SLOVENSKI STANDARD
SIST EN 13832-3:2019

01-februar-2019

Nadomešča:
SIST EN 13832-3:2006

Obutev za varovanje pred kemikalijami - 3. del: Zahteve za podaljšan stik s kemikalijami

Footwear protecting against chemicals - Part 3: Requirements for prolonged contact with chemicals

Schuhe zum Schutz gegen Chemikalien - Teil 3: Anforderungen für anhaltenden Kontakt mit Chemikalien

Chaussure protégeant contre les produits chimiques - Partie 3 : Exigences pour les contacts prolongés avec les produits chimiques

Ta slovenski standard je istoveten z: **EN 13832-3:2018**

ICS:

13.340.50 Varovanje nog in stopal Leg and foot protection

SIST EN 13832-3:2019 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13832-3

November 2018

ICS 13.340.50

Supersedes EN 13832-3:2006

English Version

Footwear protecting against chemicals - Part 3: Requirements for prolonged contact with chemicals

Chaussure protégeant contre les produits chimiques - Partie 3 : Exigences pour les contacts prolongés avec les produits chimiques

Schuhe zum Schutz gegen Chemikalien - Teil 3: Anforderungen für anhaltenden Kontakt mit Chemikalien

This European Standard was approved by CEN on 28 May 2018.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 13832-3:2018) has been prepared by Technical Committee CEN/TC 161 “Foot and leg protectors”, 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of an identical text or by endorsement, at the latest by May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.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 will supersede EN 13832-3:2006.

Overview of major technical changes compared to the previous edition:

— Reference to regulation 2016/425 instead of Directive 89/686

— New splashing test

— Reference to the new permeation standard EN 16523-1

— Figure 5 for damages assessment

— Table 7, change in the marking

— Slip resistance annex

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Regulation 2016/425, see informative Annex ZA, which is an integral part of this document.

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.

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 requirements for footwear intended to protect the wearer from a prolonged continuous contact (more than 1 hour) with specific chemicals.

Degradation and permeation by chemicals are addressed in this standard. Other requirements are covered by reference to EN ISO 20345, 20346 or 20347 as appropriate.

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

EN 13832-1:2018, *Footwear protecting against chemicals - Part 1: Terminology and test methods*

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

EN ISO 20345:2011, *Personal protective equipment - Safety footwear (ISO 20345:2011)*

EN ISO 20346:2014, *Personal protective equipment - Protective footwear (ISO 20346:2014)*

EN ISO 20347:2012, *Personal protective equipment - Occupational footwear (ISO 20347:2012)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13832-1:2018, EN ISO 20345:2011 and the following apply.

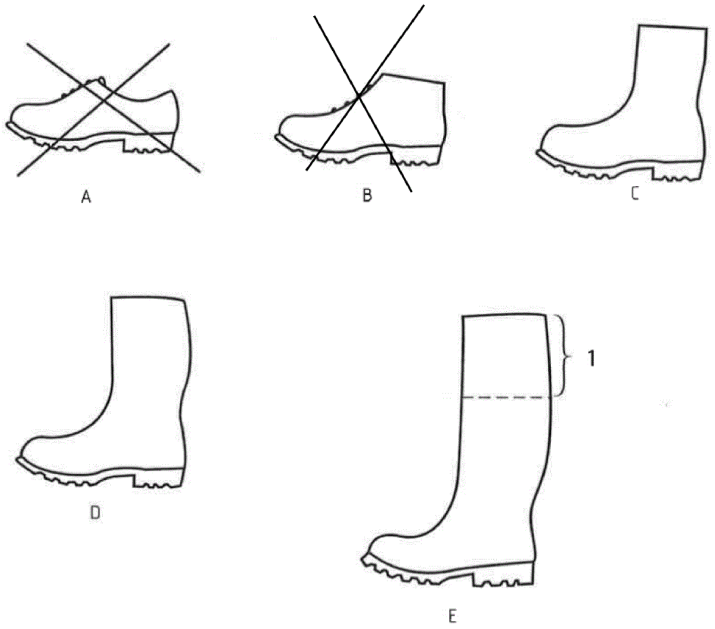
ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

3.1
footwear for prolonged contact with chemicals
footwear intended to protect the wearer from continuous or intermittent contact with chemicals for more than one hour

4 Design

For footwear for prolonged contact with chemicals, only designs C, D or E in Figure 1 shall be used.



Key

1 Variable extension that can be adapted to the wearer

A Low shoe

B Ankle boot

C Half knee boot

D Knee height boot

E Thigh boot

NOTE Design E is a knee-height boot (design D) equipped with a thin impermeable material that extends the upper and that can be cut to adapt the boot to the wearer.

