

**SLOVENSKI STANDARD**  
**oSIST prEN IEC 60794-3-11:2025**  
**01-maj-2025**

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**Optični kabli - 3-11. del: Kabli za zunanjo uporabo - Podrobna specifikacija za kanalske, neposredno vkopane in (z vezicami) povezane nadzemne optične telekomunikacijske kable**

Optical fibre cables - Part 3-11: Outdoor cables - Detailed specification for duct, directly buried, and lashed aerial optical fibre telecommunication cables

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Câbles à fibres optiques - Partie 3-11: Câbles extérieurs - Spécification particulière pour les câbles de télécommunication à fibres optiques, destinés à être installés dans des conduites, directement enterrés et en aériens ligaturés

**Ta slovenski standard je istoveten z: prEN IEC 60794-3-11:2025**

<https://standards.iteh.ai/catalog/standards/sist/ecdc20e2-221c-4667-8220-5b70f1ad7300/osist-pren-iec-60794-3-11-2025>

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**ICS:**

33.180.10 (Optična) vlakna in kabli Fibres and cables

**oSIST prEN IEC 60794-3-11:2025** en





## COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: <b>IEC 60794-3-11 ED3</b>	
DATE OF CIRCULATION: <b>2025-03-07</b>	CLOSING DATE FOR VOTING: <b>2025-05-30</b>
SUPERSEDES DOCUMENTS: <b>86A/2353/CD, 86A/2440/CC</b>	

IEC SC 86A : FIBRES AND CABLES	
SECRETARIAT: France	SECRETARY: Mr Laurent Gasca
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING <b>Attention IEC-CENELEC parallel voting</b> <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:

**Optical fibre cables - Part 3-11: Outdoor cables – Detailed specification for duct, directly buried, and lashed aerial optical fibre telecommunication cables**

PROPOSED STABILITY DATE: 2030

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95                   **INTERNATIONAL ELECTROTECHNICAL COMMISSION**  
9697                   **OPTICAL FIBRE CABLES –**  
9899                   **Part 3-11: Outdoor cables –**  
100                   **Detailed specification for duct, directly buried, and lashed aerial**  
101                   **optical fibre telecommunication cables**102                   **FOREWORD**  
103

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141 IEC 60794-3-11 has been prepared by subcommittee 86A: OPTICAL FIBRES AND CABLES, of  
142 IEC technical committee 86: FIBRE OPTICS. It is an International Standard.

143 This third edition cancels and replaces the second edition published in 2010. This edition  
144 constitutes a technical revision.

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

147 a) the title of the specification has been updated to include lashed applications;  
148 b) the fibres specification clause (6.2.2) has been enlarged to include fibre types B-657.B2/B3';  
149 c) this specification has been updated to include multimode optical fibres.

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

Draft	Report on voting
86A/XX/FDIS	86A/XX/RVD

151  
152 Full information on the voting for its approval can be found in the report on voting indicated in  
153 the above table.

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

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

159 The committee has decided that the contents of this document will remain unchanged until the  
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161 specific document. At this date, the document will be

162 • reconfirmed,  
163 • withdrawn,  
164 • replaced by a revised edition, or  
165 • amended.

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170 **OPTICAL FIBRE CABLES –**  
171172 **Part 3-11: Outdoor cables –**  
173 **Detailed specification for duct, directly buried, and lashed aerial**  
174 **optical fibre telecommunication cables**  
175177 **1 Scope**178 This part of IEC 60794 sets forth detailed requirements and characteristics specific to this type of  
179 optical fibre cables for duct, direct buried, and lashed installation.180 This specification includes functional mechanical, environmental and optical requirements,  
181 recommended features and test methods for assessing the product against the stated  
182 requirements.183 The specified test methods, where applicable, are those referenced in IEC 60794-1-1 and  
184 described in detail in IEC 60794-1-21, IEC 60794-1-22, IEC 60794-1-23..185 The requirements of this specification supplement those of the sectional specification  
186 IEC 60794-3 and the family specification IEC 60794-3-10187 **2 Normative references**188 The following documents are referred to in the text in such a way that some or all of their content  
189 constitutes requirements of this document. For dated references, only the edition cited applies.  
190 For undated references, the latest edition of the referenced document (including any  
191 amendments) applies.

