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Live working - Protective clothing against the thermal hazards of an electric arc - Part 2: Requirements

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

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 08/20

Obsahuje: EN 61482-2:2020, IEC 61482-2:2018

131502

EUROPEAN STANDARD

EN 61482-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2020

ICS 13.220.40; 29.260

English Version

**Live working - Protective clothing against the thermal hazards of
an electric arc - Part 2: Requirements
(IEC 61482-2:2018, modified)**

Travaux sous tension - Vêtements de protection contre les
dangers thermiques d'un arc électrique - Partie 2:
Exigences
(IEC 61482-2:2018, modifiée)

Arbeiten unter Spannung - Schutzkleidung gegen die
thermischen Gefahren eines Lichtbogens - Teil 2:
Anforderungen
(IEC 61482-2:2018, modifiziert)

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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

EN 61482-2:2020 (E)**European foreword**

The text of document 78/1205/FDIS, future edition 2 of IEC 61482-2, prepared by IEC/TC 78 "Live working" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61482-2:2020.

A draft amendment, which covers common modifications to IEC 61482-2 (78/1205/FDIS), was prepared by CLC/TC 78, "Equipment and tools for live working" and approved by CENELEC.

The following dates are fixed:

- latest date by which this document has (dop) 2020-11-01 to be implemented at national level by publication of an identical national standard or by endorsement
- latest date by which the national (dow) 2023-05-01 standards conflicting with this document have to be withdrawn

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

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.

Endorsement notice

The text of the International Standard IEC 61482-2:2018 was approved by CENELEC as a European Standard with agreed common modifications.

COMMON MODIFICATIONS

4 Requirements

4.4 Arc thermal protection requirements

4.4.2 Arc rating

Replace paragraph 2 by:

"Protective clothing shall have a minimum arc thermal protection, where the ELIM is at least 130 kJ/m² (3,2 cal/cm²).

In addition, it can have a minimum arc thermal protection, where the lower value of ATPV and EBT is at least 167 kJ/m² (4 cal/cm²). In case only either ATPV or EBT can be determined, this value shall be at least 167 kJ/m² (4 cal/cm²)."

5 Tests

5.2 Tests of design requirements for protective clothing

5.2.3 Size designation and ergonomics

Delete NOTE.

5.4 Tests of arc thermal protection requirements

5.4.1 Type tests

Replace paragraph 1, 1st indent, by:

"

— EN 61482-1-1 (method 1, both procedure A and procedure B)

Testing according to EN 61482-1-1 shall provide the *ELIM* and in addition the *ATPV* or *EBT*."

5.4.2 Alternative means to arc thermal resistance test to fulfil conformity assessment of protective clothing having completed the production phase

Delete sub-clause.

6 Conformity assessment of protective clothing having completed the production phase

Add note:

"NOTE It is essential to interpret the term "conformity assessment" used in this clause as the assessment of conformity to the provisions of this standard by internal production control of the manufacturer, not to the assessment of conformity to legal provisions."

EN 61482-2:2020 (E)**Annex A**
(normative)**Marking and instructions for use****A.1 Marking**

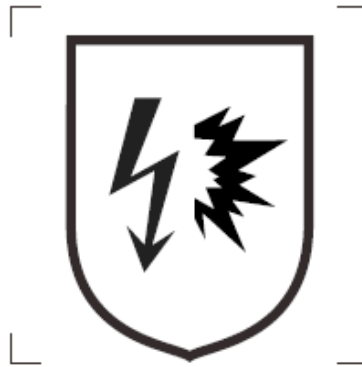
Replace paragraph 1, 5th indent by

"

- symbol IEC-60417-6353 (2016-02) – Protection against the thermal effect of the electric arc – and, adjacent to the symbol, the number of the relevant EN standard (EN 61482-2) and the *arc thermal protection* in the form of *arc rating ELIM* and/or *arc protection class* (APC 1 or APC 2);

NOTE 1 The exact ratio of the height of the figure to the base is 1,43. For the purpose of convenience, this ratio can be between the values of 1,4 and 1,5.

NOTE 2 The text in the boxes below the symbol are examples.



EN 61482-2
ELIM = xxx cal/cm²

or

EN 61482-2
APC y

or

EN 61482-2
ELIM = xxx cal/cm²
APC z

or

EN 61482-2
undershirt ref. AAA: not determined
jacket ref. BBB: ELIM = xxx cal/cm² / APC y
parka ref. CCC: ELIM = xxx cal/cm² / APC y
Garment system: ELIM = xxx cal/cm² / APC z

"

EN 61482-2:2020 (E)

Add as 6th indent

"

— in addition to *ELIM* the lower value of either *ATPV* or *EBT* can be added;

NOTE The box in the note is an example.

