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Nadzemni vodi - Zahteve in preskusi za dušilnike vetrnih vibracij

Overhead lines - Requirements and tests for Aeolian vibration dampers

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<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

Overhead lines - Requirements and tests for Aeolian vibration dampers

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OVERHEAD LINES –

Requirements and tests for aeolian vibration dampers

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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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International Standard IEC 61897 has been prepared by Maintenance Team MT1: Maintenance of TC 11 documents, of IEC Technical Committee 11: Overhead lines.

This second edition cancels and replaces the first edition published in 1998. This edition constitutes a technical revision.

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

- a) Consider, in addition to Stockbridge type aeolian vibration dampers, also Spiral aeolian vibration dampers and Elastomeric aeolian vibration dampers
- b) Consider the application of dampers on high temperature conductors, specifying additional high temperature tests in clamp slip tests
- c) Simplify the procedure of the damper effectiveness evaluation
- d) Introduce test at low temperature on fastener components such as break away bolts and conical spring washers
- e) Update the normative references
- f) Include figures showing the test arrangements for the main mechanical tests

Annexes A and C form an integral part of this standard.

Annex B and D are for information only.

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56

The text of this standard is based on the following documents:

FDIS	Report on voting
11/140/FDIS	11/142/RVD

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Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

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

reconfirmed,

withdrawn,

replaced by a revised edition, or

amended

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71 **OVERHEAD LINES –**
72 **REQUIREMENTS AND TESTS FOR AEOLIAN VIBRATION DAMPERS**

73
74 **1 Scope**

75 This International Standard applies to aeolian vibration dampers intended for single
76 conductors or earth wires or conductor bundles where dampers are directly attached to each
77 subconductor.

78 The purchaser may adopt part(s) of this standard when specifying requirements for cables
79 different from those mentioned above (e.g. optical ground wires (OPGW), all dielectric self-
80 supporting optical cables (ADSS)).

81 In some cases, test procedures and test values are left to agreement between the purchaser
82 and the supplier and are stated in the procurement contract.

83 Annex A lists the minimum technical details to be agreed between purchaser and supplier.

84 Throughout this standard, the word “conductor” is used when the test applies to dampers for
85 conductors or earth wires.

86 **2 Normative references**

87 The following normative documents contain provisions which, through reference in this text,
88 constitute provisions of this International Standard. At the time of publication, the editions
89 indicated were valid. All normative documents are subject to revision, and parties to
90 agreements are encouraged to investigate the possibility of applying the most recent editions
91 of the normative documents indicated below. Members of IEC and ISO maintain registers of
92 currently valid International Standards.
93

94 IEC 60050(466):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 466:*
95 *Overhead lines*

96 IEC 61284:1997, *Overhead lines – Requirements and tests for fittings*

97 IEC 60888:1987, *Zinc-coated steel wires for stranded conductors*

98 IEC 62567: 2013, *Methods for testing self-damping characteristics of stranded conductors for*
99 *overhead lines*

100 ISO 1461: 2009, — *Hot dip galvanized coatings on fabricated iron and steel articles -*
101 *Specifications and test methods*

102 ISO 2859-1:1999, *Sampling procedures for inspection by attributes – Part 1: Sampling*
103 *schemes indexed by acceptable quality limit (AQL) for lot-by-lot inspection + Ammendment 1*
104 *(2011)*

105

106

107 ISO 2859-2:1985, *Sampling procedures for inspection by attributes – Part 2: Sampling plans*
 108 *indexed by limiting quality level (LQ) for isolated lot inspection*

109 ISO 3951-1:2013, *Sampling procedures for inspection by variables -- Part 1: Specification for*
 110 *single sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection for a*
 111 *single quality characteristic and a single AQL*

112 ISO 3951-2:2013, *Sampling procedures for inspection by variables -- Part 2: General*
 113 *specification for single sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot*
 114 *inspection of independent quality characteristics*

115 ISO 9000:2015, *Quality management systems – Fundamentals and vocabularies*

116 ISO 9001:2015, *Quality management systems – Requirements*

117 ISO 9004:2018, *Managing for the sustained success of an organization – A quality*
 118 *management approach*

119 ISO 10684:2008, *Fasteners – Hot dip galvanized coatings*

120 **3 Definitions**

121 For the purpose of this International Standard, the definitions of the International
 122 Electrotechnical Vocabulary (IEV) apply, in particular IEC 60050(466). Those which differ or
 123 do not appear in the IEV are given below.

124 **3.1 stockbridge-type aeolian vibration damper**

125 Device comprising a steel cable with a weight at each end and one bolted clamp or a helical rod
 126 attachment, attachable to a conductor, for the purpose of damping aeolian vibration

127 **3.2 spiral aeolian vibration damper (SVD)**

128 Device made of helical plastic which wraps around the conductor for purposes of damping aeolian
 129 vibration (these are commonly used on earth wires, OPGW and ADSS cables).

130 **3.3 elastomeric aeolian vibration damper**

131 Device comprising suspended weights connected to elastomeric articulations and one bolted clamp or
 132 a helical rod attachment, attachable to a conductor for the purpose of damping aeolian vibration.

133 **1.1 3.4 high temperature conductors (HTC)**

134 **1.2** conductors which are designed to have a maximum continuous operating temperature
 135 over 95°C.

