



SLOVENSKI STANDARD
oSIST prEN IEC 60794-2-20:2023
01-junij-2023

Optični kabli - 2-20. del: Notranji kabli - Skupinska specifikacija za distribucijske kable z več optičnimi vlakni

Optical fibre cables - Part 2-20: Indoor cables - Family specification for multi-fibre optical cables

Lichtwellenleiterkabel - Teil 2-20: LWL-Innenkabel - Familienspezifikation für Mehrfaser-Lichtwellenleiterkabel

Câbles à fibres optiques - Partie 2-20: Câbles intérieurs - Spécification de famille pour les câbles optiques multifibres

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OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
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TITLE:

Optical fibre cables - Part 2-20: Indoor cables - Family specification for multi-fibre optical cables

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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OPTICAL FIBRE CABLES –

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Part 2-20: Indoor cables –

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Family specification for multi-fibre optical cables

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FOREWORD

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International Standard IEC 60794-2-20 has been prepared by sub-committee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

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This fourth edition cancels and replaces the third edition published in 2013 and constitutes a technical revision.

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

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- a) update of the normative references;
- b) review update of parameters and requirements for mechanical tests and environmental tests, maintaining alignment with additional relevant standards in the IEC 60794-2 series
- c) cabled fibre attenuation requirements have been added
- d) additional cable design examples have been added

148 This International Standard is to be used in conjunction with IEC 60794-1-1, IEC 60794-1-2,
149 IEC 60794-1-21, IEC 60794-1-22, IEC 60794-1-23 =IEC 60794-2.

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

FDIS	Report on voting
86A/xxxx/FDIS	86A/xxxx/RVD

151
152 Full information on the voting for the approval of this standard can be found in the report on
153 voting indicated in 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. The main document types developed by IEC are
158 described in greater detail at www.iec.ch/publications.

159 A list of all parts of IEC 60794 series, published under the general title *Optical fibre cables*, can
160 be found on the IEC website.

161 The committee has decided that the contents of this publication will remain unchanged until the
162 stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to
163 the specific publication. At this date, the publication will be

- 164 • reconfirmed,
- 165 • withdrawn,
- 166 • replaced by a revised edition, or [prEN IEC 60794-2-20:2023](#)
- 167 • amended. <https://standards.iteh.ai/catalog/standards/sist/5c0699c2-af23-42be-8c26-7fa1ceffb560/osist-pren-iec-60794-2-20-2023>

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OPTICAL FIBRE CABLES –

Part 2-20: Indoor cables – Family specification for multi-fibre optical cables

179 **1 Scope**

180 This part of IEC 60794 is a family specification covering multi-fibre optical cables for indoor
181 use. The requirements of the sectional specification IEC 60794-2 are applicable to cables
182 covered by this standard. Annex B contains a Blank Detail Specification and general guidance
183 in case the cables are intended to be used in installation governed by the MICE table of ISO/IEC
184 11801-1) .

185 **2 Normative references**

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

190 NOTE These reference complete the normative references already listed in the generic specifications (IEC 60794-1-
191 1 and IEC 60794-1-2).

192 IEC 60304, *Standard colours for insulation for low-frequency cables and wires*

193 IEC 60793-1-20, *Optical fibres – Part 1-20: Measurement methods and test procedures – Fibre*
194 *geometry* <https://standards.iteh.ai/catalog/standards/sist/5c0699c2-af23-42be-8c26-7fa1ceffb560/osist-pren-iec-60794-2-20-2023>

195 IEC 60793-1-21, *Optical fibres – Part 1-21: Measurement methods and test procedures –*
196 *Coating geometry*

197 IEC 60793-1-40, *Optical fibres – Part 1-40: Attenuation measurement methods*

198 IEC 60793-1-44, *Optical fibres - Part 1-44: Measurement methods and test procedures - Cut-*
199 *off wavelength*

200 IEC 60793-1-46, *Optical fibres - Part 1-46: Measurement methods and test procedures -*
201 *Monitoring of changes in optical transmittance* IEC 60793-2-10, *Optical fibres – Part 2-10:*
202 *Product specifications – Sectional specification for category A1 multimode fibres*

203 IEC 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for*
204 *class B single-mode fibres*

205 IEC 60794-1-1, *Optical fibre cables – Part 1-1: Generic specification – General*

206 IEC 60794-1-2, *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test*
207 *procedures*

208 IEC 60794-1-3, *Optical fibre cables - Part 1-3: Generic specification - Optical cable elements*

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

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

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

215 IEC 60794-1-31, *Optical fibre cables – Part 1-31: Generic specification - Optical cable elements*
216 *- Optical fibre ribbon*

217 IEC 60794-2, *Optical fibre cables – Part 2: Indoor cables – Sectional specification*

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

220 IEC 60811-203, *Electric and optical fibre cables – Test methods for non-metallic materials –*
221 *Part 203: General tests – Measurement of overall dimensions.*

222 ISO/IEC 11801-1, *Information technology – Generic cabling for customer premises*

223

224 **3 Terms and definitions**

225 No terms and definitions are listed in this document.

226 For the purposes of this document, the terms and definitions given in IEC 60794-1-1 apply.

227 ISO and IEC maintain terminological databases for use in standardization at the following
228 addresses:

229

230 • IEC Electropedia: available at <http://www.electropedia.org/>

231 • ISO Online browsing platform: available at <http://www.iso.org/obp>

232

233 **4 Construction**

234 **4.1 General**

235 In addition to the constructional requirements in IEC 60794-2, the following considerations
236 apply to multi-fibre indoor cables.

