



SLOVENSKI STANDARD
oSIST prEN ISO 20871:2016
01-april-2016

Obutev - Preskusne metode za zunanje podplate - Odpornost proti odrgnjenju (ISO/DIS 20871:2016)

Footwear - Test methods for outsoles - Abrasion resistance (ISO/DIS 20871:2016)

Schuhe - Prüfverfahren für Laufsohlen - Abriebwiderstand (ISO/DIS 20871:2016)

Chaussures - Méthodes d'essai applicables aux semelles d'usure - Résistance à l'abrasion (ISO/DIS 20871:2016)

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ICS:

61.060 Obuvala Footwear

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 20871

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Voting begins on:
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Footwear — Test methods for outsoles — Abrasion resistance

Chaussures — Méthodes d'essai applicables aux semelles d'usure — Résistance à l'abrasion

ICS: 61.060

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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.



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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 20871 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 outsoles — Abrasion resistance

1 Scope

This International standard specifies a method for the determination of the abrasion resistance for outsoles, irrespective of the material.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

ISO 17709, *Footwear. Sampling location of components for footwear.*

ISO 2420, *Leather. Determination of apparent density.*

ISO 2781, *Rubber vulcanized. Determination of density.*

ISO 4649, *Rubber. Determination of abrasion resistance using a rotating cylindrical drum device.*

3 Terms and definitions

For the purposes of this standard the following definitions apply:

3.1

abrasion resistance

the resistance to wear by mechanical action upon a surface

3.2

relative mass loss

the mass loss, in milligrams, of the outsole after being subjected to abrasion by an abrasive cloth will cause the appropriate standard rubber to lose a mass of 200 mg under the preferred conditions, namely a distance of 40 m, a load of 10 N and using a non-rotating test piece

3.3

relative volume loss

the volume loss, in cubic millimetres, of the test rubber after being subjected to abrasion by an abrasive cloth will cause the appropriate standard rubber (see clause B.1 of ISO 4649) to lose a mass of 200 mg under the preferred conditions, namely a distance of 40 m, a load of 10 N and using a non-rotating test piece

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4 Apparatus and materials

The following apparatus and material shall be used:

4.1 Abrasion machine

The test apparatus (see figure 1) consists of a laterally movable test piece holder and a rotatable cylindrical drum to which the abrasive cloth (4.2) is fixed.

The drum shall have a diameter of $150 \text{ mm} \pm 0,2 \text{ mm}$ and a length of about 500 mm and shall be rotated at a frequency of $40 \text{ min}^{-1} \pm 1 \text{ min}^{-1}$, the directions of rotation being as indicated in figure 1.

The test piece holder shall consist of a cylindrical opening, the diameter of which can be adjusted from 15,5 mm to 16,3 mm, and a device for adjusting the length of the test piece protruding from the opening to $2 \text{ mm} \pm 0,2 \text{ mm}$. The holder shall be mounted on a swivel arm which in turn is attached to a sledge which can be moved laterally on a spindle. The lateral displacement of the holder shall be $4,20 \text{ mm} \pm 0,04 \text{ mm}$ per revolution of the drum.

The centre axis of the holder shall have an inclination of 3° to the perpendicular in the direction of rotation (see figure 1), and shall be placed directly above the longitudinal axis of the drum to within $\pm 1 \text{ mm}$.

The swivel arm and test piece holder shall be free from vibration during operation, and disposed such that the test piece is pressed against the drum with a vertical force of $10 \text{ N} \pm 0,2 \text{ N}$ obtained by adding weights to the top of the test piece holder.

The abrasive cloth shall be attached to the drum using three evenly spaced strips of double-sided adhesive tape extending along the complete length of the cylinder. Care shall be taken to ensure that the abrasive cloth is firmly held so as to present a uniform abrasive surface over the whole area of the cylinder. One of the strips shall be placed where the ends of the abrasive cloth meet. Ideally the ends should meet exactly, but any gap left between them shall not exceed 2 mm. The adhesive tape shall be about 50 mm wide and not more 0,2 mm thick.

Placement of the test piece on to the cloth at the beginning of a test run, and its removal after an abrasion run of 40 m (equivalent to 84 revolutions), shall be automatic. In special cases of very high volume loss of the test piece, an abrasion distance of only 20 m (equivalent to 42 revolutions) may be used. If using an abrasion distance of 20 m, a revolution counter or automatic stopping device should be connected to the drum.

