SLOVENSKI STANDARD
SIST EN 13832-1:2018

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Obutev za varovanje pred kemikalijami - 1. del: Izrazje in preskusne metode

Footwear protecting against chemicals - Part 1: Terminology and test methods

Schuhe zum Schutz gegen Chemikalien - Teil 1: Terminologie und Prüfverfahren

Chaussure protégeant contre les produits chimiques - Partie 1 : Terminologie et méthodes d'essais

Ta slovenski standard je istoveten z: EN 13832-1:2018

ICS:

13.340.50 Varovanje nog in stopal Leg and foot protection

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EUROPEAN STANDARD

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English Version

Footwear protecting against chemicals - Part 1: Terminology and test methods

Chaussures protégeant contre les produits chimiques - Partie 1 : Terminologie et méthodes d'essais

Schuhe zum Schutz gegen Chemikalien - Teil 1: Terminologie und Prüfverfahren

This European Standard was approved by CEN on 20 May 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword

This document (EN 13832-1:2018) has been prepared by Technical Committee CEN/TC 161 “Foot and leg protection”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by April 2019, and conflicting national standards shall be withdrawn at the latest by April 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13832-1:2006.

EN 13832, *Footwear protecting against chemicals*, is published in three parts:

— Part 1: Terminology and test methods

— Part 2: Requirements for limited contact with chemicals

— Part 3: Requirements for prolonged contact with chemicals

This standard is intended for use in conjunction with EN ISO 20345, EN ISO 20346 and EN ISO 20347.

Overview of major technical changes compared to the previous edition:

— New splashing test

— Reference to the new permeation standard EN 16523-1

— Annex B for damages assessment

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies test methods for the determination of the resistance of footwear against selected chemicals under the following contact situations: splashing, degradation, and permeation.

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.

EN 16523-1:2015, *Determination of material resistance to permeation by chemicals - Part 1: Permeation by liquid chemical under conditions of continuous contact*

EN ISO 868:2003, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868:2003)*

EN ISO 20344:2011, *Personal protective equipment - Test methods for footwear (ISO 20344:2011)*

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 terms and definitions given in EN ISO 20344:2011 and EN 16523-1 and the following apply.

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

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

3.1
degradation
deleterious change in one or more properties of a footwear material due to contact with a chemical

Note 1 to entry: These changes may include, e.g. flaking, swelling, disintegration, embrittlement, discoloration, dimensions, appearance, hardening and softening.

3.2
permeation
process by which a chemical moves through a footwear material at a molecular level

Note 1 to entry: Permeation involves the following:

— absorption of molecules of the chemical into the contacted (outside) surface of a material;

— diffusion of the absorbed molecules into the material;

— desorption of the molecules from the opposite (inside) surface of the material.

3.3
splashing
contact after pouring of chemical on the footwear

3.4
test chemical
chemical that is used to assess the behaviour of a footwear or a footwear material after a defined contact under the laboratory test conditions

Note 1 to entry: The chemical can cause adverse effects to the human body by contact with the skin

4 Test methods

4.1 Sampling and conditioning

The minimum number of samples, i.e. separate items of footwear, to be tested in order to verify compliance with the requirements specified in EN ISO 20344:2011, together with the minimum number of test pieces to be taken from each sample, are given in Table 1.

Wherever possible, test pieces shall be taken from the whole footwear item unless otherwise stated.

If it is not possible to obtain a large enough test piece from the footwear, then a sample of the material from which the component has been manufactured may be used instead and this should be noted in the test report.

Table 1 — Minimum number of samples and test specimens or test pieces

Tests	Number of test pieces from each sample	Test only on the final footwear
Table 1 of EN ISO 20344:2011 is applicable		
Splashing test (4.2)	1 pair of shoe (the medium size of the range) per chemical	yes
Degradation test (4.3)	• 2 discs for outsole (one before and one after degradation) • 2 discs for upper (one before and one after degradation)	If possible
Permeation test (4.4)	3 discs per chemical	yes

All test pieces shall be conditioned in a standard atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity for a minimum of 24 h before testing, unless otherwise stated in the test method.

The maximum time which shall elapse between removal from the conditioning atmosphere and the start of testing shall be not greater than 10 min, unless otherwise stated in the test method.

For each of the required measurements performed in accordance with this standard, a corresponding estimate of the uncertainty of measurement should be evaluated. One of the following approaches should be used:

— a statistical method, e.g. as given in ISO 5725-2 [9];

— a mathematical method, e.g. as given in ISO/IEC Guide 98-3 [10];

— uncertainty and conformity assessment as given in ISO/IEC Guide 98-4 [11];

— JCGM 100:2008 [12]

4.2 Splashing test

4.2.1 Principle

Whole footwear samples are exposed for several period of time to a limited volume of specific liquids which might be encountered in operational use.