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192 IEC 60708, *Low-frequency cables with polyolefin insulation and moisture barrier polyolefin sheath* 4-3-11-2025  
193194 IEC 60793-1-22, *Optical fibres – Part 1-22: Measurement methods and test procedures – Length measurement*196 IEC 60793-1-40, *Optical fibres – Part 1-40: Measurement methods and test procedures – Attenuation*198 IEC 60793-1-44, *Optical fibres – Part 1-44: Measurement methods and test procedures – Cut-off wavelength*200 IEC 60793-1-48, *Optical fibres – Part 1-48: Measurement methods and test procedures – Polarization mode dispersion*202 IEC 60793-2-10, *Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres*204 IEC 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*206 IEC 60794-1-1, *Optical fibre cables – Part 1-1: Generic specification – General*207 IEC 60794-1-2, *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures-General guidance*

209 IEC 60794-1-21, *Optical fibre cables - Part 1-21: Generic specification - Basic optical cable test*  
 210 *procedures - Mechanical tests methods*

211 IEC 60794-1-22, *Optical fibre cables - Part 1-21: Generic specification - Basic optical cable test*  
 212 *procedures – Environmental test methods*

213 IEC 60794-1-23, *Optical fibre cables - Part 1-21: Generic specification - Basic optical cable test*  
 214 *procedures – Cable element test methods*

215

216 IEC 60794-3 (all parts), *Optical fibre cables – Part 3: Sectional specification – Outdoor cables*

217 IEC 60794-3-10, *Optical fibre cables – Part 3-10: Outdoor cables – Family specification for duct,*  
 218 *directly buried and lashed aerial optical telecommunication cables*

219 IEC 60811-1-20, *Common test methods for insulating and sheathing materials of electric cables*  
 220 *and optical cables – Part 1-1: Methods for general application – Measurement of thickness and*  
 221 *overall dimensions – Tests for determining the mechanical properties*

222 IEC 60811-202, *Electric and optical fibre cables - Test methods for non-metallic materials - Part*  
 223 *202: General tests - Measurement of thickness of non-metallic sheath*

224 **3 Terms and definitions**

225 For the purposes of this document, the terms and definitions given in IEC TR 61931 apply.

226 ISO and IEC maintain terminology databases for use in standardization at the following  
 227 addresses:

- 228 • IEC Electropedia: available at <https://www.electropedia.org/>
- 229 • ISO Online browsing platform: available at <https://www.iso.org/obp>

230 **4 Symbols**

231 The following symbols are used in this document:

232  $\lambda_{cc}$  cable cut-off wavelength

233  $d$  outer cable diameter

234 SZ technique in which the lay reverses direction periodically.

235 **5 General requirements**

236 **5.1 Overview**

237 Optical fibres are widely used for telecommunication purposes and are cabled to satisfy the  
 238 functional requirements of the installation environment. Further, cables placed into ducts and  
 239 sub-ducts may be installed using solely, or a combination of, pushing, pulling, air-assisted, or  
 240 other non-listed installation techniques.

241 For duct installation, the environment and infrastructure can be varied and may also involve the  
 242 use of single and multiple sub-ducts.

243 Directly buried cables may be installed by a variety of methods such as ploughing and trenching  
 244 with different environments and infrastructure. This may require specific cable design solutions  
 245 based on multiple layers of armours and sheaths. It is recognised that certain designs of cable  
 246 for direct buried applications involving such solutions may also be suitable for duct installation.

247 For aerial installation on poles, lashed aerial in metropolitan networks it is important to minimise  
 248 in-service cable movement. Movement of the cable produced by thermal changes, cable weight,  
 249 ice loading, wind, etc. may have a detrimental effect on the aerial cable.

250 **5.2 General cable description**

251 **5.2.1 Characteristics of optical fibre**

252 Single-mode optical fibres are classified according to their operational wavelength and  
 253 dispersion characteristics. The fibres covered by this specification are categorised as type B  
 254 and are described in IEC 60793-2-50. Single-mode fibre types featured in this specification are  
 255 listed below:

- 256 • dispersion unshifted (B-652.B/D);
- 257 • bending loss insensitive (B-657.B2/B3/A1/A2);
- 258 • dispersion shifted (B-653.A/B);
- 259 • cut-off shifted (B-654.A/B/C/D/E), non-zero dispersion (B-655.C/D/E) ;
- 260 • wide-band non-zero dispersion-shifted (B-656).

