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

*Chaussures — Méthodes d'essai pour semelles -- Résistance aux dommages durant la fermeture sous une force latérale —*

ICS 61.060

### ISO/CEN PARALLEL PROCESSING

This draft has been developed within the European Committee for Standardization (CEN), and processed under the **CEN-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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ISO 18403 was prepared by Technical Committee ISO/TC 216, *Footwear*, Subcommittee SC , and by Technical Committee CEN/TC 309, *Footwear* in collaboration.

This second/third/... edition cancels and replaces the first/second/... edition (), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

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

## 1 Scope

This 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 referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 19952, *Footwear — Vocabulary*

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

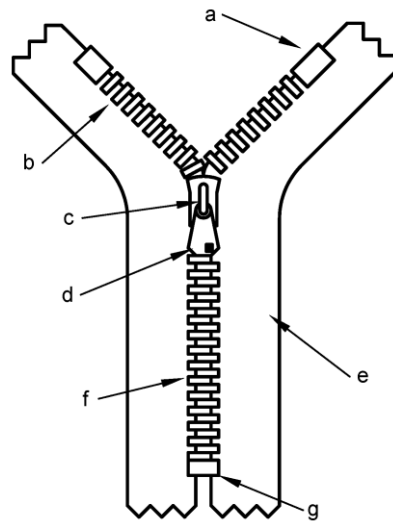
## 3 Terms and definitions

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

### 3.1

#### **slide fastener**

a means of securing two flexible materials consisting of interlockable teeth each attached to one of the opposing edges of two tapes and movable slider that spans the interlocking teeth which when moved in one direction causes the teeth of one tape to interlock with the teeth of the other tape; when the slider is moved in the opposite direction it causes the teeth to disengage (see Figure 1)



**Key**

- |                |           |
|----------------|-----------|
| a) Top stop    | b) Teeth  |
| c) Slider      | d) Puller |
| e) Tape        | f) Teeth  |
| g) Bottom stop |           |

**Figure 1 — Slide Fastener**

**3.2**

**tape**

fabric panels to support other teeth of the slide fastener

**3.3**

**slider**

means of drawing the two interlocking teeth together or apart as it traverses the length of the teeth

**3.4**

**puller**

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

**3.5**

**teeth**

individual component of the slide fastener which interlocks with an opposing element

**3.6**

**end stop/top stop**

terminal components of the teeth to prevent the slider from disengaging from the teeth and tape

**3.7**

**Stringer**

Textile tape with an attached row of teeth designed to interact with a row of similarly attached to another tape.

**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:

5.1.1 Two end clamps with:

- 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.

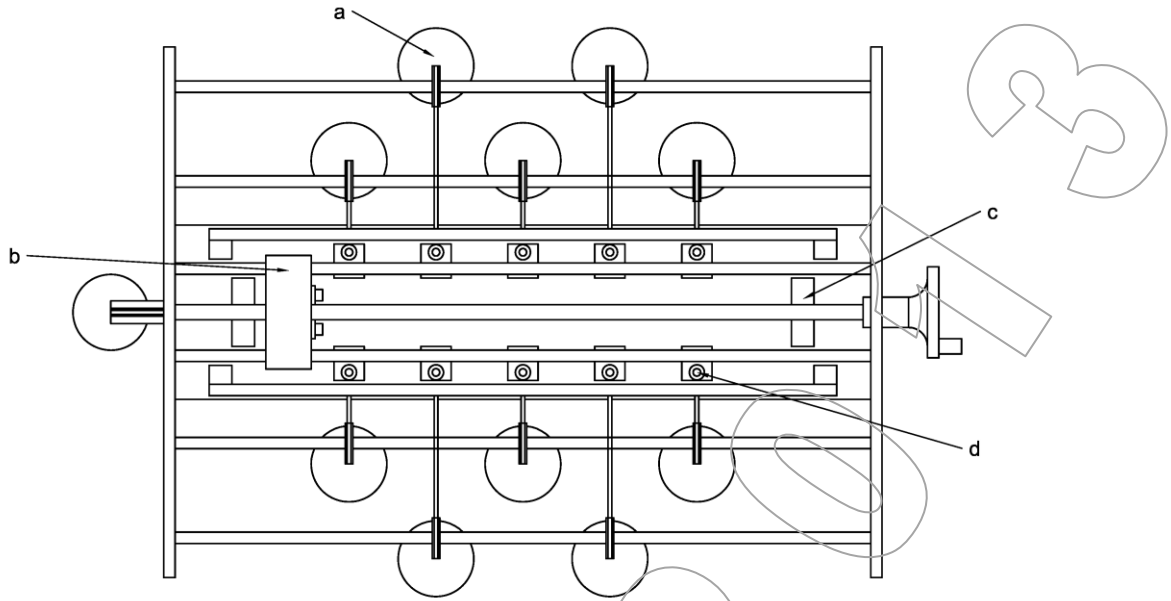
5.1.2 Five pairs of moveable side clamps, each pair with:

- 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**

- a) Mass
- b) End Clamp
- c) Moveable Clamp
- d) Side Clamp

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

**6 Test specimens**

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 hours 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.
- 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 clause 7.8.

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

- 8.1** Reference to this standard.
- 8.2** Full description of the sample tested.
- 8.3** Date of testing.
- 8.4** The maximum lateral force at which failure did not occur as recorded in 7.14.