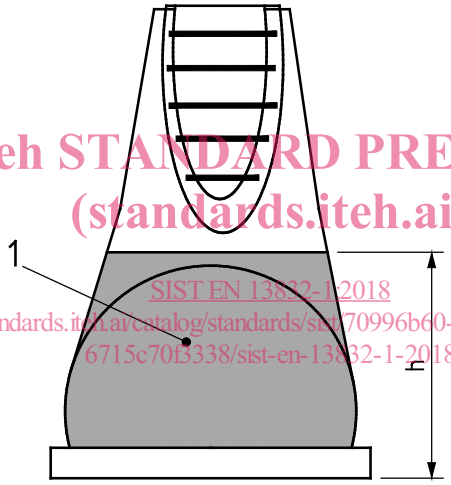
Damage to the materials and structure of the footwear including ingress through seams and manufactured structure is assessed at specified step of the test method.

4.2.2 Method

A pair of shoes shall be evaluated per chemical to be applied.

a) Clean the footwear with a dry absorbent paper to remove any productions residues.

b) Lightly mark (a waxed pencil or chalk have been found to be suitable) the sides of the test sample with a horizontal line as defined in Figure 1. The height *h* is given by Table 10 (Minimum height, below which the requirements of the upper shall be fulfilled) of EN ISO 20345:2011. This is to define the tested area (under this line) to allow accurate application of the test chemical.



Key

h height of the tested area

1 Test area

Figure 1 — Tested area for the splashing test

c) Store the footwear for at least 24 h in an environment at (23 ± 2) °C and (50 ± 5) %rh. The test shall performed between (20 and 25) °C.

d) Fill the footwear with absorbent paper as a trace medium for liquid ingress. Ensure the paper is in contact with the seams of the footwear at the front, bellows and lacing in particular.

e) Fasten the footwear.

f) Prepare a minimum of 130 ml of the chosen test chemical.

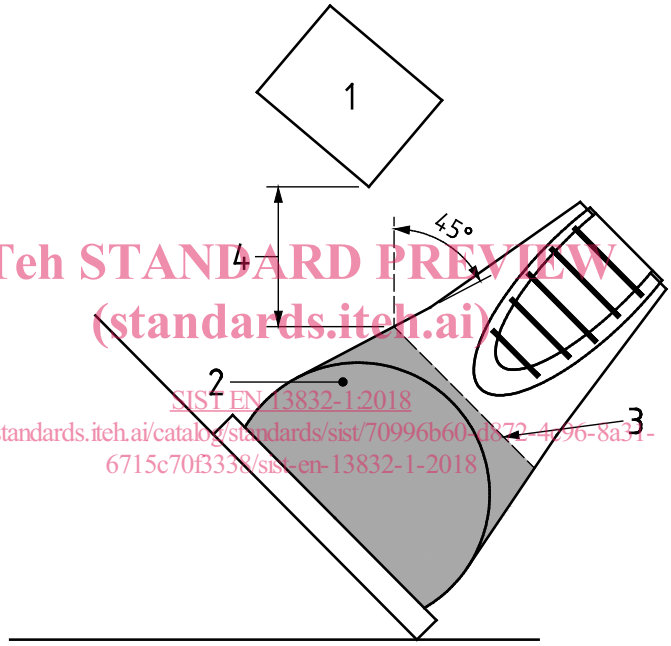
If several chemicals have to be chosen, it is necessary to use a new pair of footwear for each chemical.

g) Place the footwear into a tray of a sufficient size (30 ± 1cm large 40 ± 1cm long 5 ± 1 cm high) to allow residual liquid to drain from around the footwear during application. The material constituting the tray shall not be affected by the test chemical. Any accidental spillage during application into the inner of the footwear shall be prevented.

h) Pour 60 ± 6 ml of test liquid evenly across the two sides and front of the footwear using a (20 ± 2) ml containers.

Note 1 to entry: It has been found that using smaller containers each holding (20 ± 2) ml of the test liquid per side and across the centre front makes application more consistent.

The footwear shall have an angle of (45 ± 10) degrees when pouring chemicals onto the side sections. Using the 20 ml container, move along the drawn line and wet the test area of the sample. The pouring distance shall be between 4 cm and 6 cm (see Figure 2). Leave any spilled volume in the tray in contact with the outsole until the first examination is completed.



