IEC 61111

Edition 3.0 2026-09

INTERNATIONAL STANDARD

REDLINE VERSION

Live working - Electrical insulating matting

ICS 13.260; 29.240.20; 29.260.99

ISBN 978-2-8327-1496-6

IEC 61111:2026-09 RLV(en)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2026 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

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

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

Warning! Make sure that you obtained this publication from an authorized distributor.

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 ..... 20~~
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 .....~~
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 .....~~
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~~:1971~~, *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*~~

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61318 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

– ISO Online browsing platform: available at https://www.iso.org/obp

– IEC Electropedia: available at http://www.electropedia.org/

3.1
disruptive discharge
passage of an electric arc following ~~dielectric~~ electric breakdown

Note 1 to entry: The term “sparkover” is used when a disruptive discharge occurs in a gaseous or liquid dielectric.

Note 2 to entry: The term “flashover” is used when a disruptive discharge occurs at least partly along the surface of a solid dielectric surrounded by a gaseous or liquid medium.

Note 3 to entry: The term “puncture” is used when a disruptive discharge occurs through a solid dielectric producing permanent damage.

~~[IEV 651-01-18 and definition 2.7.7 of IEC 60743, modified]~~

[SOURCE: IEC 60050-212:2010, 212-11-46, modified – Note to entry deleted and replaced by notes to entry 1,2 and 3]

3.2
elastomer
macromolecular material which returns ~~rapidly to its initial dimensions and shape~~ after substantial deformation by a weak stress and release of the stress rapidly to approximately its initial dimensions and shape

Note 1 to entry: The definition applies to room temperature test conditions.

Note 2 to entry: Elastomer is a generic term that includes rubber, latex and elastomeric compounds that may be natural or synthetic or a mixture or a combination of both. It also includes thermoplastic elastomer (TPE) material.

~~[ISO 472 modified]~~

[SOURCE: IEC 60050-212:2010, 212-14-05, modified – Note 2 to entry has been added.]

3.3
electrical insulating matting
~~flexible sheeting made of elastomer, used to cover the surface on which the worker is standing (the potential of this surface is usually that of earth)~~

~~NOTE The sheeting is either of various definite shapes or in roll allowing the workers to custom-cut the material to fit the application.~~

~~[Definition 5.2.3 of IEC 60743 and IEV 651-04-07, modified]~~

flat protective cover made of flexible insulating material, used to provide electrical insulation between the feet of the worker and the surface on which the worker is standing