261 Multimode optical fibres are classified according to their operational wavelength and modal  
 262 bandwidth. Multimode fibres as covered by this specification are Category A1as specified in  
 263 IEC 60793-2-10. multimode fibre types featured in this specification are listed below:

- 264 • A1-OM2
- 265 • A1-OM3
- 266 • A1-OM4
- 267 • A1-OM5

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268 **5.2.2 Characteristics of optical fibre cable elements**

269 Optical fibre cable elements such as buffer tubes, tensile strength elements, crush protection  
 270 elements, water blocking elements, sheath removal elements and cable sheath shall be suitably  
 271 designed to provide adequate means of fibre location, identification, modularity, protection  
 272 during cable manufacture, installation, and termination.

273 The structure of these elements, and the materials used in their manufacture, shall not have  
 274 any long-term detrimental effects on fibre performance during the service life of the cable, splice  
 275 enclosure and/or cabinet.

276 To satisfy these functional requirements, the different elements shall comply with the  
 277 requirements of IEC 60794-3 series as well as those outlined in Clause 7 of this standard.

278 **5.2.3 Characteristics of optical fibre cables**

279 Optical fibre cables, for the intent of this standard, are completed cable products as shipped  
 280 by the manufacturer typically on disposable reels. Such products do not require additional  
 281 assembly, or the use of additional materials or protection to meet the requirements contained  
 282 herein. Some assembly or added protection is usually required only where the cables are  
 283 terminated to other cables or equipment, and typically involve the use of an optical fibre closure  
 284 or other hardware to protect fibre splices or connectorization points and other cable elements  
 285 like loose tubes, fibres, ribbons, etc.

286

287 The required levels of protection for the fibre can be achieved by laying up or assembling the  
 288 cable elements in association with suitable strength and/or anti-buckling members. These can  
 289 be either metallic or non-metallic and positioned at the centre of the cable core or as peripheral

290 members in or underneath the outer cable sheath. The cable may also contain moisture barrier  
 291 tapes, metallic or non-metallic tapes, and water blocking or swellable materials.

292 **5.2.4 Environmental and product safety requirements**

293 IEC Guide 104 should be taken into account as far as possible. The materials of the cables in  
 294 contact with the environment shall not be hazardous to the environment and personnel.

295 It should be noted that the cables specified by this standard are rarely accessible once installed.  
 296 Therefore, the risk of exposure to hazardous materials, if any, is mostly a concern in the  
 297 handling of the cable during manufacturing and installation. Additionally, the type of outer  
 298 sheath specified herein is generally considered to be non-toxic, therefore the risk to the  
 299 environment or personnel is minimal once properly installed.

300 This standard does not address the use of all types of cable materials that may be utilized in  
 301 various cable designs to support meeting the requirements unique to a specific type of special  
 302 application (e.g., very high temperatures or resistance to specific chemical attack). In such  
 303 cases, it is incumbent on the customer and supplier to agree on the requirements applicable to  
 304 such materials and cable designs, and to determine any special handling precautions or  
 305 instructions needed as a result of their use.

306 **5.3 Optical fibre splice-ability**

307 All of the single-mode fibre types covered in this specification can readily achieve very low  
 308 splice loss levels using a range of commercially available splicing techniques.

309 Typical bi-directional splice losses at 1 550 nm should be below 0,1 dB, with an average of  
 310 0,05 dB for fusion splices between fibres of the same category performed by skilled operators  
 311 on active alignment splicers according to the current best practices. Additional fibre  
 312 compatibility guidelines are provided in IEC/TR 62000.

313 All of the multimode fibre types covered in this specification can readily achieve very low  
 314 splice loss levels using a range of commercially available splicing techniques.

315  
 316 Typical bi-directional splice losses at 850 nm should be below 0,1 dB, with an average of  
 317 0,05 dB for fusion splices between fibres of the same category performed by skilled operators

318 NOTE 1 Higher maximum splice losses can be tolerated without affecting the link transmission capability.

319 NOTE 2 Splices of fibres of the same category, but different manufacturers and/or different production processes,  
 320 do generally not exceed the above values.

321 NOTE 3 If fibres of different categories are spliced, typically the splice loss is slightly higher than with splices  
 322 between fibres of the same category.

323 **5.4 Testing**

324 **5.4.1 General**

325 For all test procedures, the atmospheric test conditions shall be as specified in IEC 60794-1-2.  
 326 All measured and computed values are to be rounded to the number of decimal places given in  
 327 the corresponding acceptance criteria for each requirement. The minimum number of tested  
 328 fibres in a cable should be as recommended in IEC 60794-1-1.

329 **5.4.2 No change in attenuation**

330 **5.4.2.1 General**

331 For some of the parameters specified in this standard, the objective is no change in attenuation.