



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 63248:2021**  
**01-julij-2021**

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**Vodniki za nadzemne vode - Prevečena ali oblečena kovinska žica za koncentrične laične vodnike**

Conductors for overhead lines - Coated or clad metallic wire for concentric lay stranded conductors

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**Ta slovenski standard je istoveten z: ~~oSIST prEN IEC 63248:2021~~ prEN IEC 63248:2021**  
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**ICS:**

29.240.20      Daljnovodi      Power transmission and distribution lines

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7/706/CDV

## COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 7 : OVERHEAD ELECTRICAL CONDUCTORS	
SECRETARIAT: China	SECRETARY: Mr Qiu Zheng
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 11	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 type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING
<p><b>Attention IEC-CENELEC parallel voting</b> <a href="https://standards.iteh.ai/catalog/standards/sist/5175fb31-8a9-4fa0-bd8f-36e3-66e6831a-pren-iec-63248-2021">https://standards.iteh.ai/catalog/standards/sist/5175fb31-8a9-4fa0-bd8f-36e3-66e6831a-pren-iec-63248-2021</a></p> <p>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.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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TITLE:

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PROPOSED STABILITY DATE: 2024

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## CONTENTS

1		
2		
3	FOREWORD .....	4
4	INTRODUCTION .....	6
5	1 Scope .....	7
6	2 Normative references .....	7
7	3 Terms and definitions .....	7
8	4 Material .....	9
9	4.1 Steel .....	9
10	4.2 Aluminium .....	9
11	4.3 Zinc .....	9
12	4.4 Zinc-aluminium alloy .....	9
13	4.5 Advanced zinc-aluminium alloy .....	9
14	5 Freedom from defects .....	9
15	6 Joints .....	9
16	7 Tests .....	10
17	7.1 General .....	10
18	7.2 Place of testing .....	10
19	7.3 Sampling rate .....	10
20	7.4 Test methods .....	10
21	7.4.1 Visual test .....	10
22	7.4.2 Diameter .....	10
23	7.4.3 Stress at 1% extension, tensile strength and elongation .....	11
24	7.4.4 Ductility tests .....	12
25	7.4.5 Coating or cladding tests .....	13
26	7.4.6 Coefficient of linear expansion .....	14
27	7.4.7 Resistivity .....	14
28	7.4.8 Coating adherence heat resistance test .....	14
29	8 Acceptance and rejection .....	15
30	9 Certificate of compliance .....	15
31	10 Packaging .....	15
32	10.1 Type of packaging .....	15
33	10.2 Length and tolerance on length .....	15
34	Annex A (normative) Tables of properties for recommended IEC wire materials .....	16
35	Annex B (informative) Properties of wire for calculation purposes .....	32
36	Annex C (informative) Method to measure the equivalent diameter by volume .....	34
37	Annex D (informative) Ratio of aluminium and steel or FeNi36 cross-sectional areas .....	36
38	Bibliography .....	38
39		
40	Figure C.1 – OPGW composed of a formed aluminium-clad steel wires .....	34
41	Figure C.2 – Density measurement apparatus for example .....	34
42		
43	Table A.1 – Wire designation .....	16
44	Table A.2 – Schedule of tests .....	17

45	Table A.3 – Zinc-aluminium alloy ingot composition (group 4 and group 5) .....	18
46	Table A.4 – Requirements for zinc and zinc-aluminium alloy coated steel wires (group	
47	1, group 4 and group 5) .....	19
48	Table A.5 – Requirements for aluminium-clad FeNi36 wires (group 2).....	23
49	Table A.6 – Requirements for aluminium-clad steel wires (group 3) .....	25
50	Table A.7 – Initial setting for determining stress at 1% extension .....	28
51	Table A.8 – Coating requirements for zinc and zinc-aluminium alloy coated wires.....	29
52	Table A.9 – Cladding requirements for Group 2 and Group 3 wire .....	30
53	Table A.10 – Coating heat resistance test for Group 4 and Group 5 wire .....	30
54	Table A.11 – Temperatures for linear expansion test for Group 2 wire .....	31
55	Table A.12 – Minimum number of dips for Zn and Zn Alloy coatings (group 1, group 4,	
56	group 5) .....	31
57	Table B.1 – Properties of wire for calculation purposes .....	32
58	Table D.1 – Standard aluminium and steel or FeNi36 ratio in the cross section for	
59	Group 2 and Group 3 wires .....	36
60	Table D.2 – Average aluminium thickness.....	37

