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BASIC SAFETY PUBLICATION

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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This commented version (CMV) of the official standard IEC 60112:2025 edition 6.0 allows the user to identify the changes made to the previous IEC 60112:2020 edition 5.0. Furthermore, comments from IEC TC 112 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

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.

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

This sixth edition cancels and replaces the fifth edition published in 2020. This edition constitutes a technical revision.

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

- a) In 7.3, the term "resistivity" has been replaced by "conductivity".

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:

Draft	Report on voting
112/679/FDIS	112/686/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.

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 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. **1**

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.

The described test method is designed for a test voltage up to 600 V AC, because higher test voltages and DC voltage will lead to a reduced test severity. **2**

Test results are not directly suitable 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*.

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 available 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 can rank materials in a different order from the drop test given in this document.

The results of this method have been used for insulation coordination of equipment. It is important that use of these results also considers the overvoltage levels, creepage distances, and establishes the pollution degree to which the product insulation system will be expected to be subjected. This is in compliance with IEC 60664-1. **3**

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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.

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.

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

3 Terms and definitions

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

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

- IEC Electropedia: available at <http://www.electropedia.org>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

tracking

progressive formation of conducting paths, which are produced on the surface or within a solid insulating material or both, due to the combined effects of electric stress and electrolytic contamination

3.2

tracking failure

failure of insulation due to tracking between conductive parts

Note 1 to entry: In the present test, tracking is indicated by operation of an over-current device due to the passage of a current across the test surface or within the specimen or both.

3.3

electrical erosion

wearing away of insulating material by the action of electrical discharges

3.4

air arc

arc between the electrodes above the surface of the specimen

3.5

comparative tracking index

CTI

numerical value of the maximum voltage (in V) at which five test specimens withstand the test period for 50 drops without tracking failure and without a persistent flame occurring and including also a statement relating to the behaviour of the material when tested using 100 drops (see 11.3)

Note 1 to entry: No tracking failure and no persistent flame are allowed at any lower test voltage.

Note 2 to entry: The criteria for CTI ~~may~~ can **4** also require a statement concerning the degree of erosion.

Note 3 to entry: Although a non-persistent flame is allowed in the test without constituting failure, materials which generate no flame at all are preferred unless other factors are considered to be more important. See also Annex A.

Note 4 to entry: Some materials can withstand high test voltages, but fail at lower test voltages. See also 11.2.

3.6

persistent flame

flame which burns for more than 2 s

Note 1 to entry: In the present test, persistent flame is indicated by a visual check. **5**