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Irish Standard  
I.S. EN 60112:2003

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

## I.S. EN 60112:2003

*Incorporating amendments/corrigenda issued since publication:*

EN 60112:2003/A1:2009

*This document replaces:*  
HD 214 S2:1980

*This document is based on:*  
EN 60112:2003

*Published:*  
12 March, 2003

This document was published  
under the authority of the NSAI and  
comes into effect on:

23 May, 2003

ICS number:  
19.080  
29.035.01

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**NSAI**  
Standards

Amendment  
I.S. EN 60112:2003/A1:2009

# Method for the determination of the proof and the comparative tracking indices of solid insulating materials (IEC 60112:2003/A1:2009 (EQV))

## I.S. EN 60112/A1:2009

*Incorporating amendments/corrigenda issued since publication:*

<i>This document replaces:</i>	<i>This document is based on:</i> EN 60112:2003/A1:2009	<i>Published:</i> 3 December, 2009
This document was published under the authority of the NSAI and comes into effect on:  2 February, 2010		ICS number: 19.080 29.035.01
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60112/A1**

December 2009

ICS 19.080; 29.035.01

English version

**Method for the determination of the proof and the comparative  
tracking indices of solid insulating materials**  
(IEC 60112:2003/A1:2009)

Méthode de détermination des indices  
de résistance et de tenue  
au cheminement des matériaux isolants  
solides  
(CEI 60112:2003/A1:2009)

Verfahren zur Bestimmung der Prüfwahl  
und der Vergleichszahl  
der Kriechwegbildung von festen,  
isolierenden Werkstoffen  
(IEC 60112:2003/A1:2009)

This amendment A1 modifies the European Standard EN 60112:2003; it was approved by CENELEC on 2009-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

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

**Central Secretariat: Avenue Marnix 17, B - 1000 Brussels**

**I.S. EN 60112:2003**

EN 60112:2003/A1:2009

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**Foreword**

The text of document 112/116/CDV, future amendment 1 to IEC 60112:2003, prepared by IEC TC 112, Evaluation and qualification of electrical insulating materials and systems, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60112:2003 on 2009-10-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2010-07-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2012-10-01

Annex ZA has been added by CENELEC.

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**Endorsement notice**

The text of amendment 1:2009 to the International Standard IEC 60112:2003 was approved by CENELEC as an amendment to the European Standard without any modification.

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**Annex ZA**  
(normative)

**Normative references to international publications  
with their corresponding European publications**

**Delete** the following reference:

<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

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EUROPEAN STANDARD

**EN 60112**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2003

ICS 19.080; 29.035.01

Supersedes HD 214 S2:1980

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  
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au cheminement des matériaux isolants  
solides  
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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**

**I.S. EN 60112:2003**

EN 60112:2003

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**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.

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**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).

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## 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	-	-

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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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- 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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. 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 consolidated version of IEC 60112 consists of the fourth edition (2003) [documents 15E/209/FDIS and 15E/213/RVD], its amendment 1 (2009) [documents 112/116/CDV and 112/130/RVC] and its corrigenda of June 2003 and October 2003.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 4.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

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.

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

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

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

## 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 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*

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