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62

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CONDUCTORS FOR OVERHEAD LINES - COATED OR CLADDED  
METALLIC WIRE FOR CONCENTRIC LAY STRANDED CONDUCTORS**

## FOREWORD

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104 IEC 63248 has been prepared by IEC technical committee 7: OVERHEAD ELECTRICAL  
105 CONDUCTORS. It is an International Standard.

106 This International Standard cancels and replaces IEC 61232:1993 Edition 1.0, and replaces  
107 IEC 60888:1987 Edition 1.0 excluding wires with zinc coating class 2.

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

Draft	Report on voting
7/702/CD	7/703A/CC

109 Full information on the voting for its approval can be found in the report on voting indicated in  
110 the above table.  
111

112 The language used for the development of this International Standard is English.

113 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in  
114 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available  
115 at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are  
116 described in greater detail at <http://www.iec.ch/standardsdev/publications>.

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

- 120 • reconfirmed,
- 121 • withdrawn,
- 122 • replaced by a revised edition, or
- 123 • amended.

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125

## INTRODUCTION

126 The purpose of this standard is to group together similar wire materials that share the same  
127 general characteristics and therefore the same test procedures and requirements. Included in  
128 this standard are existing wire types from IEC 60888 and IEC 61232 as well as new wire  
129 materials that are already in use around the world in new types of conductors.

130 Zinc coating class 2 according to IEC 60888 has not been included in this standard, as the  
131 demand for this class of zinc coating is extremely rare. Extra corrosion protection can be  
132 provided by other means, including the use of Zinc-aluminium alloy coatings.

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# CONDUCTORS FOR OVERHEAD LINES - COATED OR CLADDED METALLIC WIRE FOR CONCENTRIC LAY STRANDED CONDUCTORS

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## 1 Scope

140 This document specifies the properties of wires in the diameter range of, but not limited to, 1,25  
141 mm to 5,50 mm. This standard is applicable to coated or clad metallic wires before stranding  
142 used either as concentric lay overhead stranded conductors, or in the manufacture of cores for  
143 concentric lay overhead stranded conductors, for power transmission purposes.

144 The various wire types and their designations are listed in Table A.1. For calculation purposes  
145 the values listed in Table B.1 shall be used.

## 2 Normative references

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

151 IEC 60050, *International electro-technical vocabulary*

152 IEC 60468, *Method of measurement of resistivity of metallic materials.*

153 ISO 752, *Zinc ingots*

154 ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room*  
155 *temperature*

156 ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1:*  
157 *Tension/compression testing machines — Verification and calibration of the force-*  
158 *measuring system*

159 ISO 7800, *Metallic materials — Wire — Simple torsion test*

160 ISO 7801, *Metallic materials — Wire — Reverse bend test*

161 ISO 7802, *Metallic materials — Wire — Wrapping test*

162 ISO 7989-2, *Steel wire and wire products — Non-ferrous metallic coatings on steel wire —*  
163 *Part 2: Zinc or zinc-alloy coating*

## 3 Terms and definitions

165 For the purposes of this document, the terms and definitions given in IEC 60050 and the  
166 following terms and definitions apply.

167 ISO and IEC maintain terminological databases for use in standardization at the following  
168 addresses:

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

### 3.1

#### clad metallic wire

173 the result of a process by which a metal is bonded under high pressure by co-rolling, co-  
174 extrusion, or others, onto a wire creating a metallic bond between them

