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**Footwear — Test methods for insoles —  
Abrasion resistance**

*Chaussures — Méthodes d'essai applicables aux premières de montage —  
Résistance à l'abrasion*



Reference number  
ISO 20868:2001(E)

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Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
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## Foreword

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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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 20868 was prepared by the European Committee for Standardization (as EN 12747:1999) and was adopted, under a special "fast-track procedure", by Technical Committee ISO/TC 216, *Footwear* in parallel with its approval by the ISO member bodies.

Annex A of this International Standard is given for information only.

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 309 "Footwear", the secretariat of which is held by AENOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.



## 1 Scope

This draft standard specifies a test method to determine the abrasion resistance of insoles, irrespective of the material.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of, any of these publications apply to this European Standard only when incorporated into it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 12222                      Footwear - Standard atmospheres for conditioning and testing of footwear and components for footwear.

prEN 13400:1998          Footwear. Sampling location of components for footwear.

## 3 Definitions

For the purpose of this standard the following definition applies:

### **abrasion resistance**

Surface resistance shown by an insole test piece when rubbed with a piece of wet white wool felt pad, covered with an abradant fabric, under a given pressure, with a number of to-and-fro motion cycles.

## 4 Apparatus and material

The following apparatus and material shall be used:

**4.1 Carriage**, with a horizontal, completely planar metal platform, a holder for fastening the material leaving 80 mm freely exposed and a device which allows the test piece to be maintained under a slight tension in the direction of the rubbing;

**4.2 Finger**, of mass  $500 \text{ g} \pm 10 \text{ g}$ , removable but able to be fixed firmly, with a base of  $15 \text{ mm} \pm 0,5 \text{ mm} \times 15 \text{ mm} \pm 0,5 \text{ mm}$ , a device for attaching pieces of wool felt (see 4.4) to the base, having an additional mass of  $500 \text{ g} \pm 10 \text{ g}$  and a means of guiding the finger when fully loaded (total mass  $1 \text{ kg} \pm 0,1 \text{ kg}$ ) flat on the test piece;

**4.3 means for driving the carriage to and fro**, with an amplitude of  $35 \text{ mm} \pm 1 \text{ mm}$  and a frequency of  $40 \text{ cycles/min} \pm 2 \text{ cycles/min}$ .

NOTE: The following items are convenient, but non essential parts of the equipment:

- means to move the finger at right angles to the direction of rubbing, so that two or three tracks may be used for rubbing on one test piece;
- means for pre-selecting a given number of cycles.

**4.4 Felt pads**, comprising square pieces of wool felt, 15 mm x 15 mm, punched out of a sheet of pure white wool felt with the following specification:

**4.4.1** mass per unit area of  $1\,750\text{ g/m}^2 \pm 100\text{ g/m}^2$ ;

**4.4.2** mean water uptake of  $1,0\text{ ml} \pm 0,1\text{ ml}$ ;

**4.4.3** pH of 5,5 to 7,0 for an extract prepared by shaking 5 g of ground felt with 100 ml distilled water for 2 h in a polyethylene bottle.

**4.5 Abradant fabric:** pieces of fabric of a dimension sufficient to cover the felt and attach it to the finger, with the characteristics indicated in table 1:

**Table 1**  
**Characteristics of the abradant fabric**

	Warp	Weft
Yarn linear density	R63 tex/2	R74 tex/2
Threads per cm	17	12
Singles twist, turns per metre	$540 \pm 20$ 'Z'	$500 \pm 20$ 'Z'
Two-fold twist, turns per metre	$450 \pm 20$ 'S'	$350 \pm 20$ 'S'
Fibre diameter, $\mu\text{m}$	$27,5 \pm 2,0$	$29,0 \pm 2,0$
Mass per unit area of fabric, minimum $\text{g/m}^2$	195	
Oil content, %	$0,9 \pm 0,2$	

**4.6 Distilled water.**



## 5 Sampling and conditioning

Cut a rectangle of minimum dimensions 120 mm x 20 mm, from the footwear insole, cut insole or component as supplied.

If the test piece is taken from the shoe or from the cut component, sampling shall be done in accordance with prEN 13400:1998.

The test piece and the felt pads shall be conditioned according to EN 12222 for a minimum of 24 h before testing.

Minimum three test pieces are necessary.

## 6 Test method

Weigh the conditioned felt pads.

For each test piece, place four felt pads (see 4.4) and four pieces of abradant fabric (see 4.5) in distilled water, heat to boiling and allow to continue boiling gently until they sink. Then decant the hot water and replace with cold, distilled water. Leave the pads and abradant fabric until they have reached room temperature.

Before use, take each pad and abrasion fabric from the water and squeeze or wipe it against the rim of a beaker so that it no longer drips .

Verify that the water uptake of each pad is  $1,0 \text{ ml} \pm 0,1 \text{ ml}$ , by weighing.

NOTE: The pads and abradant fabric should not be allowed to soak in water for more than 24 h before use.

Fasten the test piece on to the apparatus described in 4.1, 4.2 and 4.3, and apply a slight tension to hold it flat.

Attach a wet felt pad to the finger, cover with a rectangle of wet abradant fabric and secure it to the finger with, for example, a rubber band or ring, avoiding any crease in the fabric over the surface of the felt pad. Place the finger 5 mm from one edge of the test piece. Attach the additional mass of 500 g to the finger.

Carry out 100 cycles, lift the finger, and examine the test area for abrasion damage.

Replace the felt pad and abradant fabric with fresh ones and carry out a further 100 cycles.

Replace the felt pad and abradant fabric every 100 cycles and stop the test when the abrasion damage of the test piece is equal to, or more severe than the "acceptable" degree of abrasion of the corresponding "reference test piece"<sup>1</sup>, or after 400 cycles, whichever occurs first.

## 7 Expression of results

Examine the abraded surface of the test piece visually in order to evaluate the abrasion damage by comparison with "reference test pieces"<sup>1</sup> of the same family of materials.

The result will be the worse of the assessment of the three test pieces.

## 8 Test report

The test report shall include the following information:

- a) the result, expressed in accordance with clause 7;
- b) nature and full identification of the sample;
- c) description of sampling procedure, where relevant;
- d) reference to this standard method of test;
- e) details of any deviation from the standard test method.
- f) the date of testing

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<sup>1</sup> Information on the availability of suitable reference test pieces may be obtained from the secretariat of CEN/TC 161.

## Bibliography

- EN 344 Requirements and test methods for safety, protective and occupational footwear for professional use.

**Annex A**  
(informative)

**List of International Standards identical to the European Standards  
referenced in Clause 2**

European Standard	International Standard
EN 12222	ISO 18454
EN 13400 <sup>1)</sup>	ISO 17709 <sup>1)</sup>

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1) To be published.



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