Key

1 20 ml container for test chemical
2 Test area
3 upper edge of test area (see Figure 1)
4 pouring distance, 4cm to 6 cm

Figure 2 — Splashing test principle

i) Leave the samples for a period of 10 min ± 30 s

j) Pour (60 ± 6) ml of test liquid evenly across the two sides and front of the footwear using a (20 ± 2) ml containers.

k) Leave the samples for a period of 10 min ± 30 s prior to removal from the tray and assess any initial damage.

l) Remove the absorbent paper from inside the footwear and, if any liquid penetration is visible as damp patches, note the location of ingress.

m) 1 h (±2 min) after pouring the chemical, carry out a visual inspection of the two footwear, comparing it to an original (or photographs) and note any damage or visual change as defined in Annex B (for example, surface marking or damage, damage to components, lack of functionality). Check the area under any lacing or fastenings where spilt liquid might be trapped and not easily visible. The test sample shall be cut open to assess any internal damage or wetness.

n) 24 h (±30 min) after pouring the chemical, carry out a second visual inspection of the two footwear, comparing it to an original (or photographs) and note any damage or visual change as defined in Annex B.

4.2.3 Test report

The test report shall include the following information:

a) the number of this European Standard, i.e. EN 13832-1:2018, 4.2;

b) a full description of the sample and its origin;

c) a full description of the chemicals used in the splashing test;

d) the appearance of the test piece after the splashing tests (e.g. cracking, delamination) after 10 min, 1 h after the test and 24h after the test;

e) any penetration of chemical inside the footwear;

f) any trapped chemical in the footwear (inside or outside);

g) any deviation from test methods.

4.3 Degradation test

4.3.1 Principle

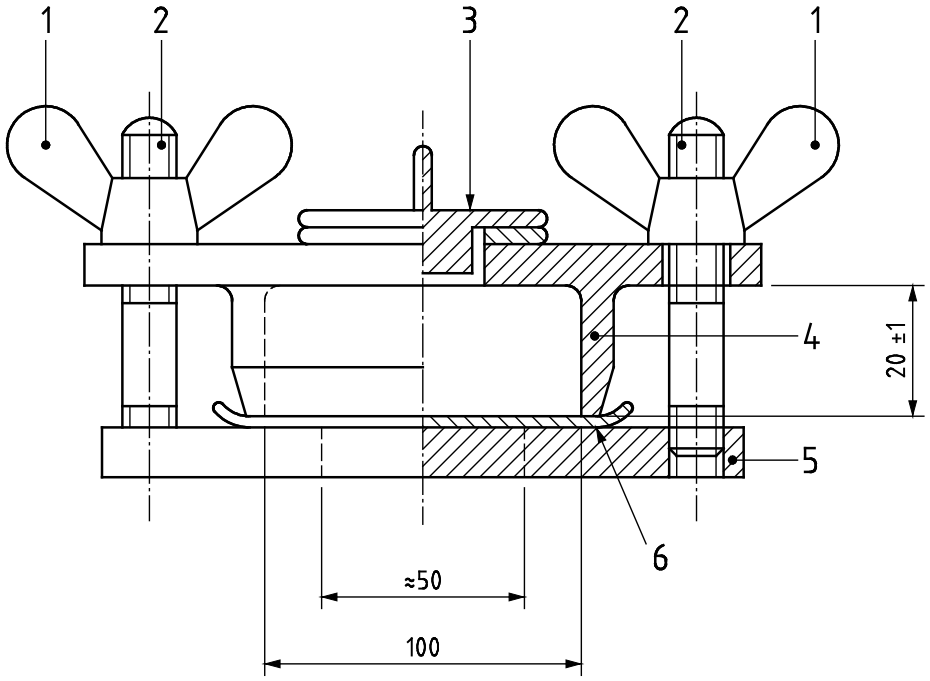
Some basic physical properties of the footwear component (upper and outsole) are checked before and after contact with chemicals.

4.3.2 Apparatus

4.3.2.1 Degradation cell. The apparatus shall be suitable for holding the test piece. A suitable apparatus is illustrated in Figure 3 and comprises a base-plate (5) and an open-ended cylindrical cell (4) that is held tightly against the test piece (6) by the wing nuts (1) mounted on the bolts (2).

NOTE A hole of diameter approximately 50 mm can be made in the base-plate for the examination of the surface not in contact with the liquid.

Dimensions in millimetres



Key

1 Wing nut
2 Bolt
3 Close-fitting plug to seal the hole in top of the cell
4 Open-ended cylindrical cell
5 Base plate
6 Test piece

Figure 3 — Example of cell for degradation resistance of footwear components

During the test, the opening in the top of the cell shall be closed by a close-fitting plug (3).

4.3.2.2 Miscellaneous

a) Wash flask, for example a Becher glass

b) Absorbent paper or lint free textile fabric

4.3.3 Preparation of samples

4.3.3.1 Preparation of the upper

The test piece for the upper shall consist of a disc of diameter (120 ± 10) mm, taken from the footwear (see Figure 4). If it is impossible to take the sample from the upper, it may be taken from raw material representative of the upper.