



IEC 61111

Edition 3.0 2026-09

INTERNATIONAL STANDARD

REDLINE VERSION

Live working - Electrical insulating matting

CONTENTS

FOREWORD	4
INTRODUCTION	1
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Requirements	10
4.1 General	10
4.2 Electrical classification	10
4.3 Physical requirements	10
4.3.1 Composition	10
4.3.2 Shape	10
4.3.3 Dimensions and tolerances	11
4.3.4 Temperature	12
4.3.5 Workmanship and finish	12
4.4 Mechanical, climatic and environmental requirements	12
4.5 Dielectric requirements	12
4.6 Marking	12
4.7 Packaging	13
4.8 Instructions for use	13
5 Type tests	14
5.1 General	14
5.2 Visual inspection and measurements	14
5.2.1 General	14
5.2.2 Classification	14
5.2.3 Composition	14
5.2.4 Dimensions, workmanship and finish	14
5.2.5 Thickness	15
5.3 Marking	15
5.3.1 Visual inspection and measurement	15
5.3.2 Durability of marking	15
5.4 Packaging and instructions for use	15
5.5 Mechanical tests	16
5.5.1 General	16
5.5.2 Mechanical puncture resistance	16
5.5.3 Test for slip resistance	17
5.6 Dielectric tests	17
5.6.1 General	19
5.6.2 Electrodes	20
5.6.3 Test equipment	24
5.6.4 Electrical test procedure	25
5.7 Ageing test	26
5.8 Thermal tests	26
5.8.1 Flame retardance test	26
5.8.2 Low temperature folding test (except for matting of category C)	27
5.8.3 Extremely low temperature folding test for matting of category C only	28
5.9 Acid resistance	28

5.10	Oil resistance	28
6	Conformity Method of assessment of defects and verification of performance applicable to electrical insulating matting having completed the production phase	29
6.1	General	29
6.2	Routine test	29
6.3	Sampling test	30
7	Modifications	29
Annex A (informative) Guidelines for the selection of the class of electrical insulating matting in relation to nominal voltage of a system		31
Annex B (normative) Suitable for live working, double triangle (IEC 60417-5216:2002-10)		32
Annex C (informative) In-service care and testing		33
C.1	General	33
C.2	Storage	33
C.3	Marking on matting of small dimensions cut from rolls	33
C.4	Examination before use	33
C.5	Temperature	33
C.6	Precautions in use	34
C.7	Periodic inspection and testing	34
C.7.1	General	34
C.7.2	Check-in	35
C.7.3	Cleaning	35
C.7.4	Preliminary visual inspection	34
C.7.5	Electrical test	35
C.7.6	Final visual inspection	36
C.7.7	Record-keeping and marking or stamping	36
C.7.8	Packing for storage or shipment	36
Annex D (normative) General type test procedure		37
D.1	General	37
D.2	Group size requirements	38
D.2.1	Group 1	38
D.2.2	Group 2	38
D.2.3	Group 3	38
D.2.4	Group 4	38
D.2.5	Group 5	39
Annex E (normative) Oil for tests for oil resistance		40
E.1	Particularities of liquid 102	40
E.2	Characteristics of oil no. 1	40
Annex F (normative) Classification of defects and tests to be allocated		41
Annex G (informative) Rationale for the classification of defects		42
Bibliography		43
Figure 1 – Test plates and needle for resistance to mechanical puncture		17
Figure 2 – Test for slip resistance		19
Figure 3 – Test set-up for voltage proof test of electrical insulating matting with alternative type of electrodes		21
Figure 3 – Test set-up for voltage proof test of electrical insulating matting with standard type of electrodes		21

Figure 4 – Test set-up for voltage withstand test	24
Figure 5 – Test set-up for low and extremely low temperature folding tests	27
Figure 6 – Example of test set-up for testing the entire length of each roll	30
Table 1 – Classes and maximum use voltages for electrical insulating matting	10
Table 1 – Common lengths and widths for electrical insulating matting	10
Table 2 – Maximum thickness for electrical insulating matting	11
Table 3 – Maximum electrode clearance for proof tests	22
Table 4 – Test voltages	25
Table 5 – Sampling plan	30
Table A.1 – Designation maximum use voltage	30
Table C.1 – Guide for periodic inspection and testing of matting	35
Table C.2 – Voltage values for periodic testing	36
Table D.1 – List and chronological order of type tests	37
Table E.1 – Characteristics of oil no. 1	40
Table F.1 – Classification of defects and associated requirements and tests	41
Table G.1 – Justification for the type of defect	42

INTERNATIONAL ELECTROTECHNICAL COMMISSION

Live working - Electrical insulating matting

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61111:2009. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 61111 has been prepared by IEC technical committee 78: Live Working. It is an International Standard.

