



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 62641:2021**  
**01-julij-2021**

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**Vodniki za nadzemne vodnike - Aluminijaste žice in žice iz aluminijeve zlitine za koncentrične proste vodnike**

Conductors for overhead lines - Aluminium and aluminium alloy wires for concentric lay stranded conductors

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**Ta slovenski standard je istoveten z: ~~oSIST prEN IEC 62641:2021~~ prEN IEC 62641:2021**  
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**ICS:**

29.240.20	Daljnovodi	Power transmission and distribution lines
77.150.10	Aluminijski izdelki	Aluminium products

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7/705/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
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TITLE:

**Conductors for overhead lines – Aluminium and aluminium alloy wires for concentric lay stranded conductors**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CONDUCTORS FOR OVERHEAD LINES - ALUMINIUM AND ALUMINIUM  
ALLOY WIRES FOR CONCENTRIC LAY STRANDED CONDUCTORS**

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IEC 62641 has been prepared by IEC technical committee 7: OVERHEAD ELECTRICAL CONDUCTORS. It is an International Standard.

This International Standard cancels and replaces IEC 60104:1987 Edition 2.0, IEC 60121:1960 Edition 1.0, IEC 60889:1987 Edition 1.0 and IEC 62004:2007 Edition 1.0.

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

Draft	Report on voting
7/696/CD	7/700A/CC

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

90 at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are  
91 described in greater detail at <http://www.iec.ch/standardsdev/publications>.

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

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- 96 • withdrawn,
- 97 • replaced by a revised edition, or
- 98 • amended.

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100

## INTRODUCTION

101 The purpose of this standard is threefold.

102 First, it is to group together similar wire materials that share the same general characteristics  
103 and therefore the same test procedures and requirements. These wires are existing aluminium  
104 and aluminium alloy wires from IEC 60104, IEC 60121, IEC 60889 and IEC 62004 as well as  
105 from EN 50183.

106 Secondly, this format allows an easier standard maintenance, as multiple wire materials are  
107 covered by a single standard instead of separate documents.

108 Thirdly, this standard indicates the most used wire materials worldwide, based on the  
109 cooperation agreement between IEC and CENELEC, an IEC questionnaire in 2017 (7/672/Q,  
110 Annex A) and a CENELEC questionnaire (7X/SEC0056/CC). The standardized materials form  
111 a good basis which may be extended by others used in regions and countries.

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# CONDUCTORS FOR OVERHEAD LINES - ALUMINIUM AND ALUMINIUM ALLOY WIRES FOR CONCENTRIC LAY STRANDED CONDUCTORS

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## 1 Scope

118 This document specifies the mechanical and electrical properties of round and formed wires for  
119 equivalent diameters up to the values as per Table 3 for aluminium and aluminium alloys and  
120 as per Table 4 for thermal resistant alloys. This document is applicable to aluminium and  
121 aluminium alloy wires for the manufacture of concentric lay overhead electrical stranded  
122 conductors with or without gap(s) for power transmission purposes.

123 The various materials and their designations are listed in Table 1. For calculation purposes, the  
124 values listed in Table 1 shall be used.

## 2 Normative references

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

- 130 IEC 60028, *International standard of resistance for copper*  
131 IEC 60050, *International electrotechnical vocabulary*  
132 IEC 60468, *Method of measurement of resistivity of metallic materials*  
133 IEC TR 61597, *Overhead electrical conductors - calculation methods for stranded bare*  
134 *conductors*  
135 ISO 6892-1, *Metallic materials - tensile testing - part 1: method of test at room temperature*  
136 ISO 7801, *Metallic materials - wires - reverse bend test*  
137 ISO 7802, *Metallic materials - wires - wrapping test*

## 3 Terms and definitions

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

141 ISO and IEC maintain terminological databases for use in standardization at the following  
142 addresses:

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

### 3.1

#### aluminium

147 all types of aluminium and aluminium alloys (Ax, ALx in Table 1, 3.13 and 4)

### 3.2

#### annealed aluminium

150 heat treated aluminium (A0 and AL0 in Table 1) for increasing its ductility, reducing its hardness  
151 and strength and having constant mechanical and electrical properties even at temperatures up  
152 to 250°C



153 **3.3**  
154 **equivalent diameter**  
155 the diameter of a round wire, which would have the same cross section area of a given formed  
156 wire

157 **3.4**  
158 **formed wire**  
159 a drawn or rolled metal wire having a constant non-circular cross-section

160 **3.5**  
161 **lot**  
162 a group of production units of one type and size of wire, which was manufactured by the same  
163 manufacturer during the same time period under similar conditions of production.

