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**Footwear — Test methods for slide  
fasteners — Resistance to damage  
during closure under a lateral force**

*Chaussures — Méthodes d'essai des fermetures à glissière —  
Résistance à l'endommagement en cas de fermeture avec application  
d'une force de traction latérale*

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ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

ISO 18403 was prepared by the European Committee Standardization (CEN) Technical Committee CEN/TC 309, *Footwear*, in collaboration with ISO Technical Committee TC 216, *Footwear*, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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# Footwear — Test methods for slide fasteners — Resistance to damage during closure under a lateral force

## 1 Scope

This International Standard specifies a test method intended to determine the maximum lateral force applied to a slide fastener for footwear under which it will close without failure. The method is applicable to all types of slide fastener.

## 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.

ISO 18454, *Footwear — Standard atmospheres for conditioning and testing of footwear and components of footwear*

ISO 19952, *Footwear — Vocabulary*

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## 3 Terms and definitions (standards.iteh.ai)

For the purposes of this document, the terms and definitions given in ISO 19952 and the following apply.

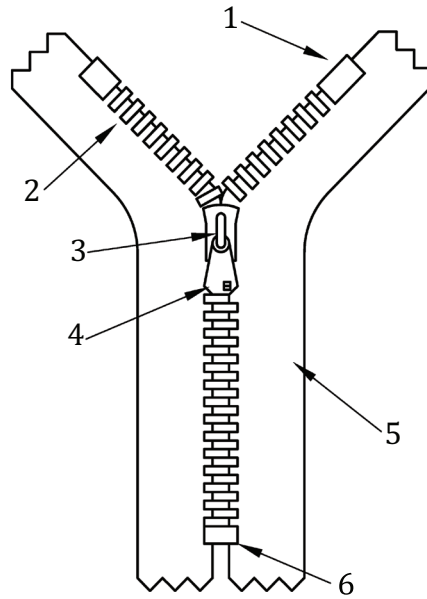
### 3.1

#### slide fastener

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means of securing two flexible materials consisting of interlockable teeth each attached to one of the opposing edges of two *tapes* (3.2) and movable slider that spans the interlocking teeth which when moved in one direction causes the *teeth* (3.5) of one tape to interlock with the teeth of the other tape

Note 1 to entry: When the *slider* (3.3) is moved in the opposite direction, it causes the teeth to disengage (see [Figure 1](#)).



**Key**

- |   |          |   |             |
|---|----------|---|-------------|
| 1 | top stop | 4 | puller      |
| 2 | teeth    | 5 | tape        |
| 3 | slider   | 6 | bottom stop |

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**Figure 1 — Slide fastener**

**3.2**

**tape**

fabric panels to support other *teeth* (3.5) of the *slide fastener* (3.1) 16

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**3.3**

**slider**

means of drawing the two interlocking teeth together or apart as it traverses the length of the *teeth* (3.5)

**3.4**

**puller**

piece of plastic or metal attached to the *slider* (3.3) as a means of manual grip for the user to operate

**3.5**

**teeth**

individual component of the *slide fastener* (3.1) or continuous plastic spiral which interlocks with an opposing element

**3.6**

**end stop**

**top stop**

terminal components of the *teeth* (3.5) to prevent the *slider* (3.3) from disengaging from the teeth and *tape* (3.2)

**3.7**

**stringer**

textile tape with an attached row of *teeth* (3.5) designed to interact with a row attached to another *tape* (3.2)

## 4 Principle

A test slide fastener is slowly closed under incrementally increasing lateral forces until the fastener fails.

## 5 Apparatus and materials

5.1 A **test machine** having the following.

5.1.1 Two end clamps with the following:

- their clamping edges parallel and aligned;
- the capability of firmly gripping the ends of the test fastener;
- a separation of  $[D]$ , where  $[D]$  can be set to a convenient distance in the range 160 mm to 335 mm;
- the facility of applying a tensioning force of  $(30 \pm 5)$  N between them. A mass suspended from strings attached to the clamps and passing over pulleys is convenient.

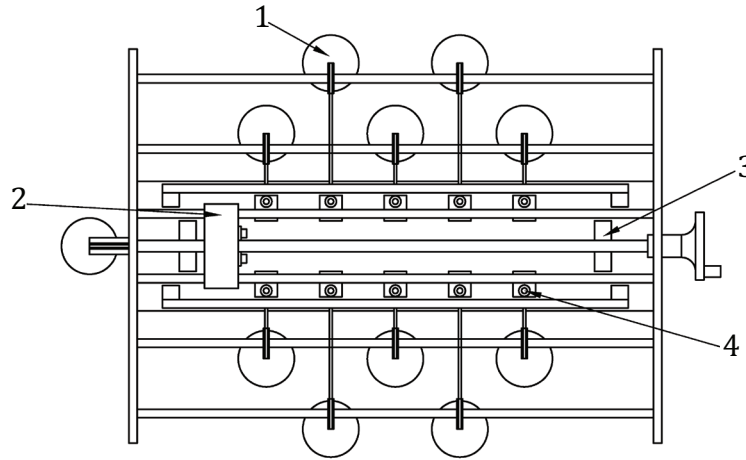
5.1.2 Five pairs of moveable side clamps, each pair with the following:

- square clamping edges of width  $(25 \pm 1)$  mm;
- the clamping edges parallel and at  $90^\circ$  to the clamping edges of the end clamps (5.1.1);
- the capability of firmly gripping the stringer edges of the test fastener;
- a lateral distance of  $(35 \pm 1)$  mm between each clamp;
- end stops restricting the clamp separation perpendicular to the clamping edges to between 20 mm and 60 mm.