ATPV = yyy cal/cm ²

"

A.2 Instructions for use

Replace paragraph 1, 1st sentence by:

"Protective clothing shall be supplied to the customer with printed information."

Annex C
(normative)

Classification of defects

Replace title (headline) by:

"Annex C
(informative)

Classification of defects"

Replace paragraph 2 by:

"The manufacturer should test the *materials* and *garments* having completed the production phase at a frequency to ascertain the protective performance for critical defects."

EN 61482-2:2020 (E)

"

Annex ZA
(normative)**Normative references to international publications
with their corresponding European publications**

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.

NOTE 1 When 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 60417	DB	Graphical symbols for use on equipment	-	-
IEC 61318	-	Live working - Conformity assessment applicable to tools, devices and equipment	EN 61318	2008
IEC 61340-2-3	2016	Electrostatics - Part 2-3: Methods of test for determining the resistance and resistivity of solid materials used to avoid electrostatic charge accumulation	EN 61340-2-3	2016
IEC 61477	-	Live working - Minimum requirements for the utilization of tools, devices and equipment	EN 61477	2009
IEC 61482-1-1	2019	Live working - Protective clothing against the thermal hazards of an electric arc - Part 1-1: Test methods - Method 1: Determination of the arc rating (ELIM, ATPV and/or EBT) of clothing materials and of protective clothing using an open arc	EN IEC 61482-1-1	2019
IEC 61482-1-2	-	Live working - Protective clothing against the thermal hazards of an electric arc - Part 1-2: Test methods - Method 2: Determination of arc protection class of material and clothing by using a constrained and directed arc (box test)	EN 61482-1-2	2014
ISO 3146	-	Plastics - Determination of melting behaviour (melting temperature or melting range) of semi-crystalline polymers by capillary tube and polarizing-microscope methods	EN ISO 3146	2000

EN 61482-2:2020 (E)

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 3758	-	Textiles - Care labelling code using symbols	EN ISO 3758	2012
ISO 5077	-	Textiles - Determination of dimensional change in washing and drying	EN ISO 5077	2008
ISO 13688	2013	Protective clothing - General requirements	EN ISO 13688	2013
ISO 13934-1	-	Textiles - Tensile properties of fabrics – Part 1: Determination of maximum force and elongation at maximum force using the strip method	EN ISO 13934-1	2013
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	2000
ISO 13938-1	-	Textiles - Bursting properties of fabrics – Part 1: Hydraulic method for determination of bursting strength and bursting distension	EN ISO 13938-1	1999
ISO 13938-2	-	Textiles - Bursting properties of fabrics - Part 2: Pneumatic method for determination of bursting strength and bursting distension	EN ISO 13938-2	1999
ISO 15025	-	Protective clothing - Protection against flame - Method of test for limited flame spread	EN ISO 15025	2016
ISO 17493	2016	Clothing and equipment for protection against heat - Test method for convective heat resistance using a hot air circulating oven	-	-
ISO 30023	-	Textiles - Qualification symbols for labelling workwear to be industrially laundered	EN ISO 30023	2012

EN 61482-2:2020 (E)**Annex ZZ**
(informative)**Relationship between this European Standard and the essential requirements of REGULATION (EU) 2016/425 EEC aimed to be covered**

This European Standard has been prepared under the Commission's standardization request M/031 to provide one voluntary means of conforming to essential requirements of Regulation (EU) 2016/425 EEC relating to Personal Protective Equipment (PPE).

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential requirements of that Regulation, and associated EFTA regulations.

Table ZZ.1 — Correspondence between this European Standard and Annex II of the Regulation (EU) 2016/425 EEC Personal Protective Equipment

Essential Requirements of Regulation 2016/425/EEC	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
1.2.1 Absence of risks and other 'inherent' nuisance factors	4.2, 4.3.1, 4.3.2, 4.3.5, 4.4.1, 5.1.3, 5.2.5	
1.3.2 Lightness and design strength	4.3.4.1, 4.3.4.2, 4.3.4.3, 5.1.3	
1.4 Information supplied by manufacturer	4.6, A.2	
2.4 PPE subject to ageing	5.2.4	
2.12 PPE bearing identification marks related to health and safety	4.5, 5.5.2, A.1	
3.6.1 Protection against heat and fire – PPE constituent materials and other components	4.3.3, 4.4.2, 4.4.3, 5.1.3	For 4.4.2 only ELIM applies
3.6.2 Protection against heat and fire – Complete PPE ready for use	4.4.2, 4.4.3, 5.1.3	For 4.4.2 only ELIM applies

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the products falling within the scope of this standard."



