



SLOVENSKI STANDARD
oSIST prEN 50214:2021
01-september-2021

Ploščati zvijavi kabli

Flat flexible cables

Flache flexible Leitung

Câbles souples méplats

Ta slovenski standard je istoveten z: prEN 50214

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Will supersede EN 50214:2006 and all of its amendments and corrigenda (if any)

English Version

Flat flexible cables

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This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2021-10-01.

It has been drawn up by CLC/TC 20.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German).
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European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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61 **European foreword**

62 This document (prEN 50214:2021) has been prepared by CLC/TC 20 "Electric cables".

63 This document is currently submitted to the Enquiry.

64 The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months (to be confirmed or modified when voting)

65 This document will supersede EN 50214:2006 and all of its amendments and corrigenda (if any).

66 prEN 50214:2021 includes the following significant technical changes with respect to EN 50214:2006:

67 — halogen-free insulated and sheathed cables are included.

68 — The cable may consist of power cores, control cores or communication units or combination of
69 them.

70 — Clause 5 describes only Flat sheathed flexible cables for lifts, assembled in single layer.

71 — Clause 6 describes only Flat sheathed flexible cables for lifts, assembled in bundles and units

72 This document has been prepared under a mandate given to CENELEC by the European Commission
73 and the European Free Trade Association, and supports essential requirements of EU Directive(s).

74 For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this
75 document.

76 1 Scope

77 This document covers the construction, requirements and particular test methods for flat, flexible PVC
78 or halogen-free insulated and sheathed cables, of rated voltage U_0/U 300/500 V and above 1 mm²
79 U_0/U 450/750 V for use in passenger and goods lifts (elevators), and U_0/U 450/750 V for general
80 purposes and for special applications such as hoists and travelling cranes.

81 NOTE 1 This revision is in accordance with an agreement with CEN TC 10 to specify in the same standard
82 a) flexible cables for lifts as required by EN 81-20, and b) flexible cable for applications such as hoists and
83 travelling cranes, previously found in HD 359. In accordance with this agreement, only those cables in Clauses 5
84 and 6 are suitable for use with EN 81-20.

85 NOTE 2 The limits for the overall diameter of the cables have been calculated in accordance with EN 60719.

86 2 Normative references

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

91 EN 50334, *Marking by inscription for the identification of cores of electric cables*

92 EN 50363 (series), *Insulating, sheathing and covering materials for low voltage energy cables*

93 EN 50395:2005, *Electrical test methods for low voltage energy cables*

94 EN 50396:2005, *Non electrical test methods for low voltage energy cables*

95 EN 50525-1:2011, *Electric cables - Low voltage energy cables of rated voltages up to and including*
96 *450/750 V (U₀/U) - Part 1: General requirements*

97 EN 50565-1, *Electric cables - Guide to use for cables with a rated voltage not exceeding 450/750 V*
98 *(U₀/U) - Part 1: General guidance*

99 EN 50565-2, *Electric cables - Guide to use for cables with a rated voltage not exceeding 450/750 V*
100 *(U₀/U) - Part 2: Specific guidance related to EN 50525 cable types*

101 EN 60204-1:2018, *Safety of machinery - Electrical equipment of machines - Part 1: General*
102 *requirements (IEC 60204-1:2016, modified)*

103 EN 60228, *Conductors of insulated cables (IEC 60228)*

104 EN 60332-1-2, *Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for*
105 *vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame*
106 *(IEC 60332-1-2)*

107 EN 60332-3-24, *Tests on electric and optical fibre cables under fire conditions - Part 3-24: Test for*
108 *vertical flame spread of vertically-mounted bunched wires or cables - Category C (IEC 60332-3-24)*

109 EN IEC 60754-3:2019, *Test on gases evolved during combustion of materials from cables - Part 3:*
110 *Measurement of low level of halogen content by ion chromatography (IEC 60754-3:2018)*

