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- iii) requires additional national guidance or information

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



PROJECT NUMBER: IEC 61111 ED3	
DATE OF CIRCULATION: 2024-07-19	CLOSING DATE FOR COMMENTS: 2024-10-11
SUPERSEDES DOCUMENTS: 78/1472/RR	

IEC TC 78 : LIVE WORKING	
SECRETARIAT: France	SECRETARY: Mrs Sophie CHABIN
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED: Safety	

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Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE: Live working - Electrical insulating matting

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LIVE WORKING –
ELECTRICAL INSULATING MATTING****FOREWORD**

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

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

It includes the following significant technical changes with regard to the previous edition:

- review of the scope;
- introduction of AC/DC use and AC use only;
- verification of dated referenced standards;
- improvement of the marking;

- 142 • rewriting of the test for slip resistance;
- 143 • updating the use of IEC 61318:2021;
- 144 • creation of an alternative test;
- 145 • revision and updating of Annexes A, B and D to H.

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

FDIS	Report on voting
78/XXXX/FDIS	78/XXXX/RVD

147
148 Full information on the voting for the approval of this standard can be found in the report on
149 voting indicated in the above table.

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

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

- 154 • reconfirmed,
- 155 • withdrawn,
- 156 • replaced by a revised edition, or
- 157 • amended.

158

159

INTRODUCTION

160 This document has been prepared according to the requirements of IEC 61477:2009 where
161 applicable.

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

165 Except for a disposal statement in the instructions for use, this standard does not include
166 requirements and test provisions for the manufacturers of the product, or recommendations to
167 the users of the product for environmental improvement. However, all parties intervening in its
168 design, manufacture, packaging, distribution, use, maintenance, repair, reuse, recovery and
169 disposal are invited to take account of environmental considerations.

170

LIVE WORKING – ELECTRICAL INSULATING MATTING

1 Scope

This International Standard is applicable to electrical insulating matting made of flexible insulating material for use as a surface covering for the electrical protection of workers on electrical installations up to 36 000 V AC or 36 000 V AC and 54 000 V DC.

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

NOTE 2 See Annex A for suggested maximum use voltage.

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.

IEC 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60060-2:2010, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

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

IEC 61318:2021, *Live Working - Methods for assessment of defects and verification of performance applicable to tools, devices and equipment*

IEC 61477:2009, *Live working – Minimum requirements for the utilization of tools, devices and equipment*

ISO 2592:2017, *Petroleum and Related Products - Determination of flash and fire points – Cleveland open cup method*

ISO 2977:1997, *Petroleum products and hydrocarbon solvents – Determination of aniline point and mixed aniline point*

ISO 3104:2020, *Petroleum products – Transparent and opaque liquids – Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO 23529:2016, *Rubber - General procedures for preparing and conditioning test pieces for physical test methods*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61318:2021 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/>

211 **3.1**212 **disruptive discharge**

213 passage of an electric arc following electric breakdown

214 Note 1 to entry: The term “sparkover” (in French “amorçage”) is used when a disruptive discharge occurs in a
215 gaseous or liquid dielectric.216 Note 2 to entry: The term “flashover” (in French “contournement”) is used when a disruptive discharge occurs at
217 least partly along the surface of a solid dielectric surrounded by a gaseous or liquid medium.218 Note 3 to entry: The term “puncture” (in French “perforation”) is used when a disruptive discharge occurs through
219 a solid dielectric producing permanent damage.

220 [SOURCE: IEC 60050-212:2010, 212-11-46]

221 **3.2**222 **elastomer**223 macromolecular material which returns after substantial deformation by a weak stress and
224 release of the stress rapidly to its initial dimensions and shape

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

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

228 [SOURCE: IEC 60050-212:2010, 212-14-05]

229 **3.3**230 **electrical insulating matting**231 flat protective cover made of flexible insulating material, used to provide electrical insulation
232 between the feet of the worker and the surface on which the worker is standing

233 Note 1 to entry: The electric potential of the surface on which the worker is standing is usually that of earth.

234

235 [SOURCE: IEC 60050-651:2014, 651-22-13]

236 **3.4**

237

238 **international rubber hardness degree**239 **IRHD**240 measure of hardness, the magnitude of which is derived from the depth of penetration of a
241 specified indenter into a test piece under specified conditions242 Note 1 to entry: The IRHD scale is such that 0 degrees represents a material showing no measurable resistance to indentation
243 and 100 degrees represents a material showing no measurable indentation. The scale is described fully in [ISO 48](#).