To protect the abrasive cloth from damage by the test piece holder, a device for switching off the apparatus just before the lower edge of the test piece holder touches the cloth is recommended.

4.2 Abrasive cloth

Abrasive cloth made with aluminium oxide of grain size 60, at least 400 mm wide, 473 mm long and 1 mm average thickness, shall be used as the abrasive medium.

This abrasive surface shall cause a mass loss between 180 mg and 220 mg for an abrasion distance of 40 m.

When each new sheet of cloth is first used, the direction of motion shall be indicated on the sheet, as it is important that the same direction be used for all subsequent test runs.

NOTE Suitable paper abrasive cloth is listed in annex A of ISO 4649.

4.3 Hollow Drill

The specification for the hollow drill is given in detail in figure 2.

The frequency of rotation of the drill needs to be at least $1\,000 \text{ min}^{-1}$ for most outsoles materials.

4.4 Balance

The balance shall be of sufficient accuracy to enable the mass loss of a test piece to be determined to ± 1 mg.

4.5 Standard rubbers

Specifications for standard rubbers are given in detail in annex B (see clause B.1) of ISO 4649.

5 Sampling and conditioning

The test pieces shall be cylindrical in shape, of diameter $16 \text{ mm} \pm 0,2 \text{ mm}$, with a minimum height of 6 mm. If test pieces of the required thickness are not available, the necessary thickness may be obtained by bonding a piece of the outsole to a base element of hardness not less than 80 IRHD. The thickness of these outsole should be not less than 2 mm.

Minimum three test pieces are necessary.

The test pieces to be tested shall be taken in accordance with EN 13400.

All test pieces shall be conditioned in accordance with ISO 18454 before testing for a minimum of 24 h.

6 Test method

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6.1 Procedure

Before each test, any rubber debris left on the abrasive cloth from a previous abrasion test shall be removed with a brush. A strong brush of about 55 mm diameter and about 70 mm length is recommended for this purpose. In some cases, a blank test with a standard rubber will effectively clean the abrasive cloth.

Weigh the test piece to the nearest 1 mg. Fix the test piece in the test piece holder in such a way that a length of $2,0 \text{ mm} \pm 0,2 \text{ mm}$ protrudes from the opening. This length shall be controlled by means of a gauge.

The test piece shall be pressed against the drum with a vertical force of $10 \text{ N} \pm 0,2 \text{ N}$.

Move the test piece holder and sledge to the starting point, place the test piece on the abrasive cloth and set the cylinder in motion. Check for vibration in the test piece holder. This test method does not yield meaningful results if there is abnormal vibration in the test piece holder. The test run is stopped automatically after an abrasion distance of 40 m. For relatively large mass losses the test run may be stopped and the length of exposed test piece reset to $2,0 \text{ mm} \pm 0,2 \text{ mm}$ so that the test can be restarted and completed.

The sample shall not be complete abraded at the end of the test (test sample carrier shall not be, or any part of it, in contact with the abradant paper). If it is, repeat the test using a reduced distance, for example, 20 m or less if it is necessary and then extrapolate the results to 40 m (This shall be stated in the test report)

6.2 Determination of density

Determine the density of the test material in accordance with ISO 2781 or ISO 2420 as appropriate.

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6.3 Comparison against standard rubbers

In this standard, the test rubbers are compared against standard rubbers.

The mass loss of standard rubber shall be determined by carrying out a minimum of three test runs both before and after each test series following the procedure in 6.1. There shall be a maximum of three test rubbers in each test series.

7 Expression of results

The relative mass loss in milligrams is given by the formula

$$M = \frac{m \times S_0}{S}$$

where

m is mass loss in milligrams

S_0 is value of nominal abrasive power (200 mg)

S is average abrasive power in milligrams

The relative volume loss in cubic millimetres is given by the formula

$$V = \frac{m \times S_0}{\rho \times S}$$

where

ρ is the density in mg/mm^3

The result will be the average of the three values.

8 Test Report

The test report shall include the following information:

- results, expressed in accordance with clause 7;
- full description of the samples tested including commercial styles, codes, colours, nature, etc.;
- reference to this method of test;
- any deviations from the test procedure, especially if the test run comprised only half the abrasion distance;
- density;
- date of testing;
- standard atmospheric conditions observed during the test, if not performed at 23°C/50%RH.