136 **3.5 maximum continuous operating temperature**

137 conductor temperature specified by the manufacturer and measured at the outer wire layers

138 **4 General requirements**

139 **4.1 Design**

140 The damper shall be designed so as to

- 141 – damp aeolian vibration;
- 142 – withstand mechanical loads imposed during installation, maintenance and specified
 143 service conditions;
- 144 – avoid damage to the conductor under specified service conditions;
- 145 – be capable of being removed and re-installed without damage to the conductor;
- 146 – be free from unacceptable levels of corona and radio interference under all service
 147 conditions, when installed on phase conductors;
- 148 – be suitable for safe and easy installation. The clamp design shall retain all parts when
 149 opened for attachment to conductor. Furthermore, the clamp design shall be such that the

150 damper, during installation, can be suspended on the conductor before tightening the
151 clamp;

152 – ensure that individual components will not become loose in service;

153 – maintain its function over the entire service temperature range;

154 – avoid audible noise;

155 – prevent water collection.

156 NOTE – Other desirable characteristics which are not essential to the basic functions of the damper but which may
157 be advantageous include:

158 – verification of proper installation from the ground;

159 – easy installation and removal from energized lines.

160 In the case of vibration dampers for conductors or earth wires containing integral fibre optic elements (or an
161 externally applied optical cable wrapped around the earth wire) the possible effects of the damper on these fibre
162 optic elements should be accounted for.

163 4.2 Materials

164 The materials shall conform to the requirements of IEC 61284.

165 4.3 Mass, dimensions and tolerances

166 Damper mass and significant dimensions, including appropriate tolerances, shall be shown on
167 contract drawings.

168 4.4 Protection against corrosion

169 In addition to the applicable requirements of IEC 61284, the messenger cable (including cut
170 ends when exposed) shall be protected against corrosion, e.g. in accordance with IEC 60888
171 for hot dip galvanized steel wire.

172 4.5 Manufacturing appearance and finish

173 The dampers shall be free of defects and irregularities; they shall have all outside surfaces
174 smooth and all edges and corners well-rounded.

175 4.6 Marking

176 The fitting marking requirements of IEC 61284 shall be applied to all clamp assemblies
177 including those using breakaway bolts. On spiral dampers, the markings should be on the
178 plastic rod.

179 4.7 Installation instructions

180 The supplier shall provide a clear and complete description of the recommended installation
181 procedure including in-span positions.

182 5 Quality assurance

183 A quality assurance programme taking into account the requirements of this standard can be
184 used by agreement between the purchaser and the supplier to verify the quality of the
185 vibration dampers during the manufacturing process.

186 Detailed information on the use of quality assurance is given in a system as per ISO 9001 or
187 similar.

188 It is recommended that test equipment used to verify compliance to this standard is routinely
189 maintained and calibrated in accordance with a relevant quality standard.

190 6 Classification of tests

191 6.1 Type tests

192 6.1.1 General

193 Type tests are intended to establish design characteristics. They are normally made once and
194 repeated only when the design or the material of the damper components is changed. The
195 results of type tests are recorded as evidence of compliance with design requirements.

196 6.1.2 Application

197 Dampers shall be subjected to type tests as per Table 1.

198 Unless otherwise specified, each type test shall be performed on three test samples which are
199 identical in all essential respects with dampers to be supplied under contract to the purchaser.

200 All units shall pass the tests.

201 The dampers used for tests during which no damage occurs to the units or their components
202 may be used in subsequent tests.

203 6.2 Sample tests

204 6.2.1 General

205 Sample tests are required to verify that the dampers meet the performance specifications of
206 the type test samples. In addition, they are intended to verify the quality of material and
207 workmanship.

208 6.2.2 Application

209 Dampers shall be subjected to sample tests as per Table 1.

210 The samples to be tested shall be selected at random from the lot offered for acceptance. The
211 purchaser has the right to make the selection.

212 The dampers used for tests during which no damage occurs to the units or their components
213 may be used in subsequent tests.

214 6.2.3 Sampling, acceptance criteria

215 The sampling plan procedures according to ISO 2859-1 and ISO 2859-2 (inspection by
216 attributes) and ISO 3951 (inspection by variables) and the detailed procedures (inspection
217 level, AQL, single, double or multiple sampling, etc.) shall be agreed between the purchaser
218 and the supplier for each different attribute or variable.

219 NOTE – Sampling inspection by variables is an acceptance sampling procedure to be used in place of inspection
220 by attributes when it is appropriate to measure on some continuous scale the characteristic(s) under consideration.
221 In the case of failure load tests and similar expensive tests, better distinction between acceptable quality and
222 objective quality is available with acceptance sampling by variables than by attributes for the same sample size.

223 The purpose of the sampling process may also be important in the choice between a variables or attributes plan.
224 For example, a purchaser may choose to use an attributes acceptance sampling plan to assure that parts in a
225 shipment lot are within a required dimensional tolerance; the manufacturer may make measurements under a
226 variables sampling plan of the same dimensions because he is concerned with gradual trends or changes which
227 may affect his ability to provide shipment lots which meet the AQL.

228 6.3 Routine tests

229 6.3.1 General

230 Routine tests are intended to prove conformance of vibration dampers to specific
231 requirements and are made on every damper. The tests shall not damage the dampers.

232 6.3.2 Application and acceptance criteria

233 Whole lots of dampers may be subjected to routine tests. Any damper which does not conform
234 to the requirements shall be discarded.