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colour inside

BASIC SAFETY PUBLICATION

Method for the determination of the proof and the comparative tracking indices of solid insulating materials

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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METHOD FOR THE DETERMINATION OF THE PROOF AND THE COMPARATIVE TRACKING INDICES OF SOLID INSULATING MATERIALS

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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This commented version (CMV) of the official standard IEC 60112:2020 edition 5.0 allows the user to identify the changes made to the previous edition IEC 60112:2003 +AMD1:2009 CSV edition 4.1. Futhermore, comments from IEC TC 112 experts are provided to explain the reasons of the most relevant changes.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

International Standard IEC 60112 has been prepared by IEC technical committee 112: Evaluation and qualification of electrical insulating materials and systems.

This fifth edition cancels and replaces the fourth edition published in 2003 and Amendment 1:2009. This edition constitutes a technical revision.

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

- Introduction of a new contaminant, solution C with a surfactant aligned with the test method of IEC 60587. The definition of the solution B was transferred to Annex B for backward reference.
- Introduction of a screening test, considering the fact that some materials can withstand high test voltages, but fail at lower test voltages.

It has the status of a basic safety publication in accordance with IEC Guide 104.

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

FDIS	Report on voting
112/479/FDIS	112/484/RVD

Full information on the voting for the approval of this International 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.

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

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METHOD FOR THE DETERMINATION OF THE PROOF AND THE COMPARATIVE TRACKING INDICES OF SOLID INSULATING MATERIALS

1 Scope

This document specifies the method of test for the determination of the proof and comparative tracking indices of solid insulating materials on pieces taken from parts of equipment and on plaques of material using alternating voltage.

This document provides a procedure **1** for the determination of erosion when required.

NOTE 1 The proof tracking index is used as an acceptance criterion as well as a means for the quality control of materials and fabricated parts. The comparative tracking index is mainly used for the basic characterization and comparison of the properties of materials.

This test method evaluates the composition of the material as well as the surface of the material being evaluated. Both the composition and surface condition directly influence the results of the evaluation and are considered when using the results in material selection process. **2**

Test results ~~cannot be used~~ are not directly suitable **3** for the evaluation of safe creepage distances when designing electrical apparatus.

NOTE 2 This is in compliance with IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests.* **4**

NOTE 3 This test discriminates between materials with relatively poor resistance to tracking, and those with moderate or good resistance, for use in equipment which can be used under moist conditions. More severe tests of longer duration are ~~required~~ available **5** for the assessment of performance of materials for outdoor use, utilizing higher voltages and larger test specimens (see the inclined plane test of IEC 60587). Other test methods such as the inclined method ~~may~~ can rank materials in a different order from the drop test given in this document. **6**

This basic safety publication focusing on a safety test method is primarily intended for use by technical committees in the preparation of safety publications in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its publications. **7**

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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 Guide 104:1997, *The preparation of safety publications and the use of basic safety publications and group safety publications*~~ **8**

~~ISO 293:1986, *Plastics – Compression moulding test specimens of thermoplastic materials*~~ **9**

~~ISO 294-1:1996, *Plastics – Injection moulding of test specimens of thermoplastic materials – Part 1: General principles, and moulding of multi-purpose and bar test specimens*~~ **10**

~~ISO 294-3:2002, *Plastics – Injection moulding of test specimens of thermoplastic materials – Part 3: Small plates*~~ **11**

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ISO 4287, *Geometrical Product Specifications (GPS) – Surface texture: Profile method – Terms, definitions and surface texture parameters* **13**

IEC 60112

Edition 5.0 2020-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

Method for the determination of the proof and the comparative tracking indices of solid insulating materials

Méthode de détermination des indices de résistance et de tenue au cheminement des matériaux isolants solides

IEC 60112:2020-10(en-fr)

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ISO 4287, *Geometrical Product Specifications (GPS) – Surface texture: Profile method – Terms, definitions and surface texture parameters*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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MÉTHODE DE DÉTERMINATION DES INDICES DE RÉSISTANCE ET DE TENUE AU CHEMINEMENT DES MATÉRIAUX ISOLANTS SOLIDES

AVANT-PROPOS

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La Norme internationale IEC 60112 a été établie par le comité d'études 112 de l'IEC: Évaluation et qualification des systèmes et matériaux d'isolement électrique.

Cette cinquième édition annule et remplace la quatrième édition parue en 2003 et l'Amendement 1:2009. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- Introduction d'un nouveau contaminant, la solution C, avec un tensioactif aligné sur la méthode d'essai de l'IEC 60587. Transfert à l'Annexe B de la définition de la solution B pour référence arrière.
- Introduction d'un essai de déverminage, en tenant compte du fait que certains matériaux peuvent supporter des tensions d'essai élevées, mais pas des tensions d'essai plus basses.

Elle a le statut de publication fondamentale de sécurité, conformément au Guide IEC 104.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
112/479/FDIS	112/484/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

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MÉTHODE DE DÉTERMINATION DES INDICES DE RÉSISTANCE ET DE TENUE AU CHEMINEMENT DES MATÉRIAUX ISOLANTS SOLIDES

1 Domaine d'application

Le présent document spécifie la méthode d'essai pour la détermination des indices de résistance et de tenue au cheminement des matériaux isolants solides sur des échantillons prélevés sur des parties d'équipement et des plaques de matériau en utilisant une tension alternative.

Le présent document fournit une procédure pour la détermination de la valeur de l'érosion quand cela est exigé.

NOTE 1 L'indice de tenue au cheminement est utilisé comme critère d'acceptation ainsi que comme critère de contrôle de la qualité des matériaux et parties fabriquées. L'indice de résistance au cheminement est principalement utilisé pour effectuer la comparaison et la caractérisation de base des propriétés des matériaux.

Cette méthode d'essai évalue la composition et la surface du matériau soumis à l'essai. La composition et les conditions de surface influencent directement les résultats de l'évaluation et sont prises en considération lors de l'utilisation des résultats au moment de la sélection des matériaux.

Les résultats d'essais tels quels ne sont pas adaptés à l'évaluation des lignes de fuite de sécurité lors de la conception des appareils électriques.

NOTE 2 Ces éléments sont conformes à l'IEC 60664-1, *Coordination de l'isolement des matériels dans les systèmes (réseaux) à basse tension – Partie 1: Principes, exigences et essais*

NOTE 3 Cet essai établit une distinction entre les matériaux ayant une tenue au cheminement relativement faible et ceux ayant une tenue moyenne ou bonne et qui peuvent être utilisés dans les équipements amenés à fonctionner sous conditions humides. Des essais plus sévères, de plus longue durée, qui utilisent des tensions plus élevées et des éprouvettes plus grandes (voir l'essai du plan incliné de l'IEC 60587), sont disponibles pour l'évaluation des performances des matériaux qui sont d'usage extérieur. D'autres méthodes d'essai comme la méthode du plan incliné peuvent classer les matériaux dans un ordre différent de celui obtenu par l'essai de gouttes donné dans le présent document.

La présente publication fondamentale de sécurité portant sur une méthode d'essai de sécurité est avant tout destinée à être utilisée par les comités d'études dans le cadre de l'élaboration de publications de sécurité, conformément aux principes établis dans le Guide IEC 104 et le Guide ISO/IEC 51.

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ISO 4287, *Spécification géométrique des produits (GPS) – État de surface: Méthode du profil – Termes, définitions et paramètres d'état de surface*