



SLOVENSKI STANDARD

SIST EN 50321-1:2018

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Nadomešča:
SIST EN 50321:2000

**Delo pod napetostjo - Obutev za zaščito pred električnim udarom -
Elektroizolacijska obutev in zaščitne gamaše**

Live working - Footwear for electrical protection - Insulating footwear and overboots

Arbeiten unter Spannung - Schuhe für elektrischen Schutz - Isolierende Schuhe und
Überschuhe

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Travaux sous tension - Chaussures pour protection électrique - Chaussures et couvre-
chaussures isolantes

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ICS:

13.260	Varstvo pred električnim udarom. Delo pod napetostjo	Protection against electric shock. Live working
13.340.50	Varovanje nog in stopal	Leg and foot protection

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EUROPEAN STANDARD

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Live working - Footwear for electrical protection - Insulating footwear and overboots

Travaux sous tension - Chaussures pour protection électrique - Chaussures et couvre-chaussures isolants

Arbeiten unter Spannung - Schuhe für elektrischen Schutz - Isolierende Schuhe und Überschuhe

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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EN 50321-1:2018 (E)**European foreword**

This document (EN 50321-1:2018) has been prepared by CLC/TC 78 “Equipment and tools for live working”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-01-12
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2021-01-12

EN 50321-1:2018 includes the following significant technical changes with respect to EN 50321:1999:

- the addition of electrical classifications 1, 2, 3 and 4 for AC voltages;
- the addition of DC voltage testing for class 00, 0, 1 and 2;
- the addition of classification of mechanical class II according to EN ISO 20345, EN ISO 20346, EN ISO 20347;
- 16 h moisture conditioning for type test;
- water as testing material for type test;
- revised marking test;
- inclusion of a test report;
- inclusion of a dielectric test on footwear with perforation resistant insert;
- inclusion of electrical insulating overboot style;
- revised marking and test method;
- periodic Inspection;
- selection of EN 61318 for quality system within an annex;
- definition of overboot;
- definition of safety, occupational, electrical shock resistant, antistatic and conductive sole footwear;
- steel metal balls to be used for routine testing only;
- the addition of the Annex ZZ.

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

For the relationship with EU Directive see informative Annex ZZ, which is an integral part of this document.

1 Scope

This European Standard specifies the requirements and testing for PPE footwear used as *electrical insulating footwear and overboots* that provide protection of the worker against electric shock and used for working live or close to live parts on installations up to 36 000 V AC or 25 000 V DC.

The products designed and manufactured according to this standard contribute to the safety of the users provided they are used by skilled persons, in accordance with safe methods of work and the instructions for use.

Antistatic, electrical shock resistant and conductive footwear are not covered by this standard.

NOTE Part 2 Electrical Shock Resistant Footwear and Part 3 Conductive Footwear for Live Working are in development.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12568:2010, *Foot and leg protectors - Requirements and test methods for toecaps and penetration resistant inserts*

EN 60060-1, *High-voltage test techniques - Part 1: General definitions and test requirements (IEC 60060-1)*

EN 60212, *Standard conditions for use prior to and during the testing of solid electrical insulating materials (IEC 60212)*

EN 61318:2008, *Live working - Conformity assessment applicable to tools, devices and equipment (IEC 61318:2007)*

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)*

IEC 60417 DB, *Graphical symbols for use on equipment*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in EN 61318:2008 and the following apply.

3.1

antistatic footwear

footwear, the resistance of which is above 100 k Ω and less than or equal to 1 000 M Ω

Note 1 to entry: Resistance is measured in accordance with ISO 20344:2011, 5.10.

[SOURCE: EN ISO 20345:2011, 3.15, modified]

3.2

conductive footwear for live working

footwear, the resistance of which is in the range of 0 k Ω to 10 k Ω

Note 1 to entry: Resistance is measured in accordance with EN 60895:2003, 8.3 (*this was added in order to be comparable to conductive footwear*).

