with Figure 2.

Figure 2 **Finger probe**



7.2.4 *Small parts cylinder (based on BS EN 71-1:2014),* in accordance with Figure 3.

Figure 3 **Small parts cylinder**



7.3 Test schedule

The sample shall be tested as follows:

- a durability test in accordance with **7.4.1**;
- a deformation test in accordance with **7.4.2.2**;
- a test of prevention of finger entrapment in accordance with **7.4.2.1** (Class 2 only); and
- the small parts test in accordance with **7.4.2.3.**

The deformation test shall be carried out before the entrapment test in each instance.

7.4 Test procedures

7.4.1 Durability test

Open and close the door to an angle of (90 ±5)° for 200 000 cycles with the device mounted to the doorset in accordance with the manufacturer's instructions.

Open the door to the maximum opening angle of the device at the beginning, middle and end of the test for five manual cycles.

The motion of the door leaf shall be operated without shock at a rate of 5–10 cycles per min.

The rest time shall be at least 1 s and shall not exceed 4 s.

7.4.2 Effectiveness tests

7.4.2.1 Prevention of finger entrapment test

Open the door to an angle of (35 ±5)°. Use the finger probe (see Figure 2) to gradually apply a force of 25_{0}^{+5} N horizontally at three onerous positions on that part of the device intended to provide protection, but not within 12 mm of each end. If the probe enters into a space which might cause entrapment, allow the door to close while maintaining the force.

Check whether the probe is trapped between the door leaf and the door frame, device and leaf, device and frame or within the device itself.

Repeat this procedure with an opening angle of (90 ±5)°.

Repeat three times at the start, middle and end of the durability test.

The probe shall be regarded as trapped when it cannot be removed by a force of not more than 12 N.

7.4.2.2 Deformation test

Open the door to an angle of (105 ±5)°. Use the finger probe (see Figure 2) to gradually apply a force of (75 ±2) N horizontally and parallel to the door frame (see Figure 1) at the most onerous position on the surface of that part of the device intended to provide protection.

Remove the probe and check the door closes fully into its frame.

Repeat three times at the start, middle and end of the durability test.

7.4.2.3 Small parts test

Place any component which becomes detached throughout the testing without compressing it and in any possible orientation in the small parts cylinder (see Figure 3).

If the component fits entirely within the cylinder the requirement of **5.4** has not been met.

7.4.3 Test report

The test report shall include the information necessary for the interpretation of the results and at least the following information:

a) a title and a date;

b) the name and address of the laboratory, and the location where the tests were carried out if different from the address of the laboratory;

c) the names, functions and signatures or equivalent identification of persons authorizing the test report;

d) the name and address of the client;

e) unique identification of the test report and on each side an identification, in order to ensure that each page is recognized as a part of the test report, and a clear identification of the end of the test report;

f) identification of the test method(s) used;

g) information on specific test conditions, such as environmental conditions;

h) a description of the condition, and unambiguous identification, of the items tested;

i) the date of receipt of the test items and the date of performance of the test;

j) the test results and units of measurement, including locations where forces were applied by probes;

k) a statement on the estimated uncertainty of measurement;

l) a statement of compliance or non-compliance with requirements of Clause **5**;

m) type of fixing; and

n) location of fixing.

Annex A (informative) Information on additional attributes

A.1 External use

If the device is intended for use on external doors then additional relevant test evidence should be provided by the manufacturer to show suitability for relevant climatic conditions. This might include a corrosion resistance grade according to BS EN 1670; details of UV light reaction, etc. The appropriate fixings should be included in such additional test data.

A.2 Opening/closing forces

Some devices might have an adverse effect on the opening and/or closing forces of the doors to which they are attached. Where this might be critical, such as fire or security doors, and doors required to give access to all users, specifiers are advised to check with the manufacturer to ascertain the degree of effect which could be anticipated.

A.3 Child appeal

Some industrial or commercial applications might call for the finger protection device to be highly visible or coloured to suit the décor. In applications where children are the main target group for protection, specifiers should consider finishes which would not draw a child's attention to the device and encourage close contact.

Many characteristics can make an object appealing to young children, including images of cartoon characters, toys, animals, foods, including beverages, and bright and/or primary colours. In the case of colours, it is likely to be the contrast between the device and the surrounding area that would render it appealing.

A.4 Choking hazard (Subclause 5.4)

If parts of the device or its fixings become detached during use (as tested), they should not present choking hazards to young children, who have a tendency to put any small object that they find into their mouths as part of their natural exploratory behaviour. This British Standard includes a requirement (**5.4**) and test (**7.4.2.3**) for the risks associated with small objects. The test and associated equipment – the so-called small parts cylinder – is taken from BS EN 71-1.

A.5 Special needs

This British Standard does not address the extra requirements which might be necessary for applications in facilities for people who might self-harm, or who have limited mental capacity. Some fingertrap protection products might be suitable for such locations and should be given specific risk-assessment by knowledgeable professionals before installation.

A.6 Overall height of the device

Protection from entrapment is needed from the bottom of the door leaf to a height safely above that which children can reach. Adults can reach greater heights but are likely to be aware of the dangers that doors present (BS EN 16005 recommends a height of 2 m for automatic swing doors). It might be possible for fingers to be inserted into the gap between the door and frame below and above the device. No requirement is included for this hazard but specifiers and end-users should take this into account when assessing the risks to likely users of the door.

A.7 Assessment of risk

Not all devices extend their protection to the very bottom of the door. This is usually due to operational limitations. Although the unprotected area might be minimal, it should be taken into account when assessing risk and selecting an appropriate device.

Annex B (normative) Information to be supplied by the manufacturer

Information concerning correct installation and use of the device shall be provided. The instructions shall include at least the following:

- name or trade mark of the manufacturer, importer or organization responsible for its sale and their UK contact details;
- the instruction: “Read this instruction carefully before installing and using the device. The protective function and any possible guarantee of the device might be affected if you do not follow the instructions. Pass the instructions to the end-user for future reference.”;
- information on which types, sizes, maximum opening angle and thicknesses of doors and door materials and hanging device for which the product is intended;
- precise and understandable instructions including appropriate diagrams and/or photographs on how and where to install the device to ensure the intended protective function;
- advice on surface preparation for devices fixed using adhesives;
- maintenance instruction;
- WARNING – "Replace the device if any part is broken, torn or missing";
- any other relevant information for safe usage; and
- advice that the device should be aligned with the bottom of the door leaf, and that the protection should be provided to a minimum height of 1 800 mm or the top of the door leaf.

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 71-1:2014, *Safety of toys – Part 1: Mechanical and physical properties*

BS EN 1670, *Building hardware – Corrosion resistance – Requirements and test methods*

BS EN 16005, *Power operated pedestrian doorsets – Safety in use – Requirements and test methods*

BS EN 16654, *Child protective products – Consumer fitted finger protection devices for doors – Safety requirements and test methods*

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