
**Footwear — Test methods for outsoles
— Dimensional stability**

*Chaussures — Méthodes d'essai applicables aux semelles d'usure —
Stabilité dimensionnelle*

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Foreword

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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).

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For an explanation on the voluntary nature of standards, 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 20873:2001), which has been technically revised.

Footwear — Test methods for outsoles — Dimensional stability

1 Scope

This document specifies a method for determining the linear shrinkage after heating of test specimens prepared from 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 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*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

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

dimensional stability

reduction in the distance between two reference points on a test piece before and after heating in air under specified conditions

Note 1 to entry: This shrinkage is expressed as percentage of the initial distance.

4 Apparatus and material

The following apparatus and material shall be used.

4.1 Steel rule, marked in millimetres.

4.2 Templates and scalpel or other sharp knife, to cut two reference marks in the test specimen either 100 mm or 50 mm apart.

4.3 Oven, for heating the test specimens to $70\text{ °C} \pm 2\text{ °C}$, which is thermostatically controlled so that they are kept within 2 °C of the required temperature during the heating period.

4.4 Device capable of measuring the distance between two cuts, 50 mm apart or 100 mm apart, on a flat surface, to an accuracy of $\pm 0,2$ mm.

This may consist of either:

- a) a steel rule, marked in millimetres as in [4.1](#), together with a $\times 5$ magnifying glass; or
- b) a travelling microscope or similar optical device with scale.

4.5 Thickness gauge, standing on a firm base and loaded with a dead weight such that the presser foot applies a pressure of $10 \text{ kPa} \pm 3 \text{ kPa}$. The gauge has a presser foot which is flat, circular and $10 \text{ mm} \pm 0,1 \text{ mm}$ in diameter, as defined in ISO 23529.

The gauge has scale division of $0,01 \text{ mm}$.

5 Sampling

The test pieces to be tested are 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.

The test samples with the full thickness of the outsoles shall be tested.

A minimum of three test pieces are necessary.

6 Test methods

6.1 Test specimen piece

Using a scalpel or other sharp knife ([4.2](#)) and a steel rule ([4.1](#)), cut the test specimens to the dimensions and tolerances given in [Figure 1](#).

Make two parallel reference cuts on the external surface not more than $0,5 \text{ mm}$ deep across the full width of the test specimen on each side of it, $100 \text{ mm} \pm 5 \text{ mm}$ apart for the larger test specimen and $50 \text{ mm} \pm 5 \text{ mm}$ apart for the smaller test specimen.

6.2 Measurement before heat treatment (L_0)

Measure to within $\pm 0,2 \text{ mm}$ the distance between the reference cuts along the centreline.

6.3 Heat treatment

Place the test specimens horizontally (supported in such a way as to ensure adequate air ventilation on all sides) in the oven ([4.3](#)) for $24 \text{ h} \pm 0,5 \text{ h}$ at a temperature of $70 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$.

6.4 Measurement after heat treatment (L)

Remove the test specimen from the oven at the end of the period of heat treatment. Keep the test specimens for at least 30 min in a standard atmosphere. If the test specimens are bowed, hold them flat for measurement.

If the measuring cuts have widened, take the point of the measurement as the centre of the cut. Measure to within $\pm 0,2 \text{ mm}$ the distance between these cuts along the centreline as described, using an appropriate device.

7 Expression of results

For each test specimen, calculate the shrinkage of the distance between the reference cuts produced by the heat treatment and express this as a percentage of the original distance.

The worst of the three values will be the result.

Shrinkage, S , in %, is to be calculated using the formula:

$$S = \frac{L - L_0}{L_0} \times 100 \quad (1)$$

where

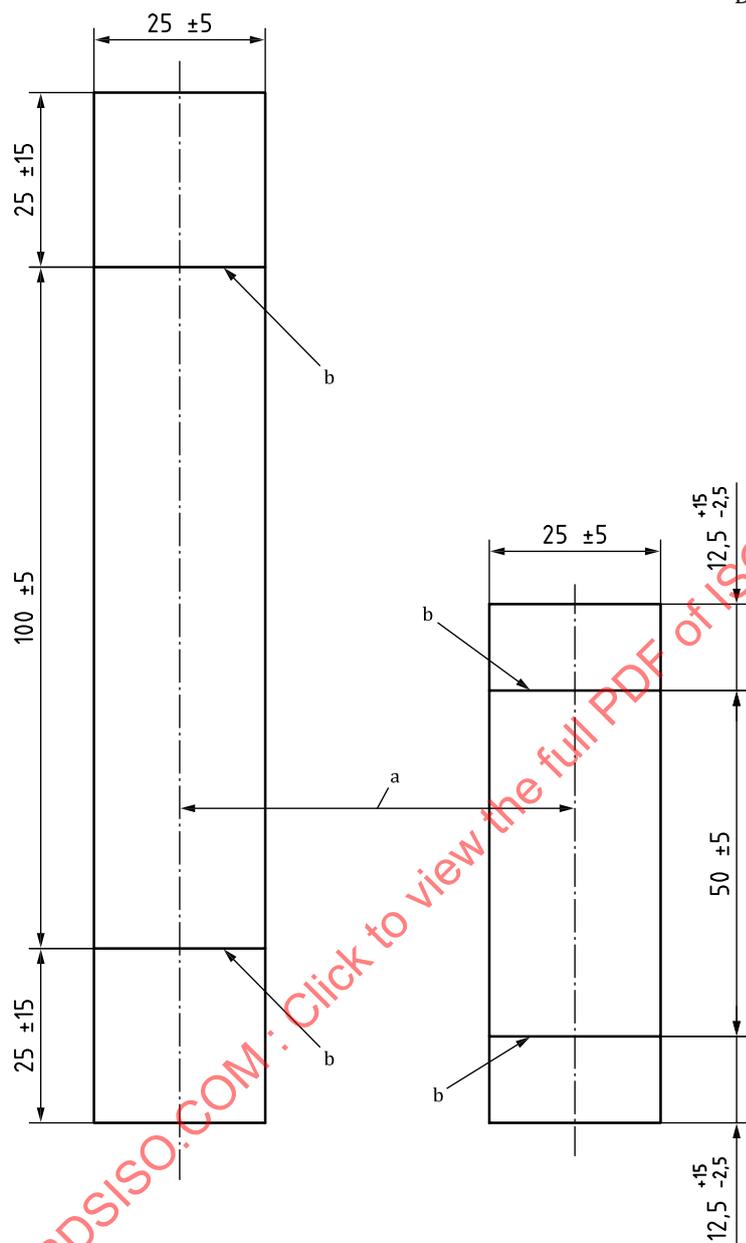
L_0 is the original distance between the reference cuts in millimetres, as recorded according to [6.2](#);

L is the distance between the reference cuts after heat treatment, in millimetres, as recorded according to [6.4](#).

8 Test report

The test report shall include the following information:

- a) results, expressed in accordance with [Clause 7](#);
- b) dimensions (including thickness) of the test specimen;
- c) full description of the samples tested including commercial styles, codes, colours, nature, etc.;
- d) reference to this test method;
- e) date of testing;
- f) any deviations from this test method;
- g) the age of the sample;
- h) standard atmospheric conditions observed during the test.



- a Centreline.
- b Shallow cut on each side of the test specimen.

Figure 1 — Long and short test specimens for shrinkage, showing dimensions and positions of reference cuts