BS EN IEC 62217:2025

BSI Standards Publication

Polymeric HV insulators for indoor and outdoor use — General definitions, test methods and acceptance criteria

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National foreword

This British Standard is the UK implementation of EN IEC 62217:2025. It is identical to IEC 62217:2025. It supersedes BS EN 62217:2013, which will be withdrawn on 30 November 2028.

The UK participation in its preparation was entrusted to Technical Committee PEL/36, Insulators for power systems.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62217

November 2025

ICS 29.080.10

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English Version

Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria (IEC 62217:2025)

Isolateurs polymériques à haute tension pour usage intérieur et extérieur - Définitions générales, méthodes d'essai et critères d'acceptation (IEC 62217:2025)

Hochspannungs-Polymerisolatoren für Innenraum- und Freiluftanwendung - Allgemeine Begriffe, Prüfverfahren und Annahmekriterien (IEC 62217:2025)

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Comité Européen de Normalisation Electrotechnique
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European foreword

The text of document 36/612/FDIS, future edition 3 of IEC 62217, prepared by TC 36 "Insulators" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62217:2025.

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) 2026-11-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2028-11-30

This document supersedes EN 62217:2013 and all of its amendments and corrigenda (if any).

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Endorsement notice

The text of the International Standard IEC 62217:2025 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60437	NOTE	Approved as EN IEC 60437
IEC 61284	NOTE	Approved as EN 61284

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60050-471	2007	International Electrotechnical Vocabulary - Part 471: Insulators	-	-
IEC 60060-1	-	High-voltage test techniques - Part 1: General terminology and test requirements	EN IEC 60060-1	-
IEC 60507	2013	Artificial pollution tests on high-voltage ceramic and glass insulators to be used on a.c. systems	EN 60507	2014
+ COR1	2018			
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	-	-
IEC/TR 62039	2021	Selection guide for polymeric materials for outdoor use under HV stress	-	-
ISO 868	-	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)	EN ISO 868	-
ISO 4892-2	-	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps	EN ISO 4892-2	-
ISO 21920-2	-	Geometrical product specifications (GPS) - Surface texture: Profile - Part 2: Terms, definitions and surface texture parameters	EN ISO 21920-2	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria

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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9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 62217 has been prepared by IEC technical committee 36: Insulators. It is an International Standard.

This third edition cancels and replaces the second edition published in 2012. This edition constitutes a technical revision.

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

a) The scope of the document is specified to comprise composite insulators with solid and hollow core and resin insulators used for both AC and DC systems in indoor and outdoor applications of HV overhead lines and substations; hybrid insulators (defined in IEC TS 62896) with ceramic core and polymeric housing are also included, while coated insulators (e.g. with Room Temperature Vulcanized (RTV) silicone rubber coatings) are not considered in this document;

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b) Steep-front impulse voltage test is modified to avoid unwanted flashovers between the leads of the electrodes;

c) Differences between hydrophobicity transfer material (HTM) and non-HTM housing materials are specified and relevant test methods and acceptance criteria for polymeric insulators with HTM housing are introduced;

d) The previous water diffusion test on core materials with or without housing is split into two tests. One is on core materials without housing, the other is on core materials with housing. The acceptance criteria are modified;

e) Stress corrosion test for core materials is introduced;

f) Annex B summarizes the test application for evaluating the quality of interfaces and connections of end fittings, housing materials and core materials;

g) Annex E is introduced to emphasize the need for control of electric fields of polymeric insulators for AC. The control of electric fields of polymeric insulators for DC is still under consideration.

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

Draft	Report on voting
36/612/FDIS	36/631/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.

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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 manufacturers might differ significantly.

The tests given in this document are those which are, in general, common to a majority of insulator designs and materials, whatever their final application. Considering the increasing applications of polymeric insulators, the scope of this document specifies technical requirements for solid core, hollow core and resin insulators used in AC and DC systems, in indoor and outdoor, in applications of HV overhead lines and substations to ensure proper insulator performance under normal operating conditions. The technical requirements have been regrouped in this document to avoid repetition of 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 (HV) applications. The influence of time on the electrical properties of the complete polymeric insulator and its components (core, housing, interfaces etc.) has been considered in specifying the design tests in order to ensure a satisfactory lifetime under normal operating and environmental conditions. To ensure quality and reliable long-term performance of insulators, the requirements on the modification of certain test procedures as well as the introduction of new tests were identified.