5.1.3 A moveable clamp which has the capability of firmly gripping the puller of the test fastener.

5.1.4 A means of applying tensile forces of  $(20 \pm 2)$  N,  $(30 \pm 3)$  N,  $(40 \pm 4)$  N,  $(50 \pm 5)$  N or  $(60 \pm 5)$  N to each of the side clamps (5.1.2) in a direction perpendicular to the clamping edges. Masses suspended from strings attached to the clamps and passing over pulleys are convenient.

5.1.5 A means of moving the clamp (5.1.3) at a speed of  $(100 \pm 25)$  millimetres per minute (mm/min) between two points about 10 mm from the centre of each clamp (5.1.1).



**Key**

- 1 mass
- 2 end clamp
- 3 moveable clamp
- 4 side clamp

**Figure 2 — Suggested apparatus for determining resistance to damage during closure under a lateral force**

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**6 Test specimens**

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6.1 A minimum of three tests is required with each lateral force (5.1.4) up to either 60 N or a lower value which causes failure of the test specimen. The number of tests which can be carried out on a single test fastener and, therefore, the number of fasteners required to carry out the complete series of tests, will depend on the fastener length (see Table 1).

**Table 1 — Number of fasteners required to carry out a complete series of tests**

Approximate fastener length, mm	Number of fasteners required
125 – 219	15 (3 sets of 5)
220 – 279	9 (3 sets of 3)
280 – 400	6 (3 sets of 2)
400+	3

6.2 Condition the test specimen according to ISO 18454 for 24 h before the test and carry out the test in this environment.

**7 Procedure**

7.1 Close a test fastener and clamp one of its ends in each of the end clamps (5.1.1) so that similar lengths of the fastener are held in each clamp and the portion of the fastener between the clamps is as long as possible, but not greater than 335 mm.

7.2 Apply a longitudinal force of  $(30 \pm 5)$  N to the end clamps (5.1.1) to tension the test fastener. Fix the end clamps in this position to maintain the resulting extension.



**7.3** Mark a line across each stringer which is  $(50 \pm 5)$  mm from, and parallel to, the edge of the clamp holding the bottom of the test fastener. This is test position 1.

**7.4** At  $(60 \pm 5)$  mm intervals along the length of the test fastener from test position 1, mark further lines across both stringers that are parallel to the line (7.3). Do not draw any lines that are less than 45 mm from the edge of the end clamp holding the top of the fastener. Each of these lines is a test position.

**7.5** At each of the test positions, fit a side clamp (5.1.2) to each stringer so that

- the clamp separation at each test position is  $(20 \pm 2)$  mm, and
- the line marked on the stringer is at  $90^\circ$  to, and central with, the clamping edges.

**7.6** Open the test fastener by moving the slider until it is  $(10 \pm 2)$  mm from the edge of the clamp (5.1.1) holding the bottom of the fastener. Tightly grip the puller with the clamp (5.1.3).

**7.7** Apply a force of  $(20 \pm 2)$  N to each of the pair of side clamps at test position 1 so that a lateral force is applied to the fastener.

**7.8** Move the clamp (5.1.3) at a speed of  $(100 \pm 25)$  millimetres per minute (mm/min) so that the test fastener is gradually closed. Stop when the clamp (5.1.3) has moved the slider body through a distance of approximately 60 mm so that it is just past the pair of side clamps applying the lateral force.

**7.9** If the fastener closes correctly without failure, then apply a force of  $(30 \pm 3)$  N to each of the next pair of side clamps (5.1.2) and repeat the procedure in 7.8.

**7.10** Repeat the procedure in 7.8 and 7.9 at any remaining test positions using forces of  $(40 \pm 4)$  N,  $(50 \pm 5)$  N and  $(60 \pm 6)$  N.

**7.11** If the test fastener fails, then record the lateral force and the type of failure, such as

- separation of locked teeth from each other,
- teeth pulled off stringer, and
- failure of stringer material.

**7.12** If the fastener was too short to allow the test to be carried out using all five test forces, and the fastener has not failed when tested at its last position, then continue the test using further fasteners.

**7.13** Repeat the procedure in 7.1 to 7.12 for the remaining two test specimens or sets of test specimens.

**7.14** Record the highest lateral force at which the fastener did not fail.

## 8 Test report

The test report shall include the following information:

- a) a reference to this International Standard, i.e. ISO 18403;
- b) a full description of the sample tested;
- c) the date of testing;
- d) the maximum lateral force at which failure did not occur, as recorded in 7.14;