- 175 **3.2**  
176 **class**  
177 a number attributed to aluminium-clad wires for the purpose of providing an approximate  
178 conductivity value
- 179 **3.3**  
180 **coated metallic wire**  
181 the result of a process by which a metal is deposited onto a wire by hot-dip or electrolytic  
182 process, creating a chemical or metallic bond between them
- 183 **3.4**  
184 **equivalent diameter**  
185 the diameter of a round wire, which would have the same cross sectional area as a given formed  
186 wire
- 187 **3.5**  
188 **formed wire**  
189 a drawn or rolled metal wire having a constant non-circular cross-section
- 190 **3.6**  
191 **group**  
192 a designation given to wire types that share a common coating or cladding, or property for a  
193 similar purpose
- 194 **3.7**  
195 **FeNi36**  
196 a grade of steel-nickel alloy designed to have a very low coefficient of thermal expansion
- 197 **3.8**  
198 **lot**  
199 a group of production units of one type and size of wire, which was manufactured by the same  
200 manufacturer during the same time period under similar conditions of production
- 201 Note: A lot can consist of part or all of a purchased quantity.
- 202 **3.9**  
203 **nominal**  
204 the value of a measurable property to which tolerance is applied. Nominal values are target  
205 values
- 206 **3.10**  
207 **production unit**  
208 a coil, reel, spool, or other package of wire that represents a single usable length
- 209 **3.11**  
210 **sample**  
211 specimen or specimens removed from a production unit or units which is considered to have  
212 properties representative of a lot
- 213 **3.12**  
214 **specimen**  
215 a length of wire removed for test purposes
- 216 **3.13**  
217 **zinc-aluminium alloy**  
218 a mixture of zinc and aluminium coating applied onto the wire for the purpose of protecting it  
219 against corrosion.

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220 Note: Some of these alloys with particular mixture are called Mischmetal.

### 221 **3.14**

#### 222 **advanced zinc-aluminium alloy**

223 a zinc-aluminium alloy reaching specific requirements as specified in ISO7989-2

224 Note: Examples of advanced zinc-aluminium alloys are Zn90% + 10% aluminium and Zn95% + 5 % aluminium with  
225 0,2 to 0,5 % magnesium.

## 226 **4 Material**

### 227 **4.1 Steel**

228 The base metal shall be steel produced by the open hearth, electric furnace, or basic oxygen  
229 process and shall be of such composition that the finished wire shall have the properties and  
230 characteristics given in this standard.

### 231 **4.2 Aluminium**

232 The aluminium used for coating or cladding shall have a minimum purity of 99,5% and of  
233 sufficient quality to meet thickness and electrical resistance requirements of this standard.

### 234 **4.3 Zinc**

235 The ingot of zinc used for coating shall meet the requirements of ZN-3 according ISO 752.

236 The zinc coating shall be applied by either the hot-dip or electroplating method. Unless agreed  
237 between the purchaser and the manufacturer, the method of coating shall be at the discretion  
238 of the manufacturer.

### 239 **4.4 Zinc-aluminium alloy**

240 The ingot of zinc-aluminium alloy used for coating shall be in accordance with Table A.3.

### 241 **4.5 Advanced zinc-aluminium alloy**

242 The ingot of advanced zinc-aluminium alloy used for coating shall be in accordance with Table  
243 A.3.

## 244 **5 Freedom from defects**

245 The wires shall be smooth and free from all imperfections such as cracks, roughness, grooves,  
246 inclusions and other defects which may compromise the performance of the final product.

## 247 **6 Joints**

248 No joints shall be made in the finished coated or clad wire.

249 Joints may be made at any stage of processing prior to final cold drawing by the electric butt-  
250 weld or flash-welding process.

251 Welding equipment and procedure shall be such that it can be demonstrated that the ultimate  
252 tensile strength of a finished wire specimen containing the welded section shall be  
253 not less than 96 % of the specified minimum stress at 1 % extension.

254 A welded section shall meet all other requirements, except the stress at 1 % extension,  
255 elongation, torsion, bend, and wrap tests.

256 No joints are allowed after heat treatment on wires, which will be used in single wire conductors.

## 257 **7 Tests**

### 258 **7.1 General**

259 Tests shall be made by the manufacturer on the wires to demonstrate their conformance to this  
260 standard. Tests shall be made in accordance with Table A.2.

261 Tests shall be performed between 10°C and 30°C.

### 262 **7.2 Place of testing**

263 Unless otherwise agreed between the purchaser and the manufacturer at time of ordering, all  
264 tests shall be carried out at the manufacturer's works.

### 265 **7.3 Sampling rate**

266 Specimen for tests specified in clause 7.4 shall be taken by the manufacturer from samples of  
267 at least 10% of each lot.