Figure 1 — Designs of footwear

5 Classification

Footwear for prolonged contact with chemicals shall be classified in accordance with Table 1.

Table 1 — Classification of footwear

Classification	Description
II	All-rubber (i.e. entirely vulcanised) and all-polymeric footwear (i.e. entirely moulded)

See Clause 4 of EN ISO 20345:2011, EN ISO 20346:2014 and EN ISO 20347:2012

6 Requirements

6.1 Basic requirements

Footwear for prolonged contact with chemicals shall conform to the requirements specified in Table 2.

Footwear for prolonged contact with chemicals may or may not include a toe cap. The choice shall be made from one of the three columns (EN ISO 20345:2011, EN ISO 20346:2014 or EN ISO 20347:2012) in Table 2.

Table 2 — Basic requirements for footwear for prolonged contact with chemicals

Requirements			Reference				Classification II
			EN ISO 20345: 2011	EN ISO 20346: 2014	EN ISO 20347 :2012	EN 13832-3	
General	Whole footwear	Designs and classifications				4 and 5	X
		Height of upper	5.2.2	5.2.2	5.2.2		X
		Specific ergonomic features	5.3.4	5.3.4	5.3.3		X
		Leakproofness	5.3.3	5.3.3	5.3.2		X
	Seat region	Designs C and D (Figure 1)	5.2.3	5.2.3	5.2.3		X
		Design E (Figure 1)	5.2.3	5.2.3	5.2.3		X
Whole footwear	Sole performance	Construction	5.3.1.1	5.3.1.1	5.3.1.1		
		Slip resistance	5.3.5	5.3.5	5.3.4		X
	Toe Protection	General	5.3.2.1	5.3.2.1			X
		Toe cap length	5.3.2.2	5.3.2.2			X
		Impact resistance	5.3.2.3	5.3.2.3			X
		Compression resistance	5.3.2.4	5.3.2.4			X
		Toecap behaviour	5.3.2.5	5.3.2.5			X
	innocuousness					6.2.3	
	footwear for prolonged contact with chemicals					6.2.1	X
Upper		General	5.4.1	5.4.1	5.4.1		X
		Thickness	5.4.2	5.4.2	5.4.2		X
		Tensile properties	5.4.4	5.4.4	5.4.4		X
		hydrolysis	5.4.8	5.4.8	5.4.8		X
		Flexing resistance	5.4.5	5.4.5	5.4.5		X
Insole/insocks			See Table 3				
Outsole		Thickness	5.8.1	5.8.1	5.8.1		X
		Tear strength	5.8.2	5.8.2	5.8.2		X
		Abrasion resistance				6.2.2	X
		Flexing resistance	5.8.4	5.8.4	5.8.4		X
		hydrolysis	5.8.5	5.8.5	5.8.5		X
		Interlayer bond strength	5.8.6	5.8.6	5.8.6		O

The applicability of a requirement to a particular classification is indicated in the table by the following.

X indicates that the requirement shall be met. In some cases the requirement relates only to particular materials within the classification, e.g. pH value of leather components. This does not mean that other materials are precluded from use.

O indicates that if the component part exists, the requirement shall be met.

Note1 The absence of X or O indicates that no requirement is met.

Note2 For class II footwear, it is usual to have no insole present. However, if a removable insock is used, Table 3 is applicable, only chromium VI and pH requirements are fulfilled for leather materials.

Note3 Stockings covering the last before the moulding process are not considered as a lining.

Table 3 — Basic requirements for insoles and/or insocks

Options			Component to be assessed	Requirements to fulfil in EN ISO 20345:2011/ EN ISO **20346**:2014/ EN ISO **20347**:2012					
				Thickness 5.7.1	**pH ❋ 5.7.2**	**Water absorption desorption 5.7.3**	**Abrasion 5.7.4.1**	**Chromium VI ❋ 5.7.5**	**Abrasion 5.7.4.2**
1	No insole or if present not fulfilling the requirements	Non-removable insock	Insock	**X**	**X**	**X**		**X**	**X**
2	Insole present	No insock	Insole	**X**	**X**	**X**	**X**	**X**	
		Seat sock present							
3		Full insock, non-removable	Insock and insole together	**X**		**X**			
			Insock		**X**			**X**	**X**
4		Full insock, removable and water-permeable♦	Insole	**X**	**X**	**X**	**X**	**X**	
			Insock		**X**			**X**	**X**
5		Full insock, removable, not water-permeable	Insole	**X**	**X**	**X**	**X**	**X**	
			Insock		**X**	**X**		**X**	**X**

NOTE For removable insocks see 8.5.

