



SLOVENSKI STANDARD
oSIST prEN IEC 60437:2022
01-junij-2022

Preskus radijskih motenj na visokonapetostnih izolatorjih

Radio interference test on high-voltage insulators

Funkstörprüfungen an Hochspannungsisolatoren

Essai de perturbations radioélectriques des isolateurs pour haute tension

Ta slovenski standard je istoveten z: prEN IEC 60437:2022

**iTeh STANDARD
PREVIEW
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Insulators

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TITLE:

Radio interference test on high-voltage insulators

PROPOSED STABILITY DATE: 2027

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RADIO INTERFERENCE TEST ON HIGH-VOLTAGE INSULATORS

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FOREWORD

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 42 all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international
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73 International Standard IEC 60437 has been prepared by IEC technical committee 36: Insulators.

74 This third edition cancels and replaces the second edition published in 1997. This edition
 75 constitutes a technical revision.

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

78 a) Composite station post and composite hollow core station post insulators have included.

79 b) All paragraphs of Samples test were actualized

80 c) Sample test fast procedure was introduced.

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

82

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

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

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

- 89 • reconfirmed,
- 90 • withdrawn,
- 91 • replaced by a revised edition, or
- 92 • amended.

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INTRODUCTION

96 The first issue of IEC 60437 presented the available information on a radio interference test on
97 high-voltage insulators as a technical report. This allowed further experience in conducting the
98 test and the interpretation of results to be gained.

99 The second edition incorporated that experience in the form of an International Standard, the
100 recommended procedures for a radio interference test on high-voltage insulators.

101 This third edition incorporates arrangements clarification and number of insulators to be tested
102 for composite station post and composite hollow core station post and hybrid insulators. Also
103 incorporates clarification on fast method for sample test.

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RADIO INTERFERENCE TEST ON HIGH-VOLTAGE INSULATORS

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1 Scope

109 This International Standard specifies the procedure for a radio interference (RI) test carried out
110 in a laboratory on clean and dry insulators at a frequency of 0,5 MHz or 1 MHz or, alternatively,
111 at other frequencies between 0,5 MHz and 2 MHz.

112 This standard applies to insulators for use on a.c. por d.c. overhead power lines and overhead
113 traction lines with a nominal voltage greater than 1 000 V.

114 In service the RI characteristics of an insulator may be modified by the ambient conditions,
115 particularly rainfall and other moisture, and by pollution. It is not considered feasible to specify
116 reproducible test conditions to simulate a range of ambient conditions. Hence only tests on
117 clean and dry insulators are specified in this standard.

118 NOTE The effects of insulator surface conditions, including pollution, are presented in CISPR 18-2:2017 clause 6.3

2 Normative references

120 The following documents are referred to in the text in such a way that some or all of their content
121 constitutes requirements of this document. For dated references, only the edition cited applies.
122 For undated references, the latest edition of the referenced document (including any
123 amendments) applies.

124 IEC 60050(471):2007, International Electrotechnical Vocabulary (IEV) – Chapter 471: Insulators

125 IEC 60060-1:2010, High-voltage test techniques – Part 1: General definitions and test
126 requirements

127 IEC 60137:2017, Insulated bushings for alternating voltages above 1 000 V

128 IEC 60168:1994+AMD1:1997+AMD2:2000 CSV Tests on indoor and outdoor post insulators of
129 ceramic material or glass for systems with nominal voltages greater than 1 000 V

130 IEC 60383-1:1993, Insulators for overhead lines with a nominal voltage above 1 000 V – Part
131 1: Glass or ceramic insulator units for a.c. systems – Definitions, test methods and acceptance
132 criteria

133 IEC 60383-2:1993, Insulators for overhead lines with a nominal voltage above 1 000 V – Part
134 2: Insulator strings and insulator sets for a.c. systems – Definitions, test methods and
135 acceptance criteria

136 IEC 61109:2008, Insulators for overhead lines – Composite suspension and tension insulators
137 for a.c. systems with a nominal voltage greater than 1 000 V – Definitions, test methods and
138 acceptance criteria

139 IEC 61462:2007, Composite hollow insulators – Pressurized and unpressurized insulators for
140 use in electrical equipment with rated voltage greater than 1 000 V – Definitions, test methods,
141 acceptance criteria and design recommendations

142 IEC 61952:2008 Insulators for overhead lines – Composite line post insulators for a.c. systems
143 with a nominal voltage greater than 1 000 V – Definitions, end fittings and designation

144 IEC 62217, Polymeric HV insulators for indoor and outdoor use – General definitions, test
145 methods and acceptance criteria

146 IEC 62231:2006, Composite station post insulators for substations with a.c. voltage greater
147 than 1 000 V up to 245 kV – Definitions, test methods and acceptance criteria

148 IEC 62772:2016, Composite hollow core station post insulators for substations with a.c. voltage
149 greater than 1 000 V and d.c. voltage greater than 1 500 V – Definitions, test methods and
150 acceptance criteria

151 IEC 62896, Hybrid insulators for a.c. and d.c. high-voltage applications – Definitions, test
152 methods and acceptance criteria

153 CISPR 16-1-1:2019, Specification for radio disturbance and immunity measuring apparatus and
154 methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring
155 apparatus