Pollution tests, according to IEC 60507 or IEC TS 61245 [1][1], are not included in this document. Specific pollution tests for polymeric insulators are under consideration of IEC, indications for design considering pollution are given in IEC TS 60815-1, IEC TS 60815-3 [2] and IEC TS 60815-4 [3].

Before the appropriate standard for DC applications will be issued, the majority of tests listed in this document can also be applied to DC insulators. The 1 000 h AC salt fog tracking and erosion test is considered as a design test in this document to reject materials in combination with the design which are inadequate. For the time being, the 1 000 h AC salt fog tracking and erosion test is used to establish a minimum requirement for the tracking and erosion resistance, for both AC and DC. For DC applications, a specific DC tracking and erosion test procedure as a design test has not been developed. Further tracking and erosion test methods such as the 5 000 hour and the tracking wheel test are described in IEC TR 62730 [4] and can be used for research or other purposes. Tracking and erosion tests are not intended to evaluate long term performance of insulators in harsh environments by the simulation of multiple environmental factors. It is therefore necessary to carry out ageing tests for insulator designs under cumulative service stresses. These aging tests do not form part of this present document.

For polymeric insulators with hydrophobicity transfer property, relevant test procedures are introduced. In this document the hydrophobicity transfer test is intended to distinguish the HTM from non-HTM rather than differentiate between different HTMs degrees.

The water diffusion test is divided into two tests. The first one is for the core (as earlier), the second one is for the core with housing. The water diffusion test on core with housing addresses the interface between the core and the housing. The acceptance criteria are modified and harmonized for both tests.

[1] Numbers in square brackets refer to the Bibliography.

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Stress corrosion test for insulators mainly subjected to tensile loads is introduced to minimize the risks of brittle fractures.

Annex B summarizes the test application for evaluating the quality of interfaces and connections of end fittings, housing materials and core materials.

Annex E is introduced to emphasize the need for the control of electric field of polymeric insulators under AC voltage.

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

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1 Scope

This International Standard is applicable to polymeric insulators for AC systems with a nominal voltage greater than 1 000 V (frequency less than 100 Hz) and DC systems with a nominal voltage greater than 1 500 V whose insulating body consists of one or various organic materials. Polymeric insulators covered by this document are intended for use both on HV overhead lines and in substations, in both indoor and outdoor applications. They include composite insulators with solid and hollow core and resin insulators. Hybrid insulators with ceramic core and polymeric housing are also included, while coated insulators (e.g. with RTV silicone rubber coatings) are not included in this standard. Electrical tests described in this document are done under AC voltage and are in general applicable to insulators to be used in DC systems too. Tests under DC voltage are intended to reflect up-to-date knowledge and experience.

NOTE Only polymeric housing materials of hybrid insulators are specified in this document. Tests for core materials and the interfaces between housing and core of hybrid insulators are not included.

The object of this document 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 lifetime under normal operating and environmental conditions (see Clause 5). This document includes design tests intended to reject materials or designs which are inadequate under normal operating and environmental conditions. This document defines test methods and acceptance criteria. The applicable tests are given in the relevant product standard.

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.

IEC 60050-471:2007, *International Electrotechnical Vocabulary (IEV) - Part 471: Insulators*

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

IEC 60507:2013+COR1:2018, *Artificial pollution tests on high-voltage ceramic and glass 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 TS 60815-1, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles*

IEC TR 62039:2021, *Selection guidelines for polymeric materials for outdoor use under HV stress*

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

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

ISO 21920-2, *Geometrical product specifications (GPS) Surface texture: Profile - Part 2: Terms, definitions and surface texture parameters*

3 Terms and definitions

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

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

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

3.1
high voltage
HV
voltage over 1 000 V AC or over 1 500 V DC 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 insulator trunk and sheds protruding from the insulator trunk 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 end 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
hybrid insulator
insulator that consists of a ceramic core and a polymeric housing, equipped with one or more metal fittings

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