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Live working - Conductive clothing

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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and corrigenda (if any)

English Version

**Live working - Conductive clothing
(IEC 60895:2020)**Travaux sous tension - Vêtements conducteurs
(IEC 60895:2020)Arbeiten unter Spannung - Leitfähige Kleidung
(IEC 60895:2020)

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Europäisches Komitee für Elektrotechnische Normung

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EN IEC 60895:2020 (E)**European foreword**

The text of document 78/1309/FDIS, future edition 3 of IEC 60895, prepared by IEC/TC 78 "Live working" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60895:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-02-25
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-05-25

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60456:2010	NOTE	Harmonized as EN 60456:2016 (modified)
IEC 60743:2013	NOTE	Harmonized as EN 60743:2013 (not modified)

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60212	2010	Standard conditions for use prior to and during the testing of solid electrical insulating materials	EN 60212	2011
IEC 60417	-	Graphical symbols for use on equipment.- Index, survey and compilation of the single sheets.	-	-
IEC 61318	-	Live working - Conformity assessment applicable to tools, devices and equipment	EN 61318	-
IEC 61477	-	Live working - Minimum requirements for the utilization of tools, devices and equipment	EN 61477	-
ISO 3175	series	Textiles – Professional care, drycleaning and wetcleaning of fabrics and garments	EN ISO 3175	series
ISO 6330	-	Textiles – Domestic washing and drying procedures for textile testing	EN ISO 6330	-
ISO 12947-1	-	Textiles - Determination of the abrasion resistance of fabrics by the Martindale method – Part 1: Martindale abrasion testing apparatus	EN ISO 12947-1	-
ISO 12947-2	-	Textiles – Determination of the abrasion resistance of fabrics by the Martindale method – Part 2: Determination of specimen breakdown	EN ISO 12947-2	-
ISO 13937-2	-	Textiles - Tear properties of fabrics - Part 2: Determination of tear force of trouser-shaped test specimens (Single tear method)	EN ISO 13937-2	-
ISO 13938-1	-	Textiles – Bursting properties of fabrics – Part 1: Hydraulic method for determination of bursting strength and bursting distension	EN ISO 13938-1	-
ISO 15797	-	Textiles – Industrial washing and finishing procedures for testing of workwear	EN ISO 15797	-



IEC 60895

Edition 3.0 2020-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Live working – Conductive clothing

Travaux sous tension – Vêtements conducteurs





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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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IEC 60895

Edition 3.0 2020-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Live working – Conductive clothing

Travaux sous tension – Vêtements conducteurs

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIVE WORKING – CONDUCTIVE CLOTHING

FOREWORD

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International Standard IEC 60895 has been prepared by IEC technical committee 78: Live working.

This third edition cancels and replaces the second edition, published in 2002. This edition constitutes a technical revision.

This 3edition includes the following significant technical changes with respect to the previous edition:

- a) increase of the use up to 1 000 kV AC and ± 800 kV DC;
- b) introduction of two classes of conductive clothing with different electrical requirements;
- c) revision of the electrical requirements of conductive clothing;
- d) definition of specific resistance values for each component part of the conductive clothing;
- e) introduction of conductive helmet and conductive scarf as *component parts* of conductive clothing;
- f) introduction of mechanical requirements and new tests for fabrics;
- g) update of the cleaning test procedures;

- h) revision of the efficiency test of the conductive clothing to improve the feasibility and repeatability;
- i) preparation of the elements of classification of defects, and general application of IEC 61318:2007;
- j) the normative Annex B for the classification of tests has been replaced by normative Annex C for the general type tests procedure, the normative Annex D for the classification of defects and the informative Annex E providing the justification for the classification of defects;
- k) the normative Annex C on sampling procedure has been deleted (not applicable according to IEC 61318:2007);
- l) modification of the recommended frequency of the periodic tests.

The text of this standard is based on the following documents:

FDIS	Report on voting
78/1309/FDIS	78/1312/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

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

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This document provides specifications for protective *conductive clothing* currently being used without incident in live work by qualified electrical workers throughout the world. The adequacy of this clothing is established by its *screening efficiency* and the electrical resistance of material and *component parts* of the *conductive clothing*. Based on resistance measurements carried out by manufacturers and utilities of used clothing being successfully worn in the field, differences of up to 1 000 fold have been reported.

The whole set-up and preparation work in very high voltage is made to limit the power of electric arcs during work activities.

When, in the preparation phase of the work, the risk assessment leads to a high probability that there may be electric arcs, due to the short distances or unsuitable equipment insulation, the work is not done.

This approach is dictated by the fact that the electric arcs produced by high-voltage installations have very significant thermal and electrical effects, which are hardly attenuated by protective clothing worn by operators.

If protection against electric arc value is required by agreements between customer and manufacturer, it is possible to perform tests on the fabric and/or on the *garment* complete with accessories using the reference standards already published on this topic by IEC TC 78.

This document has been prepared according to the requirements of IEC 61477, where applicable.

The bibliography provides a list of papers of international level that were used during the development of this edition of IEC 60895.

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LIVE WORKING – CONDUCTIVE CLOTHING

1 Scope

This document is applicable to *conductive clothing*, worn during live working (especially bare-hand working) on AC and DC electrical installations, to provide electrical continuity between all parts of the clothing and a reduction of electric field inside the clothing.

This document is applicable to *conductive clothing* assembled from a conductive *garment* (jackets and trousers or coveralls forming a one-piece *garment*) and from conductive *component parts* (gloves, hoods or helmets, shoes or boots, overshoe socks and socks) in electrical systems with nominal voltage up to 1 000 kV AC and up to ± 800 kV DC.

This document does not indicate values of protection from the effects of the electric arc, because any value indicated would not guarantee the necessary protection from the effects of electric arcs, or the operator would need to wear very heavy and rigid conductive clothing, which would not allow the execution of the work in safety.

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

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.

IEC 60212:2010, *Standard conditions for use prior to and during the testing of solid electrical insulating materials*

IEC 60417, *Graphical symbols for use on equipment* (available at: <http://www.graphical-symbols.info/equipment>)

IEC 61318, *Live working – Conformity assessment applicable to tools, devices and equipment*

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

ISO 13938-1, *Textiles – Bursting properties of fabrics – Part 1: Hydraulic method for determination of bursting strength and bursting distension*

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