164 Note: A lot can consist of part or all of a purchased quantity.

165 **3.6**  
166 **nominal**  
167 the value of a measurable property to which tolerance is applied. Nominal values are target  
168 values

169 **3.7**  
170 **production unit**  
171 a coil, reel, spool, or other package of wire that represents a single usable length

172 **3.8**  
173 **residual strength ratio**  
174 the ratio of the measured tensile strength at room temperature of a wire previously submitted  
175 to heating, to its measured tensile strength at room temperature prior to heating (to be applied  
176 only to thermal resistant aluminium alloys)

177 **3.9**  
178 **round wire**  
179 a filament of drawn metal having a constant circular cross-section

180 **3.10**  
181 **sample**  
182 specimen or specimens removed from a production unit or units which is considered to have  
183 properties representative of a lot

184 **3.11**  
185 **specimen**  
186 a length of wire removed for test purposes

187 **3.12**  
188 **thermal resistance**  
189 the capacity of a thermal resistant aluminium alloy to have a residual strength ratio of not less  
190 than 0,90 after heating

191 **3.13**  
192 **thermal resistant aluminium alloy**  
193 all types of aluminium alloys (ATx in Table 1) designed to operate continuously higher than that  
194 of conventional aluminium alloy wires or hard-drawn aluminium wires with a maximum allowable  
195 continuous operation temperature indicated in Table 5

196 Note: As per CIGRE TB 643, conventional conductor systems [using aluminum alloy or hard-drawn aluminum wires]  
197 are traditionally rated at 75°C continuous operation.

## 198 4 Material

199 The aluminium content of annealed and hard-drawn aluminium wires (A0, A1, AL0, AL1 in  
200 Table 1 shall not be less than 99.5%, aluminium alloys (A2, A3, A4, AL2, AL3, AL4, AL5 in  
201 Table 1 shall be heat-treated aluminium-magnesium-silicon alloys and thermal-resistant  
202 aluminium alloys (ATx in Table 1) shall be aluminium-zirconium alloys. The wires shall be of  
203 the required composition to achieve the mechanical, electrical and thermal-resistant (if required)  
204 properties specified hereinafter.

205 If required by the purchaser, the manufacturer shall provide a copy of the analysis certificate of  
206 the raw material.

## 207 5 Joints

208 Joints may be made in wires prior to final drawing. A joint may also be made in the finished wire  
209 providing:

- 210 – The weight of the production unit with a joint is at least 500 kg;
- 211 – There shall be no more than one joint in such production units made before final drawing;
- 212 – By lot, the amount of production units with joints is less than or equal to 10% of the total  
213 amount of production units;
- 214 – when requested by the purchaser, the manufacturer shall provide evidence that the joints  
215 have a tensile strength of not less than 130 MPa for all wires except A0.

216 The production units containing a joint made in the finished wire shall be clearly identified.

## 217 6 Tests

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### 218 6.1 General

219 Tests shall be made by the manufacturer on the wires to demonstrate their conformance to this  
220 standard. All described tests are sample tests except the 400h thermal resistance test which is  
221 a type test. The following test descriptions refer to non-stranded wires. In the case of formed  
222 wires, use the equivalent diameter instead of diameter and secure the wire in the jaws as per  
223 Annex A.

### 224 6.2 Place of testing

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

### 227 6.3 Sampling rate

228 Specimens for tests specified in clause 6 shall be taken by the manufacturer from samples of  
229 at least 10% of each lot.

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

### 232 6.4 Test methods

#### 233 6.4.1 Appearance

234 The surface of the wire shall be visually examined to ensure that it is smooth and free from all  
235 imperfections including but not limited to cracks, unevenness, striation and inclusion  
236 (particularly copper particles) which may compromise the performance of the final product.