This third edition cancels and replaces the second 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) review of the scope;
- b) introduction of AC/DC use and AC use only;
- c) verification of dated referenced standards;
- d) improvement of the marking;
- e) rewriting of the test for slip resistance;
- f) updating the use of IEC 61318;
- g) creation of an alternative test;
- h) revision and updating of Annexes A, B, C, D, F, G.

The text of this International Standard is based on the following documents:

Draft	Report on voting
78/1559/FDIS	78/1584/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

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

The product covered by this document ~~may~~ can 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, and occur at the global, regional or local level.

Except for a disposal statement in the instructions for use, 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.

1 Scope

This document is applicable to electrical insulating matting made of ~~elastomer~~ flexible insulating material for use as a ~~floor~~ covering ~~for~~ of the surface on which the worker is positioned and for worker's electrical protection ~~of workers~~ on electrical installations up to 36 000 V AC for AC use or 36 000 V AC and 54 000 V DC for AC/DC use.

~~NOTE 1—For a.c. electrical classification, as well as d.c. use, see 4.2.~~

~~NOTE 2—This document gives a.c. test provisions. There is limited history for use in d.c. applications.~~

~~NOTE 3—See Annex A for suggested maximum voltage use.~~

NOTE 1 The electric potential of the surface on which the worker is positioned is usually that of earth.

NOTE 2 See 4.2 for maximum use voltage.

NOTE 3 DC only rated matting is not specified in this document.

NOTE 4 This document does not cover the use of insulating blankets (see IEC 61112)

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 60060-1, *High-voltage test techniques - Part 1: General terminology and test requirements*

IEC 60060-2, *High-voltage test techniques - Part 2: Measuring systems*

IEC 60068-1, *Environmental testing - Part 1: General and guidance*

IEC 60212:~~1974~~, *Standard conditions for use prior to and during the testing of solid electrical insulating materials*

~~IEC 60417, Graphical symbols for use on equipment~~

IEC 61318, *Live Working —~~Conformity~~ Methods for assessment of defects and verification of performance applicable to tools, devices and equipment*

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

ISO 2592, *Petroleum and related products - Determination of flash and fire points - Cleveland open cup method*

ISO 2977, *Petroleum products and hydrocarbon solvents - Determination of aniline point and mixed aniline point*

ISO 3104, *Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO 4649:2017, *Rubber, vulcanized or thermoplastic - Determination of abrasion resistance using a rotating cylindrical drum device*

~~ISO 5904:1981, Gymnastic equipment — Landing mats and surfaces for floor exercises — Determination of resistance to slipping~~

ISO 23529, *Rubber - General procedures for preparing and conditioning test pieces for physical test methods*

~~ASTM D 3767:2003 (reapproved 2008), Standard practice for rubber — Measurement of dimensions~~

Bibliography

IEC 60050-151, *International Electrotechnical Vocabulary (IEV) - Part 151: Electrical and magnetic devices*

IEC 60050-601, *International Electrotechnical Vocabulary (IEV) - Chapter 601: Generation, transmission and distribution of electricity - General*

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

IEC 60417, *Graphical symbols for use on equipment*

IEC 60743, *Live working - Terminology for tools, devices and equipment*

~~Amendment 1 (2008)¹⁾~~

IEC 61112, *Live working - Electrical insulating blankets*

~~ISO 472:1999, *Plastics - Vocabulary*~~

ISO 48-2, *Rubber, vulcanized or thermoplastic - Determination of hardness - Part 2: Hardness between 10 IRHD and 100 IRHD*
ISO 472, *Plastics - Vocabulary*

ISO 1382, *Rubber - Vocabulary*

ISO 1817, *Rubber, vulcanized or thermoplastic - Determination of the effect of liquids*

¹⁾ ~~There exists a consolidated edition 2.1 (2008) that includes edition 2 and its Amendment 1.~~