



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 62217:2024**  
**01-februar-2024**

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**Polimerni visokonapetostni izolatorji za notranjo in zunanjo uporabo - Splošne definicije, preskusne metode in prevzemna merila**

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

Hochspannungs-Polymerisolatoren für Innenraum- und Freiluftanwendung - Allgemeine Begriffe, Prüfverfahren und Annahmekriterien

Isolateurs polymériques à haute tension pour utilisation à l'intérieur ou à l'extérieur - Définitions générales, méthodes d'essai et critères d'acceptation

**Ta slovenski standard je istoveten z: prEN IEC 62217:2023**

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**ICS:**

29.080.10      Izolatorji      Insulators

**oSIST prEN IEC 62217:2024**      **en,fr,de**





# 36/589/CDV

## COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:

**IEC 62217 ED3**

DATE OF CIRCULATION:

**2023-12-08**

CLOSING DATE FOR VOTING:

**2024-03-01**

SUPERSEDES DOCUMENTS:

**36/582/RR**

IEC TC 36 : INSULATORS	
SECRETARIAT: Sweden	SECRETARY: Mr Dan Windmar
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input checked="" type="checkbox"/> QUALITY ASSURANCE <input checked="" type="checkbox"/> SAFETY	
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TITLE:

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

PROPOSED STABILITY DATE: 2027

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

## FOREWORD

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- International Standard IEC 62217 has been prepared by IEC technical committee 36: Insulators.

This third edition of the standard cancels and replaces the second edition, published in 2012. It constitutes its technical revision and introduces the following important changes:

- a) The scope of the standard is specified to comprise composite insulators with solid and hollow core and resin insulators used for both a.c. and d.c. 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 standard;
- b) Steep-front impulse voltage test is modified to avoid unwanted flashovers between the leads of the electrodes;
- c) Differences between 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 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;

127 g) Annex E is introduced to emphasize the need for control of electric fields of polymeric  
 128 insulators for a.c. The control of electric fields of polymeric insulators for d.c. is still under  
 129 consideration.

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

CD	CC
36/537/CD	CC/36/537/CD 62217

131

132 Full information on the voting for the approval of this International Standard can be found in the  
 133 report on voting indicated in the above table.

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

135 The committee has decided that the contents of this document will remain unchanged until the  
 136 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to  
 137 the specific document. At this date, the document will be

- 138 • reconfirmed,
- 139 • withdrawn,
- 140 • replaced by a revised edition, or
- 141 • amended.

142

143 The National Committees are requested to note that for this document the stability date  
 144 is 20XX.

145 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED  
 146 AT THE PUBLICATION STAGE.

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147

## INTRODUCTION

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

155 The tests given in this standard are those which are, in general, common to a majority of  
156 insulator designs and materials, whatever their final application. Considering the increasing  
157 applications of polymeric insulators, the scope of this standard specifies technical requirements  
158 for solid core, hollow core and resin insulators used in a.c. and d.c. systems in indoor and  
159 outdoor applications of HV overhead lines and substations to ensure proper insulator  
160 performance under normal operating conditions. The technical requirements have been  
161 regrouped in this standard to avoid repetition of the relevant product standards and drift  
162 between procedures as the various product standards are drafted or revised.

163 The majority of these tests have been grouped together as "Design tests", to be performed only  
164 once for insulators of the same design. The design tests are intended to eliminate insulator  
165 designs, materials or manufacturing technologies which are not suitable for high- voltage (HV)  
166 applications. The influence of time on the electrical properties of the complete polymeric  
167 insulator and its components (core material, housing, interfaces etc.) has been considered in  
168 specifying the design tests in order to ensure a satisfactory lifetime under normal operating and  
169 environmental conditions. To ensure quality and reliable long-term performance of insulators,  
170 a need to modify some test procedures as well as to introduce new tests were identified.

