
**Footwear — Test methods for outsoles
— Determination of split tear strength
and delamination resistance**

*Chaussures — Méthodes d'essai applicables aux semelles d'usure —
Détermination de la force de déchirure sur refente et résistance au
délaminage*

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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).

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).

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 216, *Footwear*.

This second edition cancels and replaces the first edition (ISO 20875:2001), which has been technically revised.

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Footwear — Test methods for outsoles — Determination of split tear strength and delamination resistance

1 Scope

This document specifies a method for the determination of the split tear strength and delamination resistance for outsoles.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO 17709, *Footwear — Sampling location, preparation and duration of conditioning of samples and test pieces*

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

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3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

delamination resistance

force required to propagate delamination of the adhesive layer or joint interface if a multilayer outsole is composed of an adhesive layer, divided by the width of the test pieces

3.2

split tear strength

force required to propagate a cut in a test piece by tearing

4 Apparatus and material

The following apparatus and material shall be used.

4.1 Tensile-testing machine.

The tensile-testing machine shall comply with the requirements of ISO 7500-1, to an accuracy corresponding to grade B, with a constant rate of traverse of 100 mm/min \pm 10 mm/min. A low-inertia machine having autographic force recording facilities is essential.

4.2 Splitting jig and knife to use for making the initial cuts (see [Figure 1](#)).

5 Sampling and conditioning

Test specimens shall be strips of 75 mm minimum length and 25 mm ± 0,2 mm width.

The test pieces to be tested shall be taken in accordance with ISO 17709. All test pieces shall be conditioned in accordance with ISO 18454 before testing, for a minimum of 24 h.

A minimum of three pieces are necessary.

6 Test methods

6.1 Delamination resistance

In cases of multilayer outsoles, separate the layers of the sole for a length of 10 mm, inserting a heated knife in the adhesive layer.

Fold back the two tongues at one end of the test piece and insert and clamp one in each jaw of the machine. Start the machine so that the jaws separate at 100 mm/min, and record a trace of the force as the test continues.

6.2 Split tear strength

Using the splitting jig and knife (see 4.2), split one end of each test piece half-way between the top and bottom surfaces for a distance of approximately 30 mm.

Fold back the two tongues at one end of the test piece and insert and clamp one in each jaw of the machine. Start the machine so that the jaws separate at 100 mm/min, and record a trace of the force as the test continues.

7 Expression of results

7.1 The delamination resistance, D_s , expressed in newton per millimetre of width is given by [Formula \(1\)](#):

$$D_s = F/d \quad (1)$$

where

F is the average force in newton;

d is the width of the test piece in millimetres.

The results will be the average of the three values obtained.

7.2 The split tear strength, ST_s , expressed in newton per millimetre of width is given by [Formula \(2\)](#):

$$ST_s = F/d \quad (2)$$

where

F is the median force in newton;

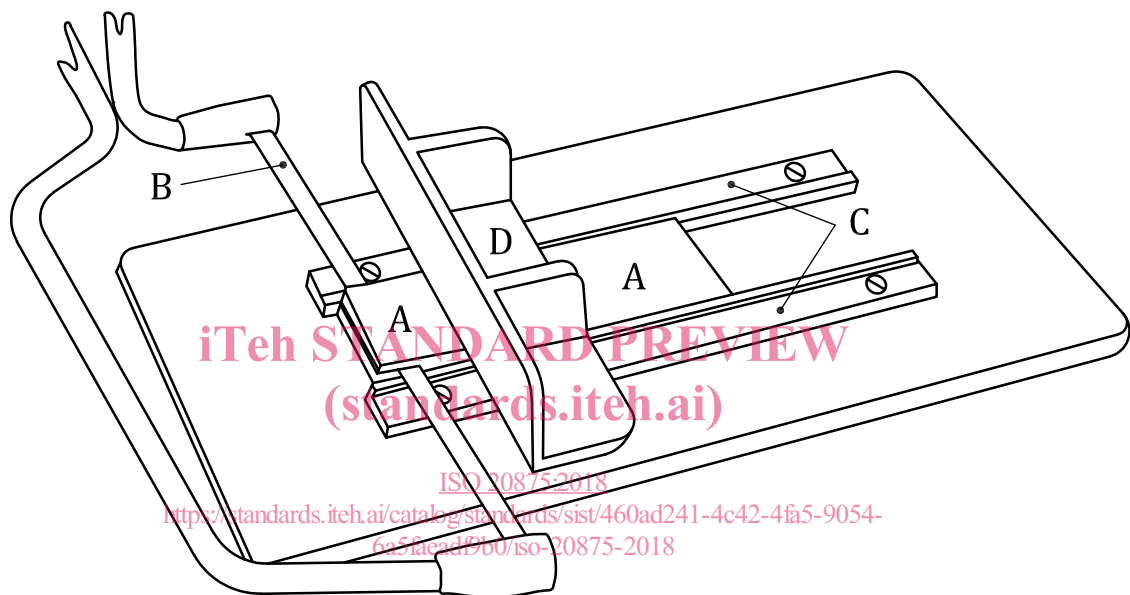
d is the width of the test piece in millimetres.

The results will be the median of the three values obtained.

8 Test report

The test report shall include the following information:

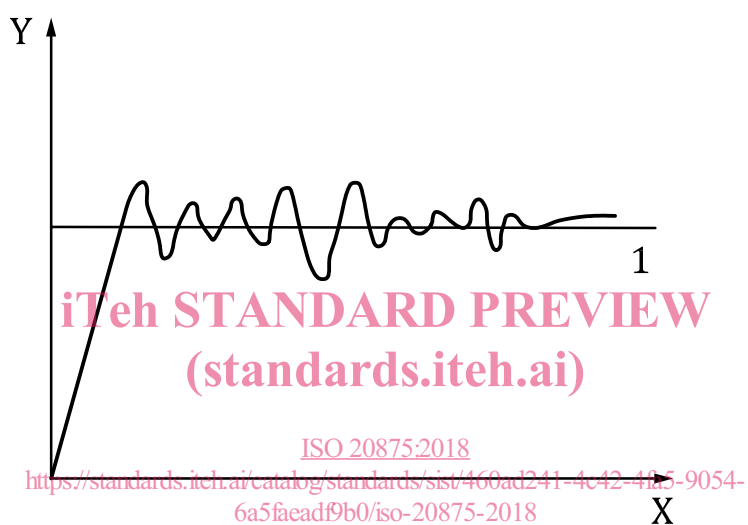
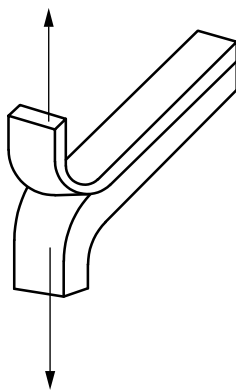
- a) results, expressed in accordance with [Clause 7](#);
- b) full identification of the samples tested, including styles codes, colours, nature, etc.;
- c) reference to this method of test;
- d) date of testing;
- e) details of any deviation from this standard test procedure.
- f) standard atmospheric conditions observed during the test.



Key

- A test piece
- B straight-edged cutting blade
- C guide rails for blade B to produce the correct depth of cut
- D hand-held guard which keeps the test piece stationary during cutting

Figure 1 — Example of knife and splitting jig



Key

- X deformation
- Y delamination force, in N
- 1 average

Figure 2 — Example of diagram force/deformation

Bibliography

- [1] ISO 20344, *Personal protective equipment — Test methods for footwear*

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