111 EN 60811 (series), *Electric and optical fibre cables - Test methods for non-metallic materials*
112 *(IEC 60811 series)*

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- 113 EN 60811-506:2012, *Electric and optical fibre cables - Test methods for non-metallic materials - Part*
 114 *506: Mechanical tests - Impact test at low temperature for insulations and*
 115 *sheaths(IEC 60811-506:2012)*
- 116 EN 60811-509:2012, *Electric and optical fibre cables - Test methods for non-metallic materials - Part*
 117 *509: Mechanical tests - Test for resistance of insulations and sheaths to cracking (heat shock test)*
 118 *(IEC 60811-509:2012)*
- 119 EN 61034-2, *Measurement of smoke density of cables burning under defined conditions - Part 2: Test*
 120 *procedure and requirements (IEC 61034-2)*
- 121 HD 308, *Identification of cores in cables and flexible cords*
- 122 HD 60364-5-52:2011, *Low-voltage electrical installations. Part 5-52. Selection and erection of*
 123 *electrical equipment. Wiring systems (IEC 60364-5-52:2009, modified)*
- 124 IEC 60227-6:2001, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*
 125 *- Part 6: Lift cables and cables for flexible connections*
- 126 IEC 61156-6, *Multicore and symmetrical pair/quad cables for digital communications - Part 6:*
 127 *Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz - Work area wiring -*
 128 *Sectional specification*
- 129 ISO 11898-1, *Road vehicles — Controller area network (CAN) — Part 1: Data link layer and physical*
 130 *signalling*

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131 **3 Definitions**

- 132 For the purposes of this document, the following terms and definitions apply.
- 133 ISO and IEC maintain terminological databases for use in standardization at the following addresses:
- 134 — ISO Online browsing platform: available at <https://www.iso.org/obp>
- 135 — IEC Electropedia: available at <https://www.electropedia.org/>

136 **3.1 Definitions relating to insulating and sheathing materials**137 **3.1.1**138 **type of compound**

139 category in which a compound is placed according to its properties and determined by specific tests

140 Note 1 to entry: The type designation is not directly related to the composition of the compound.

141 **3.1.2**142 **polyvinyl chloride compound**143 **PVC**

144 combinations of materials, of which polyvinyl chloride is the characteristic constituent, suitably
 145 selected, proportioned and treated which meet the requirements given in the particular specification

146 **3.1.3**147 **halogen-free compound**148 **halogen-free**

149 halogen-free thermoplastic material with improved properties in reaction of fire

150 **3.2 Definitions relating to the tests**

151 **3.2.1**

152 **type tests**

153 **T**

154 tests required to be made before supplying a type of cable covered by this document on a general
155 commercial basis, in order to demonstrate satisfactory performance characteristics to meet the
156 intended application

157 Note 1 to entry: These tests are of such a nature that, after they have been made, they need not be repeated
158 unless changes are made in the cable materials, design or type of manufacturing process which might change the
159 performance characteristics.

160 **3.2.2**

161 **sample tests**

162 **S**

163 tests made on samples of completed cable, or components taken from a completed cable adequate to
164 verify that the finished product meets the design specifications

165 **3.2.3**

166 **routine tests**

167 **R**

168 tests made on all production cable lengths to demonstrate their integrity

169 **3.3**

170 **rated voltage**

171 <of a cable> reference voltage for which the cable is designed, and which serves to define the
172 electrical tests

173 Note 1 to entry: The rated voltage is expressed by the combination of two values U_0/U , expressed in volts:

174 — U_0 being the r.m.s. value between any insulated conductor and "earth" (metal covering of the cable or
175 the surrounding medium);

176 — U being the r.m.s. value between any two phase-conductors of a multicore cable or of a system of
177 single-core cables.

178 Note 2 to entry: In an alternating current system, the rated voltage of a cable shall be at least equal to the
179 nominal voltage of the system for which it is intended.