IEC 61482-2

Edition 2.0 2018-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Live working – Protective clothing against the thermal hazards of an electric arc –
Part 2: Requirements**

**Travaux sous tension – Vêtements de protection contre les dangers thermiques
d'un arc électrique –
Partie 2: Exigences**



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IEC 61482-2

Edition 2.0 2018-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Live working – Protective clothing against the thermal hazards of an electric arc –
Part 2: Requirements**

**Travaux sous tension – Vêtements de protection contre les dangers thermiques
d'un arc électrique –
Partie 2: Exigences**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIVE WORKING – PROTECTIVE CLOTHING AGAINST THE THERMAL HAZARDS OF AN ELECTRIC ARC –

Part 2: Requirements

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61482-2 has been prepared by IEC technical committee 78: Live working.

This second edition cancels and replaces the first edition published in 2009. This edition constitutes a technical revision.

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

- a) new definition for *ELIM*, *ATPV* and *EBT* as used in accordance with IEC 61482-1-1:–;
- b) new requirements for the thermal stability of the intermediate layers;
- c) additional material requirement for volume resistance;
- d) new test procedure for the thermal resistance of sewing threads;

e) new symbol for marking.

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

FDIS	Report on voting
78/1205/FDIS	78/1228/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 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 standard.

A list of all parts of the IEC 61482 series, published under the general title *Live working – Protective clothing against the thermal hazards of an electric arc*, can be found on the IEC website.

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.

INTRODUCTION

This document has been prepared in accordance with the requirements of IEC 61477.

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.

The product covered by this document may have an impact on the environment during some or all stages of its life cycle. These impacts can range from slight to significant, be of short-term or long-term duration, and occur at the global, regional or local level.

This document does not include requirements and test provisions for the manufacturers of the product, or recommendations to the users of the product for environmental improvement. However, all parties intervening in its design, manufacture, packaging, distribution, use, maintenance, repair, reuse, recovery and disposal are invited to take account of environmental considerations.

LIVE WORKING – PROTECTIVE CLOTHING AGAINST THE THERMAL HAZARDS OF AN ELECTRIC ARC –

Part 2: Requirements

1 Scope

This part of IEC 61482 is applicable to *protective clothing* used in work where there is the risk of exposure to an *electric arc hazard*.

This document specifies requirements and test methods applicable to *materials* and *garments* for *protective clothing* for electrical workers against the thermal hazards of an *electric arc*.

Electric shock hazard is not covered by this document, which is applicable in combination with standards covering such hazards.

Other effects than the thermal effects of an *electric arc* like noise, light emissions, pressure rise, hot oil, electric shock, the consequences of physical and mental shock or toxic influences are not covered by this document.

Protection of eyes, face, head, hands and feet against *electric arc hazard* is not covered by this document.

NOTE Requirements and tests to cover *electric arc hazards* to these parts of the body are under development.

Protective clothing for work intentionally using an *electric arc*, e.g. arc welding, plasma torch, is not covered by this document.

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 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*

IEC 61340-2-3:2016, *Electrostatics – Part 2-3: Methods of test for determining the resistance and resistivity of solid materials used to avoid electrostatic charge accumulation*

IEC 61477, *Live working – Minimum requirements for the utilization of tools, devices and equipment*

IEC 61482-1-1:–1, *Live working – Protective clothing against the thermal hazards of an electric arc – Part 1-1: Test methods – Method 1: Determination of the arc rating (ELIM, ATPV and/or EBT) of clothing materials and of protective clothing using an open arc*

IEC 61482-1-2, *Live working – Protective clothing against the thermal hazards of an electric arc – Part 1-2: Test methods – Method 2: Determination of arc protection class of material and clothing by using a constrained and directed arc (box test)*

ISO 3146, *Plastics – Determination of melting behaviour (melting temperature or melting range) of semi-crystalline polymers by capillary tube and polarizing-microscope methods*

ISO 3758, *Textiles – Care labelling code using symbols*

ISO 5077, *Textiles – Determination of dimensional change in washing and drying*

ISO 13688:2013, *Protective clothing – General requirements*

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

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*

ISO 13938-2, *Textiles – Bursting properties of fabrics – Part 2: Pneumatic method for determination of bursting strength and bursting distension*

ISO 15025, *Protective clothing – Protection against flame – Method of test for limited flame spread*

ISO 17493:2016, *Clothing and equipment for protection against heat – Test method for convective heat resistance using a hot air circulating oven*

ISO 30023, *Textiles – Qualification symbols for labelling workwear to be industrially laundered*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN

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