156 CISPR 18-2:2017, Radio interference characteristics of overhead power lines and high-voltage
157 equipment – Part 2: Methods of measurement and procedure for determining limits Amendment
158 1 (1993)

159 **3 Terms and definitions**

160 No terms and definitions are listed in this document.

161 ISO and IEC maintain terminological databases for use in standardization at the following
162 addresses:

- 163 - IEC Electropedia: available at <http://www.electropedia.org/>
- 164 - ISO Online browsing platform: available at <http://www.iso.org/obp>

165 **4 Measurement frequency**

166 The reference measurement frequency is 0,5 MHz. It is recommended that measurements are
167 made at a frequency of 0,5 MHz \pm 10 % but other frequencies, for example 1 MHz, may be
168 used. Alternatively, by agreement between purchaser and manufacturer, other frequencies
169 between 0,5 MHz and 2 MHz may be used.

170 NOTE Although CISPR 18-2 gives the reference measurement frequency for the measurement of RI characteristics
171 as 0,5 MHz, the existing standard practice in some countries is to use 1 MHz or 2 MHz when measuring radio
172 interference characteristics of insulators.

173 The frequencies of 0,5 MHz or alternatively 1 MHz are preferred because, usually, the level of
174 radio noise at this part of the spectrum is representative of the higher levels and also because
175 0,5 MHz lies between the low and medium frequency radio broadcast bands.

176 The RI characteristics of insulators do not normally affect television broadcasts.

177 **5 Radio noise limits and test voltage**

178 This standard does not specify a limiting value for the radio interference characteristic of
179 insulators or the test voltage.

180 When RI tests are required, the relevant values shall be found in the relevant IEC standard or
181 shall be agreed between the purchaser and manufacturer.

182 NOTE Guidance for establishing limit values is given in CISPR 18-2:2017

183 **6 Measuring instruments**

184 **6.1 Standard CISPR measuring apparatus**

185 Unless otherwise agreed, the standard CISPR measuring apparatus, as specified in CISPR 16-
186 1-1, shall be used for all measurements of RI characteristics of insulators.

187 **6.2 Other measuring apparatus**

188 By agreement between the purchaser and manufacturer measuring apparatus differing from the
189 CISPR standard measuring apparatus may be used provided that conversion of the
190 measurements to quasi peak values is possible.

191 7 Measuring circuit

192 Laboratory measurements of radio noise shall be made by measuring the conducted quantities,
193 either current or voltage.

194 The relevant measuring circuits are specified in CISPR 18-2.

195 The basic test circuit is shown in figure 4 of CISPR 18-2:2017, and a practical form of standard
196 test circuit in figure 5. For DC insulators tests, H.V. transformer mentioned on both figures shall
197 be a DC voltage generator. Depending on the distance between the measuring set and the test
198 circuit, the arrangements shown in figure 6 or figure 7 of CISPR 18-2:2017 may be incorporated
199 into the test circuit of figure 5.

200 The test circuit shall be arranged so as to permit an accurate measurement of the radio noise
201 level generated by the object under test. Any interference from outside the test circuit, including
202 the supply, or from other parts of the circuit, shall be at a low level and, preferably, at least 10
203 dB below the level specified for the test object. Also, with the specified test voltage applied to
204 the circuit, the level of background noise shall be at least 6dB below the lowest level to be
205 measured. (see 4.5.11 – CISPR 18-2:2017).

206 8 Requirements for test voltage

207 RI measurements shall be made with a power-frequency voltage (for AC insulators) or direct
208 voltage (for DC insulators) applied to the test object. The test voltage and its method of
209 measurement shall comply with the requirements of IEC 60060-1.

210 9 Atmospheric conditions

211 The standard reference atmospheric conditions in accordance with IEC 60060-1 are not
212 applicable to radio interference tests.

213 Tests made in accordance with this standard shall be performed under atmospheric conditions
214 complying with the following requirements:

215 – temperature between 10 °C and 35 °C

216 – pressure between 87 kPa and 107 kPa (870 mbar and 1 070 mbar)

217 – relative humidity between 45 % and 75 %.

218 NOTE 1 The absolute humidity and the atmospheric pressure can influence the test results.

219 NOTE 2 By agreement between the purchaser and manufacturer, e.g. to simulate service conditions, tests may be
220 carried out under other atmospheric conditions. Examples of these include:

221 – temperature between 5 °C and 40 °C

222 – relative humidity between 20 % and 80 %.

223 Correction to standard atmospheric conditions shall not be applied to either the test voltage or
224 the radio interference measurements.

225 The atmospheric conditions shall be recorded.

226 10 Test area

227 Tests on smaller insulators and insulator sets preferably shall be performed inside a screened
228 room which is large enough to prevent the walls and floor having any significant effect on the
229 distribution of the electric field at the surface of the test object. Circuits, for example power and
230 lighting, entering the screened test area shall, ideally, be filtered so as to avoid the introduction
231 of radio noise present in the general environment.

232 When, for testing larger insulators and insulator sets, a suitable screened room is not available,
233 the tests may be carried out at any place where the background noise level is sufficiently low
234 compared with the levels to be measured (see Clause 7).