[SOURCE: EN 60895:2003, 8.3, modified]

EN 50321-1:2018 (E)**3.3****electrical insulating footwear**

footwear which protects the wearer against electrical shocks by preventing the passage of dangerous current through the body via the feet

[SOURCE: EN ISO 20345:2011, 3.16, modified]

3.4**electrical insulating overboot**

device designed to be worn over existing footwear, made of flexible insulating material with slip resistant sole, which protects the wearer against electric shock by preventing the passage of dangerous current through the body via the feet

[SOURCE: IEC 60050-651:2014, 651-23-05, modified]

3.5**electrical shock resistant footwear**

footwear of which only the outsole protects the wearer against electrical shocks by preventing the passage of dangerous current through the body via the feet

Note 1 to entry: Outsole is defined in Figure 3 as a single unit that incorporates the sole and heel.

3.6**height of the upper**

vertical distance between the lowest point of the insole i.e. between the heel breast and the back of the heel (see Figure 3) and the lowest point of the upper

Note 1 to entry: the *height of the upper* is referred as (X) in the standard.

3.7**occupational footwear**

footwear incorporating protective features to protect the wearer from injuries which could arise through accidents

Note 1 to entry: Items of *occupational footwear* are fitted without toecaps designed to give protection against impact or against compression

[SOURCE: EN ISO 20347:2012, 3.1 modified]

3.8**proof test voltage**

specified voltage that is applied to an *electrical insulating footwear or overboots* for the time defined under specified conditions to assure that the electrical strength of the insulation is above a specified value

3.9**routine test**

test to which each unit is subjected during or after manufacture to ascertain whether it complies with certain criteria

[SOURCE: IEC 60050-151: 2001, 151-16-17, and EN 61318:2008, 3.11, modified]

3.10**safety footwear**

footwear incorporating features to protect the wearer from injuries that could arise through accidents

Note 1 to entry: Items of *safety footwear* are fitted with toe caps designed to give protection against impact when tested at an energy level of at least 200 J and against compression load of at least 15 kN.

[SOURCE: EN ISO 20345:2011, 3.1]

3.11**type test**

test performed on one or more *electrical insulating footwear and overboots* representative of the production made to show that the design meets certain requirements

[SOURCE: IEC 60050-151:2001 and EN 61318:2008, 3.15, modified]

3.12**withstand test voltage**

specified voltage that an *electrical insulating footwear or overboots* withstand without disruptive discharge or other electric failure when voltage is applied under specified conditions

4 Requirements**4.1 Electrical classification**

Electrical insulating footwear and overboots shall be classified by electrical classes, according to their use on or near electrical installations of a defined nominal voltage, as follows:

- Electrical class 00, for installations with nominal voltage up to 500 V AC or 750 V DC;
- Electrical class 0, for installations with nominal voltage up to 1 000 V AC or 1 500 V DC;
- Electrical class 1, for installations with nominal voltage up to 7 500 V AC or 11 250 V DC;
- Electrical class 2, for installations with nominal voltage up to 17 000 V AC or 25 500 V DC;
- Electrical class 3, for installations with nominal voltage up to 26 500 V AC;
- Electrical class 4, for installations with nominal voltage up to 36 000 V AC;

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Guidance to the use of *electrical insulating footwear and overboots* is given in Annex A.

4.2 Non-electrical requirements**4.2.1 General**

Electrical Insulating footwear shall comply with the requirements of EN ISO 20345:2011, Table 2 Class II or EN ISO 20346:2014, Table 2 or EN ISO 20347:2012, Table 2. Any additional requirements shall comply with EN ISO 20345:2011, Table 18 or EN ISO 20346:2014, Table 18 or EN ISO 20347:2012, Table 16.

Electrical insulating overboots shall comply with the requirements of EN ISO 20347:2012, Table 2 The closing system when closed shall remain secure.

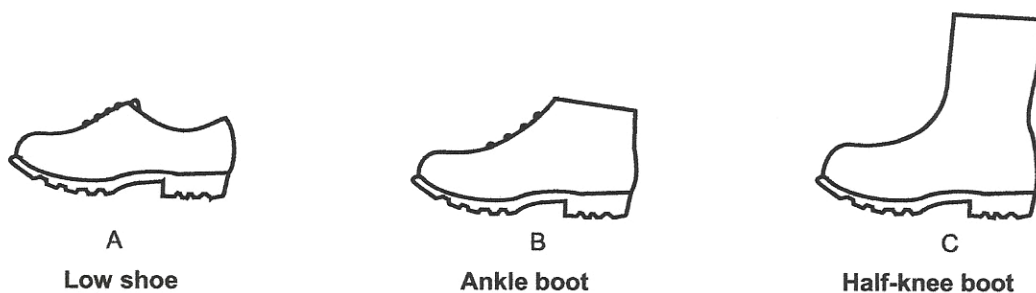
4.2.2 Footwear and overboot design**4.2.2.1 General**

The design of *electrical insulating footwear* shall be: A low shoe, B ankle boot, C half knee boot or D knee height boot, as given in Figure 1.