268 Alternatively, if a quality assessment procedure is in place and implemented, the sampling rate  
269 shall be subject to agreement between the manufacturer and purchaser.

### 270 **7.4 Test methods**

#### 271 **7.4.1 Visual test**

272 The surface of the wire shall be visually examined to ensure that it is smooth and free from all  
273 imperfections including but not limited to cracks, unevenness, holes and inclusion of impurities.

#### 274 **7.4.2 Diameter**

##### 275 **7.4.2.1 Unit for diameter**

276 The nominal diameter of a wire shall be expressed in millimetres to two decimal places.

##### 277 **7.4.2.2 Diameter from direct measurements**

278 The diameter of a round wire shall be the mean of two measurements at right angle taken at  
279 the same cross-section. The measurement apparatus shall have an accuracy of at least 0,001  
280 mm.

281 When tested in accordance with this sub clause the diameter shall not vary from its nominal  
282 value by more than the appropriate value indicated in Table A.4, Table A.5, or Table A.6.

##### 283 **7.4.2.3 Diameter from weight measurements**

284 The equivalent diameter of a formed wire shall be obtained from weight measurements made  
285 on a sample not less than 1,0 m in length, and its density as defined in Table B.1.

286 The equivalent diameter, D of the formed wire shall be calculated by the Formula (1).

$$287 \quad D = \sqrt{\frac{4A}{\pi\rho L}} \quad (1)$$

288 *Where:*

289 *D* is the equivalent diameter of the sample in mm

290 *A* is the weight of the sample with Length *L* in g

291 *L* is the length of the sample in m

292  $\rho$  is the density of the sample in g/cm<sup>3</sup>

293 When tested in accordance with this sub clause the equivalent diameter shall not vary from its  
294 nominal value by more than the tolerance value indicated in Table A.4, Table A.5, or Table A.6.

#### 295 **7.4.2.4 Diameter from volume measurement**

296 Alternatively the equivalent diameter of a formed wire shall be obtained from volume and weight  
297 measurements as described in the informative Annex C.

298 When tested in accordance with this sub clause the equivalent diameter shall not vary from its  
299 nominal value by more than the tolerance value indicated in Table A.4, Table A.5, or Table A.6.

### 300 **7.4.3 Stress at 1% extension, tensile strength and elongation**

#### 301 **7.4.3.1 Sample preparation**

302 The wire samples shall be free from bends or kinks other than the curvature resulting from the  
303 usual coiling operation. It shall be straightened before inserting in the grips of the tensile testing  
304 equipment with a roller type wire straightening arrangement or by any other means designed to  
305 exert the minimum effect upon the mechanical properties of the sample. Samples for tests shall  
306 not be less than 450 mm long and shall be fitted in the testing machine so as to leave a free  
307 length of minimum 300 mm between the grips.

#### 308 **7.4.3.2 Stress at 1% extension and tensile strength**

309 The test shall be performed in accordance with ISO 6892-1.  
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310 The force-measuring system of the testing machine shall be calibrated in accordance with ISO  
311 7500-1, class 1, or better.

312 The rate of separation of the jaws of the testing machine shall be between 25 mm/min and 100  
313 mm/min.

314 In order to obtain a straight test piece and ensure the alignment of the test piece and grip  
315 arrangement, a preliminary load corresponding with the initial stress in accordance with Table  
316 A.7 shall be applied.

317 This load shall be maintained while a 250 mm gauge is marked on the sample and a suitable  
318 extensometer applied on a 250 mm gauge length (not necessarily corresponding with the  
319 marked gauge length).

320 A correction of the extension, in accordance with Table A.7, should be carried out to take into  
321 account the effect of the preliminary load.

322 This load shall then be increased uniformly until the extensometer indicates an extension of 2,5  
323 mm in 250 mm (1% extension).

324 At this point the tensile testing equipment may be stopped if necessary, and the load read. The  
325 value of stress at 1% extension is calculated by dividing this load by the area of the wire based  
326 on wire diameter measurements as per clause 7.3.2. Following this operation, the extensometer  
327 may be removed. The specimen shall then be loaded to rupture and its tensile strength  
328 determined.