180 Note 3 to entry: This condition applies both to the value U_0 and to the value U .

181 Note 4 to entry: In a direct current system, the nominal voltage between conductors shall be not higher than 1,5
182 times the rated voltage (U) of the cable, and the nominal voltage between any conductor and earth shall not be
183 higher than 1,5 times the rated voltage (U_0) of the cable.

184 Note 5 to entry: The operating voltage of a system may permanently exceed the nominal voltage of such a
185 system by 10 %. A cable can be used at a 10 % higher operating voltage than its rated voltage if the latter is at
186 least equal to the nominal voltage of the system.

187 **3.4**

188 **freely suspended length**

189 unsupported allowed length of cable between two fixing points

190 **3.5**

191 **strain bearing member**

192 **sbm**

193 metallic or non-metallic high tensile strand or bunch included in the cable construction in order to hold
194 the cable weight

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195 **4 Requirements for the construction of cables**196 **4.1 General**

197 The cable may consist of power cores, control cores or communication units or combination of them.
198 Symmetric design is preferred.

199 **4.2 Power and control cores (EN 60204-1)**

200 Unless otherwise indicated in Clauses 5, 6 or 7 of this EN, the cables shall comply with the general
201 requirements specified in EN 50525-1:2011, Clause 5.

202 Core identification with or without a green-and-yellow core are harmonized. For cables with five cores
203 or fewer, the identification of the remaining cores shall be either by colours, in accordance with a)
204 below, or by numbers in accordance with b) below. For cables with six cores or more only identification
205 by numbers shall be used, except for any green-and-yellow core.

206 a) Identification by colours

207 The identification system of HD 308 shall be used.

208 b) Identification by numbers

209 Identification by numbers shall be in accordance with EN 50334.

210 The green-and-yellow core, if any, shall not be identified by a number.

211 **4.3 Communication Units (standards.iteh.ai)**

212 Communication units can be copper pairs, quads, coaxial cables or optical fibres or combination of
213 them. Cables can also consist exclusively of communication units.

214 Conductor shall have a minimum cross section of 0,14 mm². Compounds may differ from
215 EN 50363 series.

216 Copper units (pairs, quads): (difference based on frequency OR characteristics):

217 — Units without defined High Frequency performances (below 100 MHz) shall be tested in
218 accordance to the relevant product specification

219 — Units with defined High Frequency performances (equal and above 100 MHz) of 100 Ohm
220 impedance shall be tested with reference to IEC 61156-6 and the relevant product specification.

221 — Units with defined High Frequency -performances of 120 Ohm impedance shall be tested with
222 reference to ISO 11898-1 and the relevant product specification

223 Coaxial cable units:

224 — Shall be tested with the relevant product specification

225 Optical fibre units:

226 — Shall be tested with the relevant product specification

227 **5 Flat sheathed flexible cables for lifts, assembled in single layer**228 **5.1 Code designation**

229 PVC compound

Without strain bearing members: H05VVH6-F / H05V3V3H6-F

With strain bearing members: H05VVD3H6-F / H05V3V3D3H6-F

230 Halogen-free compound

Without strain bearing members: H05Z1Z1H6-F

With strain bearing members: H05Z1Z1D3H6-F

231 In the case of additional voltage levels above 300/500 V for power cores within one cable, the
232 harmonized designation shall not be applied.

233 5.2 Rated voltage

234 300/500 V

235 5.3 Construction

236 5.3.1 Conductor of power and control cores

237 Material: copper

238 Number of conductors: 4 up to 30

239 Nominal cross sections: 0,5 mm² up to 4 mm² (referenced standard EN 60204-1:2018, Table 5 -
240 > 0,75mm²)

241 The conductors shall be in accordance with the requirements of Class 5 given in EN 60228.

242 5.3.2 Insulation

243 The insulation shall be PVC compound of type TI 2 or TI 5 to EN 50363-3 or halogen-free
244 thermoplastic compound TI 6 or TI 7 to EN 50363-7 or cross-linked halogen-free compound EI 8 to
245 EN 50363-5 applied around each conductor. The mean value of the thickness of insulation shall be not
246 less than the specified value for each type and size of cable shown in Table 3.

