

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 60112:2003 sisaldab Euroopa standardi EN 60112:2003 ingliskeelset teksti.

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English version

**Method for the determination of the proof
and the comparative tracking indices
of solid insulating materials
(IEC 60112:2003)**

Méthode de détermination des indices
de résistance et de tenue
au cheminement des matériaux isolants
solides
(CEI 60112:2003)

Verfahren zur Bestimmung der Prüfwahl
und der Vergleichszahl
der Kriechwegbildung von festen,
isolierenden Werkstoffen
(IEC 60112:2003)

This European Standard was approved by CENELEC on 2003-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 15E/209/FDIS, future edition 4 of IEC 60112, prepared by SC 15E, Methods of test, of IEC TC 15, Insulating materials, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60112 on 2003-03-01.

This European Standard supersedes HD 214 S2:1980.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2003-12-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2006-03-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A and B are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60112:2003 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60587 NOTE Harmonized as HD 380 S2:1987 (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60589	1977	Methods of test for the determination of ionic impurities in electrical insulating materials by extraction with liquids	HD 381 S1	1979
IEC Guide 104	1997	The preparation of safety publications and the use of basic safety publications and group safety publications	-	-
ISO 293	1986	Plastics - Compression moulding of test specimens of thermoplastic materials	-	-
ISO 294-1	1996	Plastics - Injection moulding of test specimens of thermoplastic materials Part 1: General principles, and moulding of multipurpose and bar test specimens	-	-
ISO 294-3	2002	Part 3: Small plates	-	-
ISO 295	1991	Plastics - Compression moulding of test specimens of thermosetting materials	-	-

INTERNATIONAL STANDARD

IEC
60112

Fourth edition
2003-01

BASIC SAFETY PUBLICATION

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

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



Reference number
IEC 60112:2003(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

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INTERNATIONAL STANDARD

IEC 60112

Fourth edition
2003-01

BASIC SAFETY PUBLICATION

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

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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For price, see current catalogue

CONTENTS

FOREWORD	5
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	11
4 Principle.....	13
5 Test specimen	13
6 Test specimen conditioning	15
6.1 Environmental conditioning	15
6.2 Test specimen surface state	15
7 Test apparatus	15
7.1 Electrodes	15
7.2 Test circuit.....	17
7.3 Test solutions	17
7.4 Dropping device.....	19
7.5 Test specimen support platform	19
7.6 Electrode assembly installation.....	19
8 Basic test procedure.....	21
8.1 General	21
8.2 Preparation.....	21
8.3 Test procedure	23
9 Determination of erosion	23
10 Determination of proof tracking index (PTI)	23
10.1 Procedure.....	23
10.2 Report	25
11 Determination of comparative tracking index (CTI)	25
11.1 General	25
11.2 Determination of the 100 drop point	25
11.3 Determination of the maximum 50 drop withstand voltage.....	27
11.4 Report	29
Annex A (informative) List of factors that should be considered by product committees	37
Annex B (informative) Electrode material selection.....	39
Bibliography.....	41
Figure 1 – Electrode.....	33
Figure 2 – Electrode / specimen arrangement	33
Figure 3 – Example of typical electrode mounting and specimen support	35
Figure 4 – Example of test circuit	35

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
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- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60112 has been prepared by subcommittee 15E: Methods of test, of IEC technical committee 15: Insulating materials.

This fourth edition cancels and replaces the third edition, published in 1979, of which it constitutes a technical revision.

Major changes since the previous edition are the following:

The selection of a material for a specific application frequently involves compromises in the levels of the individual properties and test criteria. In the previous edition of IEC 60112 the test criteria required "no burning of the specimen", but this gave rise to two issues:

- difficulties in the identification of burning which includes all types of combustion, e.g. flaming, and smouldering in the situation where scintillations had occurred giving rise in many cases to carbon on the surface of the specimen, and
- a situation in which some product committees had found it necessary to dispense with the "no burning" criterion in the tracking tests which they replaced by flame tests on the final product, thereby giving rise to two types of CTI/PTI with different criteria.

This standard attempts to regularize this situation.

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

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

FDIS	Report on voting
15E/209/FDIS	15E/213/RVD

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

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

The committee has decided that the contents of this publication will remain unchanged until 2015. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

The contents of the corrigenda of June 2003 and October 2003 have been included in this copy.

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

1 Scope

This International standard 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 voltages.

The standard provides 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.

Test results cannot be used directly for the evaluation of safe creepage distances when designing electrical apparatus.

NOTE 2 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 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 rank materials in a different order from the drop test given in this standard.

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 60589:1977, *Methods of test for the determination of ionic impurities in electrical insulating materials by extraction with liquids*

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

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

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*

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

ISO 295:1991, *Plastics – Compression moulding of test specimens of thermosetting materials*