

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Live working – Protective clothing against the thermal hazards of an electric arc –

Part 1-1: Test methods – Method 1: Determination of the arc rating (ATPV or E_{BT50}) of flame resistant materials for clothing

Travaux sous tension – Vêtements de protection contre les dangers thermiques d'un arc électrique –

Partie 1-1: Méthodes d'essai – Méthode 1: Détermination de la caractéristique d'arc (ATPV ou E_{BT50}) de matériaux résistant à la flamme pour vêtements



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 1-1: Test methods – Method 1: Determination of the arc rating (ATPV or E_{BT50}) of flame resistant materials for clothing

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International Standard IEC 61482-1-1 has been prepared by IEC technical committee 78: Live working.

This standard cancels and replaces IEC 61482-1:2002. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 61482-1:

- addition of a detailed analysis of the sensor response.

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

FDIS	Report on voting
78/793/FDIS	78/805/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.

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site 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- withdrawn;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.

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

Part 1-1: Test methods – Method 1: Determination of the arc rating (ATPV or E_{BT50}) of flame resistant materials for clothing

1 Scope

This part of IEC 61482 specifies test methods to measure the arc thermal performance value of materials intended for use in heat- and flame-resistant clothing for workers exposed to the thermal effects of electric arcs and the function of garments using these materials. These test methods measure the arc thermal performance value of materials which meet the following requirements: less than 100 mm char length and less than 2 s afterflame after removal from flame, when tested in accordance with ISO 15025, procedure B (bottom-edge ignition) on the outer material, and the char length measured using a modified ISO method as described in Annex A.

These methods are used to measure and describe the properties of materials, products, assemblies or garments, in response to convective and radiant energy generated by an electric arc in open air under controlled laboratory conditions.

The materials used in these methods are in the form of flat specimens for method A and garments for method B.

Method A is used to determine the arc rating of materials and material assemblies when tested in a flat configuration.

Method B is used to measure garment response, not arc rating, to an arc exposure including all the garment findings, sewing thread, fastenings, fabrics and other accessories when tested on a male mannequin torso. Method B is also used for accident replication.

It is the responsibility of the user of this part of IEC 61482 to establish appropriate safety and health practices prior to use. For specific precautions, see Clause 7.

The test methods in this part of IEC 61482 are not directed to classify by protection classes. Methods determining protection classes are prescribed in IEC 61482-1-2.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 3175-2, *Textiles – Professional care, drycleaning and wetcleaning of fabrics and garments – Part 2: Procedure for testing performance when cleaning and finishing using tetrachloroethene*

ISO 6330, *Textiles – Domestic washing and drying procedures for textile testing*

ISO 9151, *Protective clothing against heat and flame – Determination of heat transmission on exposure to flame*

ISO 15025:2000, *Protective clothing – Protection against heat and flame – Method of test for limited flame spread*

3 Terms, definitions and symbols

For the purposes of this document, the following terms, definitions and symbols apply.

NOTE For definitions of other textile terms related to the topic, see ASTM D-123 [7]¹⁾.

3.1 Terms and definitions

3.1.1

arc duration

time duration of the arc

NOTE Arc duration is expressed in s.

3.1.2

arc energy

W_{arc}

electrical energy supplied to the arc and converted in the arc; sum of the instantaneous arc voltage values multiplied by the instantaneous arc current values multiplied by the incremental time values during the arc duration

NOTE Arc energy is expressed in kJ or kW·s.

3.1.3

arc gap

distance between the arc electrodes

NOTE Arc gap is expressed in mm.

3.1.4

arc rating

value attributed to materials or material systems that describes their performance to exposure to an electrical arc discharge

NOTE The arc rating is expressed in kW·s/m² – or optionally in cal/cm² – and is derived from the determined value of ATPV or E_{BT50} (should a material or material system exhibit a breakopen response below the ATPV value).

3.1.5

arc thermal performance value (ATPV)

in arc testing, the incident energy on a material or a multilayer system of materials that results in a 50% probability that sufficient heat transfer through the tested specimen is predicted to cause the onset of a second degree skin burn injury based on the Stoll curve, without breakopen

NOTE ATPV is expressed in kJ/m² or kW·s/m² (cal/cm²).

3.1.6

arc voltage

voltage across the arc

NOTE Arc voltage is expressed in V.

¹⁾ Figures in square brackets refer to the bibliography.