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Footwear — Test method for slide fasteners — Strength of slide fastener pullers

Chaussures — Méthodes d'essai des fermetures à glissière — Résistance des tirettes des fermetures à glissière

Reference number
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Foreword

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ISO 10734 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).

Footwear — Test method for slide fasteners — Strength of slide fastener pullers

1 Scope

This International Standard specifies a test method intended to assess the strength of slide fastener pullers for footwear. The method is applicable to all types of footwear 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 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

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

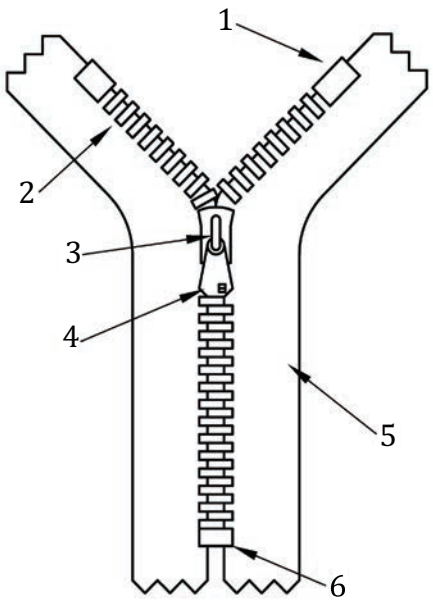
ISO 19952, *Footwear — Vocabulary*

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
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

Figure 1 — Slide fastener

3.2
tape
fabric panels to support other *teeth* (3.5) of the *slide fastener* (3.1)

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

The slider and puller of a test fastener are clamped so that the puller is perpendicular to the slider body. This International Standard describes the following methods:

Method 1: Tension — The force required to pull the puller from the slider in a direction parallel to the longitudinal centre line of the puller is measured;

Method 2: Torsion — The torque required to twist the puller from the slider about the longitudinal centre line of the puller is measured.

5 Apparatus and materials

5.1 Method 1 — Tension

A **tensile testing machine** with the following characteristics shall be used.

5.1.1 A jaw separation rate of (100 ± 10) mm/min.

5.1.2 The capability of measuring forces up to 1 kN to an accuracy of 2 % as specified by Class 2 in ISO 7500-1.

5.1.3 A means of recording either the force at all times during the test or the maximum force.

5.1.4 A jig, in one jaw, for holding the test fastener slider. A flat plate of thickness at least 1 mm, which fits between the slider and the puller and has a tapered slot to engage the slider body, is suitable. An arm attached to the place is clamped into the jaw [see Figure 2 a)].

5.1.5 A device, fixed in the other jaw, for clamping the puller of the test fastener. A small rigid hook is suitable for pullers with a hole.

5.2 Method 2 — Torsion

A **test device** [see Figure 2 b)] with the following characteristics shall be used.

5.2.1 A pair of clamps, one capable of holding the test fastener slider and the other capable of gripping the puller so that it is perpendicular to the slider.

5.2.2 A method of rotating the two clamps (5.2.1) relative to one another at a rate of (9 ± 3) degree per second (°/s).

5.2.3 The capability of measuring the torque between the two clamps to the nearest 0,5 Nm.

5.2.4 Protractor capable of measuring angles of twist to the nearest 1°.

5.3 Minimum number of fasteners required

The minimum number of fasteners required for each version of the test are the following:

— Method 1 – Three;

— Method 2 – Six.

6 Procedure

6.1 Conditioning

The samples should be conditioned for at least 24 h according to ISO 18454 before the test is carried out and the test should be carried out in this environment.

6.2 Method 1 — Tension

6.2.1 Remove the slider from the stringers of the test fastener. Clamp the main body of the slider in the jig (5.1.4) so that it is at 90° to the axis of the tensile testing machine (5.1).

6.2.2 Attach the puller of the test fastener to the device (5.1.5) so that it is parallel to the axis of the tensile testing machine (5.1). Try to grip the puller in such a way that the device (5.1.5) will not cause an unnatural failure of the puller during the test. For example, if using a hook with a two hole puller which looks weak around its top hole, insert the hook through the bottom hole in the puller where it is fixed to the slider body.

6.2.3 Operate the tensile testing machine with a jaw separation rate of (100 ± 10) mm/min until either the puller breaks or pulls off the slider.

