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

Chaussures — Méthode d'essai pour les fermetures éclair -- Résistance des entraînements auxiliaires des fermetures éclair

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.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 10734 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.

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

1 Scope

This 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 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 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

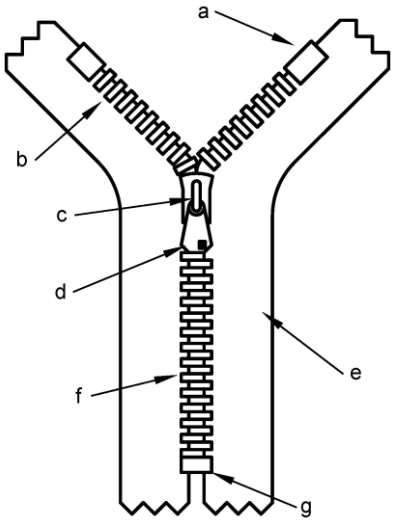
ISO 19952, *Footwear — Vocabulary*

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

The slider and puller of a test fastener are clamped so that the puller is perpendicular to the slider body. This 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 faces of the slider 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 2a.

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 2b) 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.

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 1º

5.3 Minimum number of fasteners required

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

— Method 1 – Three

— Method 2 – Six

6 Procedure

6.1 Conditioning

The samples should be conditioned 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 90º 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.

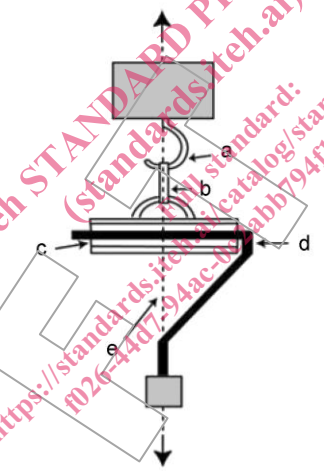
6.2.4 Record the maximum force obtained in newtons to the nearest 5N and the type of failure such as:

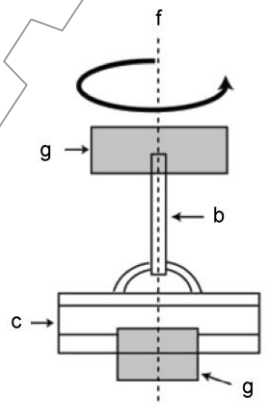
— Slider broke at the point of attachment to the puller.

— 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.





Key

a) Hook (5.1.5)
b) Puller
c) Slider
d) Plate (5.1.4)
e) Axis of tensile tester
f) Axis of rotation
g) Clamp (5.2.1)

Figure 2 — 2a (top) Tension; Fig 2b Torsion (bottom)

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 clauses 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 1b.

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 (º/s) until either:

— The puller breaks or twists off the slider.

— The jaws have rotated through a total of 180º.

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

— 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 5º using the protractor (5.2.4).

6.3.5 Repeat the procedure in clauses 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 clauses 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: