

**Polymeric HV insulators for indoor and outdoor use -
General definitions, test methods and acceptance
criteria (IEC 62217:2012)**

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EESTI STANDARDI EESSÕNA

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English version

**Polymeric HV insulators for indoor and outdoor use -
General definitions, test methods and acceptance criteria
(IEC 62217:2012)**

Isolateurs polymériques à haute tension
pour utilisation à l'intérieur
ou à l'extérieur -
Définitions générales, méthodes d'essai et
critères d'acceptation
(CEI 62217:2012)

Hochspannungs-Polymerisolatoren für
Innenraum- und Freiluftanwendung -
Allgemeine Begriffe, Prüfverfahren und
Annahmekriterien
(IEC 62217:2012)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 36/321/FDIS, future edition 2 of IEC 62217, prepared by IEC TC 36 "Insulators" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62217:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-09-08
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-11-01

This document supersedes EN 62217:2006.

EN 62217:2013 includes the following significant technical change with respect to EN 62217:2006:

EN 62217:2006 included two other alternative tracking and erosion tests (a 5 000 hour multi-stress test and a tracking wheel test) which were based on tests developed by CIGRE and utilities. These tests are no longer given as normative alternatives following the results of a study/questionnaire by TC 36 on the relative merits of all three tracking and erosion tests. The 5 000 hour multi-stress test and a tracking wheel test are described in IEC/TR 62730:2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62217:2012 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:

ISO 3274 NOTE Harmonized as EN ISO 3274.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 60050-471	2007	International Electrotechnical Vocabulary - Part 471: Insulators	-	-
IEC 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60068-2-11	-	Environmental testing - Part 2: Tests - Test Ka: Salt mist	EN 60068-2-11	-
IEC 60507	-	Artificial pollution tests on high-voltage insulators to be used on a.c. systems	EN 60507	-
IEC 60695-11-10	-	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	-
IEC 60721-1	-	Classification of environmental conditions - Part 1: Environmental parameters and their severities	EN 60721-1	-
IEC/TS 60815-1	-	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles	-	-
ISO 868	-	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)	EN ISO 868	-
ISO 4287	-	Geometrical Product Specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters	EN ISO 4287	-
ISO 4892-1	-	Plastics - Methods of exposure to laboratory light sources - Part 1: General guidance	EN ISO 4892-1	-
ISO 4892-2	-	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps	EN ISO 4892-2	-

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INTRODUCTION

Polymeric insulators consist either of one insulating material (resin insulators) or two or several insulating materials (composite insulators). The insulating materials are generally cross-linked organic materials synthesised from carbon or silicon chemistry and form the insulating body. Insulating materials can be composed from organic materials containing various inorganic and organic ingredients, such as fillers and extenders. End fittings are often used at the ends of the insulating body to transmit mechanical loads. Despite these common features, the materials used and the construction details employed by different manufacturers may be widely different.

The tests given in this standard are those which are, in general, common to a great majority of insulator designs and materials, whatever their final application. They have been regrouped in this standard to avoid repetition in the relevant product standards and drift between procedures as the various product standards are drafted or revised.

The majority of these tests have been grouped together as "Design tests", to be performed only once for insulators of the same design. The design tests are intended to eliminate insulator designs, materials or manufacturing technologies which are not suitable for high-voltage applications. The influence of time on the electrical properties of the complete polymeric insulator and its components (core material, housing, interfaces etc.) has been considered in specifying the design tests in order to ensure a satisfactory lifetime under normal operating and environmental conditions.

Pollution tests, according to IEC 60507 or IEC 61245, are not included in this document, the applicability of their methodology to composite insulators not having been proven and still requiring study by CIGRE. The results of such pollution tests performed on insulators made of polymeric materials do not correlate with experience obtained from service. Specific pollution tests for polymeric insulators are still under consideration.

The 1 000 hour salt-fog tracking and erosion test given in this second edition of IEC 62217 is considered as a screening test intended to reject materials or designs which are inadequate. This test is not intended to predict long term performance for insulator designs under cumulative service stresses. For more information, see Annex C. The first edition of IEC 62217 (2005) included two other alternative tracking and erosion tests (a 5 000 hour multi-stress test and a tracking wheel test) which were based on tests developed by CIGRE and utilities. These tests are no longer given as normative alternatives following the results of a study/questionnaire by TC 36 on the relative merits of all three tracking and erosion tests. The 5 000 hour multi-stress test and a tracking wheel test are described in IEC/TR 62730 (2012).

Composite insulators are used in both a.c. and d.c. applications. In spite of this fact a specific tracking and erosion test procedure for d.c. applications as a design test has not yet been defined and accepted. The 1 000 hour a.c. tracking and erosion test described in this standard is used to establish a minimum requirement for the tracking resistance of the housing material.

IEC Guide 111 has been followed wherever possible during the preparation of this standard.

POLYMERIC HV INSULATORS FOR INDOOR AND OUTDOOR USE – GENERAL DEFINITIONS, TEST METHODS AND ACCEPTANCE CRITERIA

1 Scope and object

This International Standard is applicable to polymeric insulators whose insulating body consists of one or various organic materials. Polymeric insulators covered by this standard include both solid core and hollow insulators. They are intended for use on HV overhead lines and in indoor and outdoor equipment.

The object of this standard is

- to define the common terms used for polymeric insulators;
- to prescribe common test methods for design tests on polymeric insulators;
- to prescribe acceptance or failure criteria, if applicable;

These tests, criteria and recommendations are intended to ensure a satisfactory life-time under normal operating and environmental conditions (see Clause 5). This standard shall only be applied in conjunction with the relevant product standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-471:2007, *International Electrotechnical Vocabulary – Part 471: Insulators*

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

IEC 60068-2-11, *Environmental testing – Part 2: Tests. Test KA: Salt mist*

IEC 60507, *Artificial pollution tests on high-voltage insulators to be used on a.c. systems*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60721-1, *Classification of environmental conditions – Part 1: Environmental parameters and their severities*

IEC 60815-1, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles*

ISO 868, *Plastics and ebonite – Determination of indentation hardness by means of a durometer (Shore hardness)*

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

ISO 4892-1, *Plastics – Methods of exposure to laboratory light sources – Part 1: General Guidance*

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc sources*

3 Terms and definitions

For the purposes of this document the terms and definitions given in IEC 60050-471:2007 and the following apply:

3.1

high voltage (HV)

voltage over 1 000 V a.c. or over 1 500 V d.c. or over 1 500 V peak value

3.2

polymeric insulator

insulator whose insulating body consists of at least one organic based material

Note 1 to entry: Polymeric insulators are also known as non-ceramic insulators.

Note 2 to entry: Coupling devices may be attached to the ends of the insulating body.

[SOURCE: IEC 60050-471:2007, 471-01-13]

3.3

resin insulator

polymeric insulator whose insulating body consists of a solid shank and sheds protruding from the shank made from only one organic based housing material (e.g. cycloaliphatic epoxy)

3.4

composite insulator

insulator made of at least two insulating parts, namely a core and a housing equipped with metal fittings

Note 1 to entry: Composite insulators, for example, can consist either of individual sheds mounted on the core, with or without an intermediate sheath, or alternatively, of a housing directly moulded or cast in one or several pieces on to the core.

[SOURCE: IEC 60050-471:2007, 471-01-02]

3.5

core

central insulating part of an insulator which provides the mechanical characteristics

Note 1 to entry: The housing and sheds are not part of the core.

[SOURCE: IEC 60050-471:2007, 471-01-03]

3.6

insulator trunk

central insulating part of an insulator from which the sheds project

Note 1 to entry: Also known as shank on smaller insulators.

[SOURCE: IEC 60050-471:2007, 471-01-11]