



SLOVENSKI STANDARD

oSIST prEN 50286:2020

01-oktober-2020

Nadomešča:
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Električno izolacijska zaščitna oblačila za delo na nizkonapetostnih inštalacijah

Electrical insulating protective clothing for low-voltage installations

Elektrisch isolierende Schutzkleidung für Arbeiten an Niederspannungsanlagen

Vêtements de protection isolants pour installations basse tension

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Ta slovenski standard je istoveten z: **prEN 50286**

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ICS:

13.260	Varstvo pred električnim udarom. Delo pod napetostjo	Protection against electric shock. Live working
13.340.10	Varovalna obleka	Protective clothing

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ICS

Will supersede EN 50286:1999 and all of its amendments and corrigenda (if any)

English Version

Electrical insulating protective clothing for low-voltage installations

Vêtements de protection isolants pour installations basse tension

Elektrisch isolierende Schutzkleidung für Arbeiten an Niederspannungsanlagen

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2020-11-13.

It has been drawn up by CLC/TC 78.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German).
A version in any other language made by translation under the responsibility of a CENELEC 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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

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prEN 50286:2020 (E)**European foreword**

This document (prEN 50286:2020) has been prepared by CLC/TC 78 “Equipment and tools for live working”.

This document is currently submitted to the Enquiry.

The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months (to be confirmed or modified when voting)

This document will supersede EN 50286:1999 and all of its amendments and corrigenda (if any).

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(s).

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

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This edition includes the following significant technical changes with respect to EN 50286:1999:

- up-date of referenced documents;
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- update definitions and terms;
- addition of tear resistance and tensile strength;
- addition of change due to laundering and cleaning;
- up-date of marking and instruction for use;
- up-date on testing conditions;
- update on pre-conditioning;
- up-date of conformity assessment;
- addition of Annex C on classification of defects;
- addition of Annex D on rationale of selection of defects;
- addition of Annex ZZ.

Introduction

This document complies with the electrical insulating requirements set out by CLC/TC 78 and with the non-electrical requirements set out by CEN/TC 162. This insulating clothing is recognized as a PPE according to PPE Regulation 2016-425.

Electrical insulating protective clothing was developed primarily for use by workers for work on low-voltage overhead lines.

For the moment, there is no *withstand test* applicable to products where the principle risk is of unintentional contact with live parts, and such a test is not included in the present document. However, despite this lack, it is considered that a satisfactory level of electrical protection is provided by compliance with this document for both the *proof tests* and the periodic electrical inspections.

For the moment, no test is available in relation to the risk of workers exposure to an electrical arc generated by low-voltage installations. This task is presently under study by CLC/TC 78 WG 7.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

Terms defined in Clause 3 are given in italic print throughout this document.

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prEN 50286:2020 (E)**1 Scope**

This document is applicable to *electrical insulating protective clothing* used by skilled persons when they are working on or near live parts of low-voltage installations at nominal voltages up to 500 V AC or 750 V DC.

The purpose of this clothing when used in conjunction with other PPE, such as boots and gloves etc., is to prevent dangerous current from passing through persons when there is a risk of unintentional contact with several live parts located in and around the working area. Where the risk of unintentional contact with live parts is restricted e.g. with live parts in front of the worker, the wearing of this clothing is not essential.

The products designed and manufactured according to this document 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.

NOTE Some restrictions on the use of this clothing can exist in areas with hot climatic conditions.

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 343:2019, *Protective clothing - Protection against rain*

EN 60060-1:2010, *High-voltage test techniques - Part 1: General definitions and test requirements (IEC 60060-1:2010)*

EN 60060-2:2011, *High-voltage test techniques - Part 2: Measuring systems (IEC 60060-2:2010)*

EN 60529:1991,¹ *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN ISO 811:2018, *Textiles - Determination of resistance to water penetration - Hydrostatic pressure test (ISO 811:2018)*

EN ISO 4674-1:2016, *Rubber- or plastics-coated fabrics - Determination of tear resistance - Part 1: Constant rate of tear methods (ISO 4674-1:2016)*

EN ISO 5077:2008, *Textiles - Determination of dimensional change in washing and drying (ISO 5077:2007)*

EN ISO 11092:2014, *Textiles - Physiological effects - Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test) (ISO 11092:2014)*

EN ISO 13688:2013, *Protective clothing - General requirements (ISO 13688:2013)*

EN ISO 13934-1:2013, *Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1:2013)*

EN ISO 13937-2:2000, *Textiles - Tear properties of fabrics - Part 2: Determination of tear force of trouser-shaped test specimens (Single tear method) (ISO 13937-2:2000)*

EN ISO 15025:2016, *Protective clothing - Protection against flame - Method of test for limited flame spread (ISO 15025:2016)*

IEC 60050-651, *International Electrotechnical Vocabulary (IEV) - Part 651: Live working*

¹ As impacted by EN 60529:1991/A2:2013.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-651 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 <https://www.iso.org/obp>

3.1

electrical insulating protective clothing

protective clothing which prevents dangerous current from passing through the human body

Example Jacket with hood, trousers and overall are articles of the protective clothing.