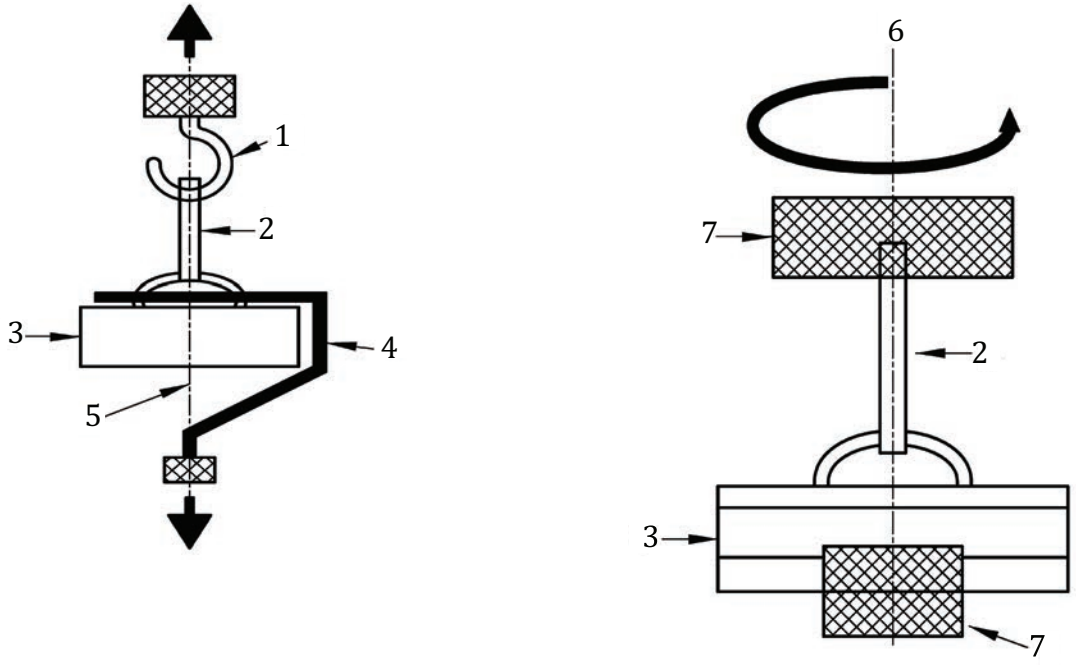
6.2.4 Record the maximum force obtained in newtons to the nearest 5 N and the type of failure such as the following:

— slider broke at the point of attachment to the puller;

— puller broke at the point of attachment to the slider;

— slider broke at a point away from the attachment to the puller;

— puller broke at a point away from the attachment to the slider.



a) Tension **b) Torsion**

Key

1 hook (5.1.5)
2 puller
3 slider
4 plate (5.1.4)
5 axis of tensile tester
6 axis of rotation
7 clamp (5.2.1)

Figure 2 — Test device

6.2.5 If the puller failed at the point of contact with the device (5.1.5), or it appears that the device contributed to the failure, then ignore this result and repeat the test with a fresh fastener.

6.2.6 Repeat the procedure in 6.2.1 to 6.2.5 with the other two test fasteners.

6.2.7 Calculate the arithmetic mean of the three maximum forces (6.2.4).

6.3 Method 2 — Torsion

6.3.1 Remove the slider from the stringers of the test fastener. Clamp the slider in one of the clamps (5.2.1) and the puller in the other, so that the puller is perpendicular to the slider and the longitudinal centre line of the puller is aligned with the axis of rotation between the two clamps [see Figure 2 b)].

6.3.2 Operate the testing device (5.2) so that the two jaws rotate relative to each other in a clockwise direction, when looking from the puller side of the slider, at a rate of (9 ± 3) degree per second (°/s) until either

— the puller breaks or twists off the slider, or

— the jaws have rotated through a total of 180°.

6.3.3 Record the maximum torque in Nm to the nearest 0,5 Nm and the type of failure such as the following:

— slider broke at the point of attachment to the puller;

— puller broke at the point of attachment to the slider;

— slider broke at a point away from the attachment to the puller;

— puller broke at a point away from the attachment to the slider;

— puller twisted, but did not break.

6.3.4 If the puller is permanently twisted, estimate the amount of twist to the nearest 5° using the protractor (5.2.4).

6.3.5 Repeat the procedure in 6.3.1 to 6.3.4 for another two test fasteners.

6.3.6 Calculate the arithmetic mean of the three maximum torques (6.3.3).

6.3.7 Repeat the procedure in 6.3.1 to 6.3.6 for another three test fasteners, this time rotating the clamps (5.2.1) in an anticlockwise direction.

7 Test report

The test report shall include the following information:

a) a reference to this International Standard, i.e ISO 10734;

b) a full description of the samples tested;

c) the date of testing;

d) the version of the test used: either method 1 or method 2;

   — method 1 — the arithmetic mean maximum force as calculated in 6.2.7;

   — method 2 — the arithmetic mean maximum torque for each direction of rotation as calculated in 6.3.6;

e) a description of the type(s) of failure;

f) any deviations from this test method.

ICS 61.060

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