244

245 [SOURCE: ISO 1382:2020, 3.264]

246 **3.5**

247

248 **nominal voltage of a system**

249 suitable approximate value of voltage used to designate or identify a system

250 [SOURCE: IEC 60050-601:1985, 601-01-21]

251 **3.6**252 **proof test voltage**253 specified voltage that is applied to a device or test piece for the time defined under specified
254 conditions to assure that the electrical strength of the insulation is above a specified value255 **3.7**256 **withstand test voltage**257 voltage that a test piece is required to withstand without disruptive discharge or other electric
258 failure when voltage is applied under specified conditions

4 Requirements

4.1 General

Electrical insulating matting shall be designed and manufactured to 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.

4.2 Electrical classification

The electrical insulating matting covered by this standard shall be designated as follows:

- by electrical class: as class 0, class 1, class 2, class 3 and class 4;
 - class 0, for installations with nominal voltage up to 1 000 V AC and/or 1 500 V DC;
 - class 1, for installations with nominal voltage up to 7 500 V AC and/or 11 250 V DC;
 - class 2, for installations with nominal voltage up to 17 000 V AC and/or 25 500 V DC;
 - class 3 for installations with nominal voltage up to 26 500 V AC and/or 39 750 V DC;
 - class 4; for installations with nominal voltage up to 36 000 V AC and/or 54 000 V DC;
- by adding the suffix “C” to the class designation, in case of category C matting (resistance to extremely low temperature).

Guidance for the selection of class (AC and DC) is given in Annex A. DC only use matting are not covered by this document.

4.3 Physical requirements

4.3.1 Composition

The electrical insulating matting shall be manufactured of elastomer.

Both sides of the electrical insulating matting shall be slip resistant. The slip resistance may be achieved with surface such as corrugated or diamond design.

Any insert shall not adversely affect the dielectric characteristics of the electrical insulating matting.

4.3.2 Shape

There is no requirement for the shape of the electrical insulating matting.

Electrical insulating matting may be supplied in either portable style or stationary style (in roll) to be cut for individual applications.

4.3.3 Dimensions and tolerances

4.3.3.1 Length and width

Electrical insulating matting shall not have length and width less than 600 mm.

Electrical insulating matting of class 3 & 4 shall not have length and width less than 36” (914 mm).

Manufacturers shall provide the dimensions of the matting length and width. These dimensions for each matting shall be within a tolerance up to $\pm 2\%$ of the stated dimensions.

Portable matting shall have maximum dimensions of (width x length) less or equal to 1220 x 2000 mm.

Stationary matting shall have longitudinal length above 2000 mm.

Common dimensions and permissible variations for electrical insulating matting are indicated in Table B.1 Annex B (informative).

4.3.3.2 Maximum thickness

The maximum thickness of matting shall be as given in Table 1 in order to obtain appropriate flexibility.

Table 1 – Maximum thickness for electrical insulating matting

Class	mm
0	6,0
1	6,0
2	8,0
3	11,0
4	14,0

When corrugations or diamonds are present, measurements shall be made over the corrugations or diamonds. The corrugations shall not be more than 3 mm deep. The diamonds shall not be higher than 2 mm.

4.3.3.3 Minimum thickness

The minimum thickness shall be determined only by the ability to pass the tests defined in Clause 5.

4.3.4 Temperature

Standard electrical insulating matting shall be designed to be used in applications having ambient temperatures between – 25 °C and + 55 °C and category C matting in ambient temperatures between – 40 °C and + 55 °C.

4.3.5 Workmanship and finish

Electrical insulating matting shall be free from harmful physical irregularities on both surfaces that can be detected by thorough test and/or inspection.

Harmful physical irregularities are those defined as any feature that disrupts the uniform, smooth surface contour, such as pinholes, cracks, blisters, cuts, conductive embedded foreign matter, creases, pinch marks, voids (entrapped air), prominent ripples and prominent molded marks shall not be acceptable.

Non-harmful physical irregularities are those defined as surface irregularities present on either surface of the matting due to imperfections on forms or molds or other imperfections inherent to the manufacturing process and are acceptable provided that:

- a) the thickness at any irregularity conforms to the thickness requirements. Surface design to improve slip resistance shall not be considered as an irregularity;
- b) the indentations, protuberances or mold marks blend into a smooth slope upon stretching of the material mechanical, climatic and environmental requirements.

Any additions to the matting for marking / traceability e.g. identification tags or microchips can be considered as non-harmful irregularities as long the matting fulfils the dielectric and mechanical requirements contained in clause 4.

4.4. Mechanical, climatic and environmental requirements

Electrical insulating matting shall support the mechanical, climatic and environmental stresses occurring during normal working conditions.

All electrical insulating matting shall be resistant to acid, oil, and low temperature and category C shall be resistant to extremely low temperature.