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

174 Before the appropriate standard for DC applications will be issued, the majority of tests listed  
175 in this document can also be applied to DC insulators. The AC 1000 h salt fog tracking and  
176 erosion test is considered as a design test in this standard to reject materials in combination  
177 with the design which are inadequate. For the time being, the 1 000 h AC tracking and erosion  
178 test is used to establish a minimum requirement for the tracking and erosion resistance, for  
179 both AC and DC. For DC applications, a specific DC tracking and erosion test procedure as a  
180 design test shall be developed. Further tracking and erosion test methods such as the 5 000  
181 hour and the tracking wheel test are described in IEC TR 62730 and can be used for research  
182 or other purposes. Tracking and erosion tests are not intended to evaluate long term  
183 performance of insulators in harsh environments by the simulation of multiple environmental  
184 factors. It is therefore necessary to carry out ageing tests for insulator designs under cumulative  
185 service stresses.

186 For polymeric insulators with hydrophobicity transfer property, relevant test procedures are  
187 introduced. In the standard the hydrophobicity transfer test is intended to distinguish the  
188 hydrophobicity transfer material (HTM) from non-HTM rather than differentiate between  
189 different HTMs.

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

194 Stress corrosion test for insulators mainly subjected to tensile load is introduced to minimize  
195 risks of brittle fractures.

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

198 Annex E is introduced to emphasize the need for the control of electric field of polymeric  
199 insulators under a.c. voltage.

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



201 **POLYMERIC HV INSULATORS FOR INDOOR AND OUTDOOR USE -**  
 202 **GENERAL DEFINITIONS, TEST METHODS AND ACCEPTANCE CRITERIA**  
 203

204 **1 Scope**

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

215 The object of this standard is

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

219 These tests, criteria and recommendations are intended to ensure a satisfactory lifetime under  
 220 normal operating and environmental conditions (see Clause 5). The standard includes design  
 221 tests intended to reject materials or designs which are inadequate under normal operating and  
 222 environmental conditions. This standard shall only be applied in conjunction with the relevant  
 223 product standard.

224 **2 Normative references**

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

229 IEC 60050-471, International Electrotechnical Vocabulary - Part 471: Insulators

230 IEC 60050-151, International Electrotechnical Vocabulary - Part 151: Electrical and magnetic  
 231 devices

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

233 IEC 60507:2013/COR1:2018, Artificial pollution tests on high-voltage ceramic and glass  
 234 insulators to be used on a.c. systems

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

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

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

241 IEC TS 60815-3, Selection and dimensioning of high-voltage insulators intended for use in  
 242 polluted conditions - Part 3: Polymer insulators for a.c. system

243 IEC TS 60815-4, Selection and dimensioning of high voltage insulators intended for use in  
 244 polluted conditions – Part 4: Insulators for d.c. systems

245 IEC 61109 Insulators for overhead lines – Composite suspension and tension insulators for a.c.  
 246 systems with nominal voltage greater than 1 000 V – Definitions, test methods and acceptance  
 247 criteria

- 248 IEC TS 61245 Artificial pollution tests on high-voltage insulators to be used on d.c. systems
- 249 IEC 61462, Composite hollow insulators – Pressurized and unpressurized insulators for use in  
250 electrical equipment with rated voltage greater than 1 000 V – Definitions, test methods,  
251 acceptance criteria and design recommendations
- 252 IEC 61952 Insulators for overhead lines – Composite line post insulators for A.C. systems with  
253 a nominal voltage greater than 1 000 V – Definitions, test methods and acceptance criteria
- 254 IEC TR 62039, Selection guide for polymeric materials for outdoor use under HV stress
- 255 IEC TS 62073, Guidance on the measurement of wettability of insulator surfaces
- 256 IEC TR 62730, HV polymeric insulators for indoor and outdoor use tracking and erosion testing  
257 by wheel test and 5000 h test
- 258 IEC 62772 Composite hollow core station post insulators for substations with a.c. voltage  
259 greater than 1 000 V and d.c. voltage greater than 1 500 V – Definitions, test methods and  
260 acceptance criteria
- 261 IEC TS 62896, Hybrid insulators for a.c. and d.c. high-voltage applications – Definitions, test  
262 methods and acceptance criteria
- 263 ISO 868, Plastics and ebonite - Determination of indentation hardness by means of a durometer  
264 (Shore hardness)
- 265 ISO 3274 Geometrical Product Specifications (GPS) — Surface texture: Profile method —  
266 Nominal characteristics of contact (stylus) instruments
- 267 ISO 4287, Geometrical Product Specifications (GPS) - Surface Texture; Profile method - Terms,  
268 definitions and surface texture parameters
- 269 ISO 4892-2, Plastics - Methods of exposure to laboratory light sources - Part 2; Xenon-arc  
270 sources
- 271 **3 Terms and definitions**
- 272 For the purposes of this document the terms and definitions given in IEC 60050-471:2007 and  
273 the following apply:
- 274 ISO and IEC maintain terminological databases for use in standardization at the following  
275 addresses:
- 276 • IEC Electropedia: available at <http://www.electropedia.org/>
  - 277 • ISO Online browsing platform: available at <http://www.iso.org/obp>
- 278 **3.1**
- 279 **high voltage (HV)**  
280 voltage over 1 000 V a.c. or over 1 500 V d.c. or over 1 500 V peak value
- 281 **3.2**
- 282 **polymeric insulator**  
283 insulator whose insulating body consists of at least one organic based material
- 284 Note 1 to entry: Polymeric insulators are also known as non-ceramic insulators.
- 285 Note 2 to entry: Coupling devices may be attached to the ends of the insulating body.
- 286 [SOURCE: IEC 60050-471:2007, 471-01-13]
- 287 **3.3**
- 288 **resin insulator**  
289 polymeric insulator whose insulating body consists of a solid insulator trunk and sheds  
290 protruding from the insulator trunk made from only one organic based housing material (e.g.  
291 cycloaliphatic epoxy)