247 However, the thickness at any place may be less than the specified value provided that the difference
248 does not exceed 0,1 mm + 10 % of the specified value.

249 Compliance shall be checked by the test given in EN 50396:2005, 4.1.

250 The insulation resistance at 70 °C shall be not less than the values given in Table 3.

251 5.3.3 Assembly of cores and communication units

252 Assembly of cores and units shall be designed to reinforce the cable under mechanical load. Various
253 groupings and numbers of cores with different cross section or communication units may be used.

254 The preferred number of cores for the composition of the cables is given in Table 1, according to the
255 nominal cross-sectional areas of conductors.

256 **Table 1 — Number and nominal cross-sectional area of conductors**

Nominal cross-sectional area mm ²	Preferred number of cores
0,75	4, 6, 9, 12, 16, 18, 20 and 24
1	4, 5, 6, 9, 12, 16, 18, 20 and 24

257 The cores shall be laid parallel and covered with the sheath.

258 The cores shall be grouped, lying closely side by side in groups of 2 to 5 cores. For cables having the
259 preferred number of cores, given in Table 1, it is recommended to group shown in Table 2.

260

Table 2 — Grouping of cores

Number of cores	6	9	12	16	18	20	24
Number of groups x number of cores in group	2 × 3	3 × 3	3 × 4	4 × 4	2 × 4 + 2 × 5	5 × 4	6 × 4
A rip-cord may be added inside each core group.							

261 The green-and-yellow core, if any, shall be placed inside one of the inner core groups, and preferably
 262 next to either core number 7 or 8. For cables with fewer than 8 cores, the green-and-yellow core shall
 263 be placed as centrally as possible.

264 It shall be possible to separate the cores without damage to the insulation.

265 5.3.4 Strain bearing member (sbm)

266 A strain bearing member (or members) either of textile material or of metal may be included in the
 267 cable, but shall be separated from the core groups.

268 It is permitted to apply a protective surface coating to the sbm.

269 The use of sbm is compulsory for freely suspended lengths exceeding 45 m. Thus, the value of the
 270 freely suspended length for each particular cable shall be declared. The sbm shall preferably be
 271 located on the edges of the cable in a symmetrical position and shall be easily separable from the
 272 cable, without damage to the cores, when separate terminations of the sbm are necessary.

273 5.3.5 Sheath

274 The sheath shall be PVC compound of type TM 2 or TM 4 to EN 50363-4-1 or for halogen-free sheath
 275 compound of type TM 7 to EN 50363-8 applied so as to substantially avoid the formation of cavities.
 276 The sheath shall not stick to the cores.

277 The sheath thickness shall be measured and evaluated generally in accordance with EN 50396:2005,
 278 4.3, with the following exceptions:

279 Measurements for e_1 , e_2 and e_3 shall be taken as follows (see Figures 1 and 2):

- e_1 the clearance separating groups of cores shall not at any place be less than the value specified in Table 3;
- e_2 the thickness on both flat sides shall be measured in each core group at the place where the sheath is thinnest; the opposite thickness at the same core shall also be measured. The mean value of measurements above shall not be less than that specified in Table 3. The minimum value of e_2 at any place shall not be less than the specified value by more than 0,2 mm + 20 % of the specified value;
- e_2 the thickness of the cable sheath, where measured over communication units, shall comply with the requirements for minimum thickness but shall not be taken into account when calculating the mean value
- e_3 the thickness at the edge and the separation between sbm, if any, and cores shall be measured at both edges of the cable, along the major axis of the cross section. The mean value of measurements above shall not be less than that specified in Table 3. The minimum value of e_3 at any place shall not be less than the specified value by more than 0,2 mm + 20 % of the specified value.