237 The cable shall be designed and manufactured for an expected operating lifetime of at least 15
238 years. In this context, the attenuation at the operational wavelength(s) of the optical fibres
239 contained in the installed cable shall not exceed values specified in Clause 4.5, Transmission
240 requirements. The materials in the cable shall not present a health or environmental hazard
241 within its intended use.

242 Optical elements may comprise any of the cable elements described in clauses 3.3 to 3.8 below
243 or in IEC 60794-1-3.

244 There shall be no fibre splice in a delivery length unless otherwise agreed by customer and
245 supplier.

246 It shall be possible to identify each individual fibre throughout the length of the cable.

247 4.2 Optical fibres

248 Multimode or single-mode optical fibres meeting the requirements of IEC 60793-2-10 sub-categories
249 A1-OM1 to A1-OM5 or IEC 60793-2-50 Categories B-652 and B-657 shall be used. The linear
250 coefficient of optical fibre attenuation and attenuation point discontinuity may be affected by
251 the cable manufacturing process. Maximum values for these optical characteristics shall be as
252 specified in Clause 5.4, Transmission requirements.

253 4.3 Buffer

254 If a buffer is required, it shall consist of one or more layers of inert material. The buffer shall be
255 easily removable. For tight buffers, the buffer and fibre primary coating shall be removable in
256 one operation over a minimum length of 15 mm, depending on customer requirements. For
257 semi-tight buffers, the buffer shall be easily removable over a minimum length of 300 mm. For
258 loose buffers, the buffer shall be easily removable over a length of not less than 1,0 m. Buffer
259 dimensions are shown in Table 1.

260 **Table 1 – Dimensions of buffered fibres**

Buffer type	Nominal diameter mm	Tolerances mm
Semi-tight or loose buffer	0,3 to 1,3	± 0,05
Tight buffer	0,3 to 1,0	± 0,05

263 4.4 Ruggedized fibre

264 Further protection can be provided to tight or semi-tight buffered fibres by surrounding them
265 with non-metallic strength members within a sheath of suitable material.

266 4.5 Slotted core

267 The slotted core is obtained by extruding a suitable material with a defined number of slots,
268 providing helical or SZ (reverse-oscillating lay) configuration along the core. One or more
269 primary coated fibres or optical elements such as ribbons or fibre bundles are located in each
270 slot.

271 4.6 Tube

272 One or more primary coated or buffered fibres or ribbons are packaged (loosely or not) in a
273 tube construction which may be filled. The tube may be reinforced with a composite wall. The
274 polymeric tube may be hard, to provide some crush protection to the fibre bundle or soft to
275 enable easy strippability of the tube without specialized tools.

276 4.7 Stranded tube

277 Multiple tubes, containing one or more primary coated or buffered fibres or ribbons, may be:

- 278 • stranded around a central member
- 279 • non-stranded
- 280 • a number of homogeneous optical tubes stranded using helical or SZ configurations

282 For the sake of preserving cable geometry, some tubes may be "filler" or "empty" elements
283 not containing optical fibres.

284 4.8 Ribbon structure

285 Ribbon structures shall conform to IEC 60794-1-31. Fibres shall be arranged to be parallel and
286 formed into ribbons so that the fibres remain parallel and do not cross over.

287 Partially bonded ribbon structures enable the optical fibre ribbon to be rolled up easily and
288 accommodated very tightly in cables. Unless otherwise specified, each ribbon shall be uniquely
289 identified with a printed legend or by uniquely colouring the reference fibre and/or by colouring
290 the matrix material of the ribbon.

291 **4.9 Strength and anti-buckling members**

292 The cable shall be designed with sufficient strength members to meet installation and service
293 conditions so that the fibres are not subjected to strain in excess of limits specified in clause
294 4.3.1, Tensile performance.

295 The strength and/or anti-buckling members may be either metallic or non-metallic and may be
296 located in the cable core and/or under the sheath and/or in the sheath.

297 **4.10 Ripcord**

298 If required, a ripcord may be provided beneath the sheath.

299 **4.11 Sheath**

300 The cable shall have an overall protective sheath. The cable diameter shall be specified in the
301 relevant blank detail specification (or product) specification.

302 **4.12 Sheath marking**

303 If required, the cable shall be marked as agreed between customer and supplier.

304 **4.13 Identification**

305 Optical fibres, buffers and sub-unit sheaths shall be easily and uniquely identifiable through the
306 use of a suitable colour code (i.e. IEC 60304) and/or an easily visible numbering scheme to be
307 agreed between customer and supplier.

308 **4.14 Examples of cable constructions**

309 Examples of some types of cable construction are shown in Annex A. Other configurations (e.g.
310 multi-layer constructions) are not precluded if they meet the mechanical, environmental and
311 transmission requirements given in this specification.

312 **5 Tests**

313 **5.1 General**

314 Compliance with relevant detail specification requirements shall be verified by carrying out tests
315 selected from the following subclauses. It is not intended that all tests be carried out; the
316 frequency of testing shall be agreed between customer and supplier.

317 Unless otherwise specified, all tests shall be carried out at standard atmospheric conditions
318 according to IEC 60794-1-2. These tests are not intended to define end-of-life performance.

319 The attenuation of cabled fibres shall be as specified in Clause 4.5, Transmission requirements

320 Measurements of attenuation shall be carried out according to IEC 60793-1-40. Change in attenuation
321 measurements shall be carried out according to IEC 60793-1-46

322 NOTE The optimized wavelength for multimode fibres sub-categories A1-OM3 and A1-OM4 is 850 nm and for A1-OM5 fibre, the
323 targeted operational wavelength(s) is between 850 nm and 950 nm.