292 **3.4**  
293 **composite insulator**

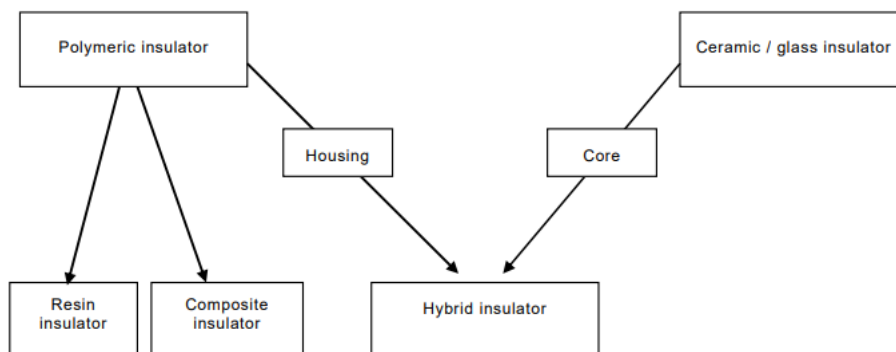
294 insulator made of at least two insulating parts, namely a core and a housing, equipped with  
295 metal fittings

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

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

300 **3.5**  
301 **hybrid insulator**

302 insulator that consists of a ceramic core and a polymeric housing, equipped with one or more  
303 metal fittings



IEC

304 Note 1 to entry: According to IEC TS 62896.

306 Note 2 to entry: The mechanical functions are mainly characterised by the core, the external electrical functions  
307 are mainly characterised by the polymeric housing. The housing may cover the core completely or partly. In the  
308 latter case the exposed portions of the ceramic core are usually covered by glaze.

310 **3.6**  
311 **composite insulator with fibre reinforced plastic solid core**  
312 **composite insulator with FRP solid core**

313 Composite insulators of which the core is made of solid insulating polymeric material reinforced  
314 by fibres such as glass fibres. The core is covered by polymeric housing.

315 **3.7**  
316 **composite hollow insulator**

317 insulator consisting of at least two insulating parts, namely a tube-shaped core, and a housing

318 Note 1 to entry: The housing may consist either of individual sheds mounted on the tube, with or without an  
319 intermediate sheath, or directly applied in one or several pieces onto the tube. A composite hollow insulator unit is  
320 permanently equipped with fixing devices or end fittings.

321 **3.8**  
322 **core**  
323 central insulating part of an insulator which provides the mechanical characteristics

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

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

326 **3.9**  
327 **insulator trunk**

328 central insulating part of an insulator from which the sheds project

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

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

331 **3.10**  
332 **housing**

333 external insulating part of a composite insulator providing the necessary creepage distance and  
334 protecting core from environment