3.2

seam

junction of two edges of material which are permanently joined by sewing or any other method

3.3 tests

3.3.1

acceptance test

contractual test to prove to the customer that the article of clothing meets certain conditions of its specification

[SOURCE: IEC 60050-151: 2001, 151-16-23, modified – “item” is replaced by “article of clothing”]

3.3.2

proof test

specified voltage test that is applied to an article of clothing for the time defined under specified conditions to assure that the electrical strength of the insulation is above a specified value

3.3.3

routine test

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

[SOURCE: IEC 60050-151: 2001, 151-16-17, modified – “item” is replaced by “article of clothing”]

3.3.4

sampling test

test performed on a number of articles of clothing taken at random from a batch

3.3.5

type test

test performed on one or more articles of clothing made to a certain design to show that the design meets certain specifications

[SOURCE: IEC 60050-151: 2001, 151-16-16, modified – “item” is replaced by “article of clothing”]

4 Requirements

4.1 Non-electrical requirements

4.1.1 General

General requirements for *electrical insulating protective clothing* for low-voltage installations which are not specifically covered in this document shall be in accordance with EN ISO 13688:2013.

4.1.2 Design requirements

The *electrical insulating protective clothing* shall consist of a jacket with hood and trousers or an overall with a hood.

No metal parts shall be on the outside of the *electrical insulating protective clothing*.

The colour of the *electrical insulating protective clothing* shall be bright.

A red colour is recommended. This colour may differ from colour code marking (the IEC code for Class 00 is beige).

4.1.3 Size designation and fit

The dimensions of the *electrical insulating protective clothing* shall be in accordance with the requirements of EN ISO 13688:2013, Clause 6.

The dimensions of the *electrical insulating protective clothing* shall be selected in such a way that this clothing can be worn over the normal working clothing. The bottoms of the trousers or overall legs shall be wide enough to be worn over footwear.

Where protection is provided by a two-piece suit, sufficient overlap shall be ensured. It shall be determined, that when correctly sized for the wearer, an overlap between the jacket and trousers remains when one standing wearer firstly fully extends both arms above the head and then bends over until the fingertips touch the ground when tested according to 5.2.1.

4.1.4 Comfort

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The comfort of the *electrical insulating protective clothing* shall be in accordance with the requirements of EN ISO 13688:2013, 4.4.

4.1.5 Pockets and flaps

The number of pockets in the protective clothing shall be limited to two. The protective suit shall have one pocket for the jacket and one for the trousers. The protective overall shall have two pockets located in similar positions.

One pocket shall be placed at the chest level to the jacket or the overall. One pocket shall be placed laterally to the thigh to the trousers. The pockets shall be equipped with flaps which shall have hook and loop fasteners.

4.1.6 Closures and seams

All *seams*, except hem-*seams*, shall be made in such a way that they do not impair the electrical properties.

Hook and loop fastener should be used.

Cuffs shall be provided with closures to reduce their width.

Any zip-fasteners necessary to close the jacket, the trousers or the overall shall be made from insulating material. However, if metal parts are used for the slider or for the terminal pieces of the zip-fastener, they shall be covered with insulating material.

The closures shall be designed with a protective cover flap on the outside of the clothing.

The length of the zip-fastener shall correspond to the design of the jacket or the overall. The slide fastener of the zipper shall be designed to lock when completely closed. The flap shall be equipped with a hook and loop fastener, which covers at least the whole length of the zip-fastener.

The trousers shall be equipped with a fly which is closed over its length by a zip-fastener. The fly shall be covered by a flap which shall have a hook and loop fastener over the whole length.

4.1.7 Additional requirements

The hood shall be securely attached to the jacket or overall.

The hood front edge shall be designed to fit closely to the face, face shields and/or to the insulating helmets. If a cord is used, it shall be made of electrical insulating material, shall be flame retardant and shall be taken into a cord tunnel.

The trousers shall be equipped with braces which shall be securely connected to the trousers and shall be adjustable or elasticated.

4.1.8 Limited flame spread

All outer layer and innermost layer materials except for an intermediate layer that is used for specific protection other than heat protection, for example electrical insulation, shall fulfil the following requirements in Table 1 (testing in accordance with 5.2.2):

Table 1 — Outer and innermost layer materials

Property	Requirement
Flame spread	No specimen shall permit any part of the lowest boundary of any flame to reach the upper or either vertical edge.
Flaming debris	No specimen shall give flaming or molten debris.
Hole formation	No specimen shall give hole formation of 5 mm or greater in any direction, except for an interlining that is used for specific protection other than heat and flame protection.
Afterglow	Afterglow time shall be ≤ 2 s. A glowing inside the charred area is defined in ISO 15025 as afterglow without combustion and for the purpose of this clause is not regarded as afterglow.
After-flame	After-flame time shall be ≤ 2 s.

In addition, if the clothing consists of more than two layers, each intermediate layer shall fulfil Table 2:

Table 2 — Intermediate layer material

Property	Requirement
Flame spread	No specimen shall permit any part of the lowest boundary of any flame to reach the upper or either vertical edge.
Flaming debris	No specimen shall give flaming or molten debris.
Afterglow	Afterglow time shall be ≤ 2 s. A glowing inside the charred area is defined in ISO 15025 as afterglow without combustion and for the purpose of this clause is not regarded as afterglow.

4.1.9 Tear resistance

Woven and laminated outer material shall have a tear resistance of at least 15 N for weight higher than 220 g/m² or at least 10 N for weight of 220 g/m² or below in the machine and the cross directions when tested according to 5.2.3.