In addition, the design of *electrical insulating overboot* shall be those described in Figure 2. Overboots shall at least cover the height of the footwear in use,

In addition to the requirements given in EN ISO 20345:2011, Table 2, the *height of the upperpart* of design A, of electrical class 00 and 0 denoted as X, shall be a minimum of 75 mm, measured as indicated in Figure 3.

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Knee-height boot

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Figure 1 — Designs of electrical insulating footwear

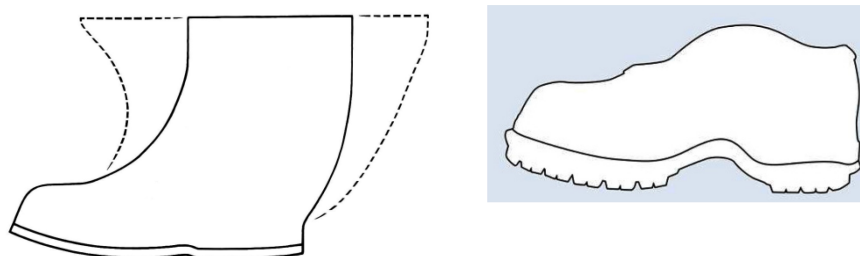
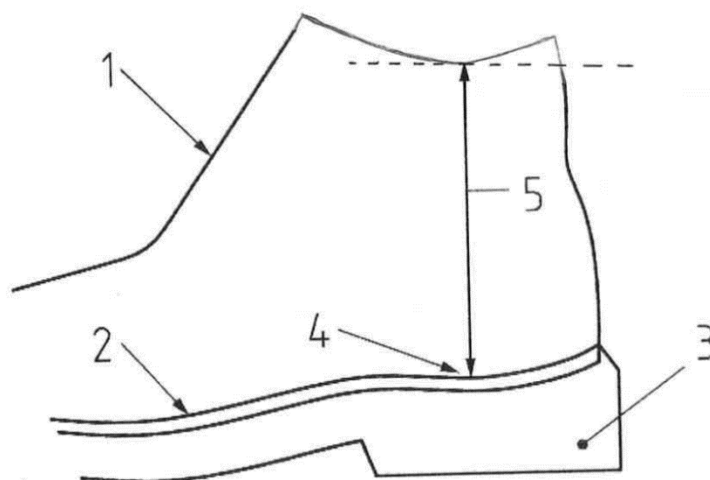


Figure 2 — Example of designs of overboot

4.2.2.2 Height of upper

The *height of the upper* (X in mm) is the vertical distance between the lowest point on the insole i.e. between the heel breast and the back of the heel (see Figure 3) and the lowest point of the upper.

**Key**

- 1 upper
- 2 insole
- 3 outsole
- 4 lowest point of the insole within the heel region
- 5 height of the upper (X)

Figure 3 — Measurement of the height of the upper (X)

4.2.2.3 Minimum height of the upper (X_{mhu}) to be tested

The minimum *height of the upper* to be tested with the electrical tests (5.2) is given in Table 1.

NOTE The minimum *height of the upper* to be tested is given as 40 % of the height of the upper footwear, as given in the Table 4 of EN ISO 20345:2011 (for type B-C and D).

Table 1 — Minimum height (X_{mhu}) to be tested

Footwear size		Height (X_{mhu})			
French size	UK size	Design A mm	Design B mm	Design C mm	Design D mm
36 and below	up to 3 1/2	35	41	65	102
37 and 38	4 to 5	35	42	66	104
39 and 40	5 1/2 to 6 1/2	35	44	69	108
41 and 42	7 to 8	35	45	71	112
43 and 44	8 1/2 to 10	35	47	74	116
45 and above	10 1/2 and above	35	48	77	120

4.2.2.4 Minimum height of the upper

The minimum *height of the upper* (H_{um}) is given by Formula (1):

$$H_{um} = X_{mhu} + h \quad (1)$$