X indicates that the requirement shall be met.

♦ indicates a water permeable insock which, when tested in accordance with EN ISO 20344:2011, 7.2, lets water through in 60 s or less.

❋ Indicates those requirements that are only for leather.

6.2 Requirements for footwear for prolonged contact with chemicals,

6.2.1 Resistance of whole footwear

6.2.1.1 General

At least 3 test chemicals shall be taken from the list given in Table 4. Other testing chemicals could be used depending on the application of the footwear.

Table 4 — List of test chemicals

CODE LETTER	CHEMICAL	CAS NUMBER	CLASS (informative)
A	Methanol	67–56–1	Primary alcohol
B	Acetone	67–64–1	Ketone
C	Acetonitrile	75–05–8	Nitrile compound
D	Dichloromethane	75–09–2	Chlorinated hydrocarbon
E	Carbon disulphide	75–15–0	Sulphur containing organic compound
F	Toluene	108–88–3	Aromatic hydrocarbon
G	Diethylamine	109–89–7	Amine
H	Tetrahydrofuran	109–99–9	Heterocyclic and ether compound
I	Ethyl acetate	141–78–6	Ester
J	n-Heptane	142–82–5	Saturated hydrocarbon
K	Sodium hydroxide 40 %	1310–73–2	Inorganic base
L	Sulphuric acid 96 %	7664–93–9	Inorganic mineral acid, oxidizing
M	Nitric acid 65 %	7697–37–2	Inorganic mineral acid, oxidizing
N	Acetic acid 99 %	64–19–7	Organic acid
O	Ammonium hydroxide 25 %	1336–21–6	Organic base
P	Hydrogen peroxide 30 %	7722–84–1	Peroxide
Q	isopropanol	67–63–0	Aliphatic alcohol
R	Sodium Hypochlorite (13 ± 1)% (active chloride)	7681–52–9	hypochlorite
S	Hydrofluoric acid 40 %	7664–39–3	Inorganic mineral acid
T	Formaldehyde 37 %	50–00–0	Aldehyde

Safety precautions — Person using this standard should be familiar with normal laboratory practice. This standard does not purport to address all the safety problems, if any, associated with its use. It is the responsibility of the user to apply established Health and Safety practices and to ensure compliance with the applicable regulations.

Footwear for prolonged contact with chemicals shall fulfil the requirements given in Table5.

Table 5 — Requirements on footwear for prolonged contact to chemicals

Chemicals	Degradation 24 h - 6.2.2	Permeation - 6.2.3
At least 3 chemicals of Table 4	X	X

6.2.1.2 Degradation resistance

6.2.1.2.1 General

For footwear for prolonged contact with chemicals, the degradation shall be tested according to EN 13832-1:2018, 4.3, with a degradation time of 24 h, for each chemical claimed (see Table 4) in the marking and reported in the user instruction. The sole and upper shall both be tested with the same chemicals.

After the tests, the tests pieces shall be inspected. If any test pieces is very affected (see EN 13832-1:2018, 4.3.4.3) after testing, it is considered that they fail the test.

Other chemicals may be used according to the intended use.

6.2.1.2.2 Tests to be performed after the degradation test

6.2.1.2.2.1 Mass variation

EN 13832-1:2018, 4.3.4.3 requires the measurements of the mass variation on the upper and sole samples. They shall be given on the test report.

There is no requirement on the mass variation. It is used only as information to assess the samples changes during the test.

6.2.1.2.2.2 Requirements

The requirements to fulfil after the degradation test are given in Table 6.

Table 6 — Tests for basic properties of the sole and the upper after degradation

Sole		Upper	
Tear resistance EN ISO 20344:2011, 8.2	Hardness EN ISO 868:2003	Tear resistance Class II:EN ISO 20344:2011, 8.2	Elongation at break EN ISO 20344:2011, 6.4
Applicable for all type of sole material prepared according 4.3.3.2 of EN 13832-1:2018		Applicable for upper material of class II prepared according 4.3.3.1 of EN 13832-1:2018	Not applicable for class II with a non-removable lining.
• Greater or equal to 6,4 kN/m for material with density greater than 0,9 g/cm³ • Greater or equal to 4,0 kN/m for material with density smaller or equal to 0,9 g/cm³	Minimum: 30 shore A Maximum: (value before degradation + 10) shore A	For class II Minimum 80 % of value before degradation	for class II with a removable lining, Minimum 80 % of value before degradation

6.2.1.3 Permeation resistance

Each permeation resistance result for footwear for prolonged contact with chemicals shall be classified according to Table 7, using the results as given in EN 13832-1:2018, 4.4 for the normalized breakthrough time.