



SLOVENSKI STANDARD
oSIST prEN IEC 60793-2-50:2023
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Optična vlakna - 2-50. del: Specifikacije izdelka - Področna specifikacija za enorodovna vlakna razreda B

Optical fibres - Part 2-50: Product specifications - Sectional specification for class B singlemode fibres

Lichtwellenleiter - Teil 2-50: Produktspezifikationen - Rahmenspezifikation für Einmodenfasern der Kategorie B

Fibres optiques - Partie 2-50: Spécifications de produits - Spécification intermédiaire pour les fibres unimodales de classe B

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TITLE:

Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres

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NOTE FROM TC/SC OFFICERS:

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OPTICAL FIBRES –

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**Part 2-50: Product specifications –
Sectional specification for class B single-mode fibres**

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FOREWORD

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128 all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international
129 co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and
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133 may participate in this preparatory work. International, governmental and non-governmental organizations liaising
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156 indispensable for the correct application of this publication.

157 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent
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159 International Standard IEC 60793-2-50 has been prepared by subcommittee 86A: Fibres and
160 cables, of IEC technical committee 86: Fibre optics.

161 The seventh edition cancels and replaces the sixth edition published in 2018. This edition
162 constitutes a technical revision. This edition includes the following significant technical changes
163 with respect to the previous edition:

164 a) Adding a **200 µm coating nominal outer diameter** option for B-654A, B, C fibres in Annex
165 C

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

FDIS	Report on voting
86A/1884/FDIS	86A/1898/RVD

167

168 Full information on the voting for the approval of this International Standard can be found in the
169 report on voting indicated in the above table.

170 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

171 A list of all parts in the IEC 60793 series, published under the general title *Optical fibres*, can
172 be found on the IEC website.

173 The committee has decided that the contents of this document will remain unchanged until the
174 stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to
175 the specific document. At this date, the document will be

- 176 • reconfirmed,
- 177 • withdrawn,
- 178 • replaced by a revised edition, or
- 179 • amended.

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OPTICAL FIBRES –

Part 2-50: Product specifications – Sectional specification for class B single-mode fibres

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190 1. Scope

191 This part of IEC 60793 is applicable to optical fibre categories B-652, B-653, B-654, B-655,
192 B-656 and B-657. A map illustrating the connection of IEC designations to ITU-T designations
193 is shown in Table 1. These fibres are used or can be incorporated in information transmission
194 equipment and optical fibre cables.

195 Three types of requirements apply to these fibres:

- 196 • general requirements, as defined in IEC 60793-2;
- 197 • specific requirements common to the class B single-mode fibres covered in this document
198 and which are given in Clause 5;
- 199 • particular requirements applicable to individual fibre categories or specific applications,
200 which are defined in Annexes A to F.

201 For some fibre categories (shown in the relevant family specifications), there are sub-categories
202 that are distinguished on the basis of difference in transmission attribute specifications. The
203 designations for these sub-categories are documented in the individual family specifications.

204 Table 1 shows a map from the IEC designations to the ITU-T recommendations. The table also
205 provides the normative annex in this document that contains the detailed specification as well
206 as the name used to describe this fibre type in IEC 60793-2-50:2015. The ITU-T
207 recommendations as well as the IEC categories/sub-categories within each recommendation
208 are given. In some cases, as for Recommendation G.652, a given IEC designation maps to
209 multiple categories in the ITU-T because the ITU-T categories are distinguished by cabled fibre
210 attribute (PMD_Q) performance which are not distinguished in the IEC fibre specifications.

211
212**Table 1 – Map of IEC designation to ITU-T Recommendations and IEC 60793-2-50:2015 designation**

Annex	Category	Sub Category	Description	IEC 60793-2-50:2015	ITU-T Rec
	B-652		Dispersion unshifted fibre		G.652
A		B-652.B		B1.1	G.652.B
A		B-652.D		B1.3	G.652.D
	B-653		Dispersion shifted fibre		G.653
B		B-653.A		B2_a	G.653.A
B		B-653.B		B2_b	G.653.B
	B-654		Cut-off shifted fibre		G.654
C		B-654.A		B1.2_a	G.654.A
C		B-654.B		B1.2_b	G.654.B
C		B-654.C		B1.2_c	G.654.C
C		B-654.D		N/A	G.654.D
C		B-654.E		N/A	G.654.E
C	B-655		Non-zero dispersion shifted fibre	B4	G.655
D		B-655.C		B4_c	G.655.C
D		B-655.D		B4_d	G.655.D
D		B-655.E		B4_e	G.655.E
E	B-656		Wideband non-zero dispersion shifted fibre	B5	G.656
F	B-657		Bending loss insensitive fibre	B6	G.657
F		B-657.A1		B6_a1	G.657.A1
F		B-657.A2		B6_a2	G.657.A2
F		B-657.B2		B6_b2	G.657.B2
F		B-657.B3		B6_b3	G.657.B3

213

2. Normative references

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

219 IEC 60793-1 (all parts), *Optical fibres*

220 IEC 60793-1-20, *Optical fibres – Part 1-20: Measurement methods and test procedures – Fibre*
 221 *geometry*

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

224 IEC 60793-1-22, *Optical fibres – Part 1-22: Measurement methods and test procedures –*
 225 *Length measurement*

226 IEC 60793-1-30, *Optical fibres – Part 1-30: Measurement methods and test procedures – Fibre*
 227 *proof test*

- 228 IEC 60793-1-31, *Optical fibres – Part 1-31: Measurement methods and test procedures –*
229 *Tensile strength*
- 230 IEC 60793-1-32, *Optical fibres – Part 1-32: Measurement methods and test procedures –*
231 *Coating strippability*
- 232 IEC 60793-1-33, *Optical fibres – Part 1-33: Measurement methods and test procedures – Stress*
233 *corrosion susceptibility*
- 234 IEC 60793-1-34, *Optical fibres – Part 1-34: Measurement methods and test procedures – Fibre*
235 *curl*
- 236 IEC 60793-1-40, *Optical fibres – Part 1-40: Measurement methods and test procedures –*
237 *Attenuation*
- 238 IEC 60793-1-42, *Optical fibres – Part 1-42: Measurement methods and test procedures –*
239 *Chromatic dispersion*
- 240 IEC 60793-1-44, *Optical fibres – Part 1-44: Measurement methods and test procedures – Cut-*
241 *off wavelength*
- 242 IEC 60793-1-45, *Optical fibres – Part 1-45: Measurement methods and test procedures – Mode*
243 *field diameter*
- 244 IEC 60793-1-46, *Optical fibres – Part 1-46: Measurement methods and test procedures –*
245 *Monitoring of changes in optical transmittance*
- 246 IEC 60793-1-47, *Optical fibres – Part 1-47: Measurement methods and test procedures –*
247 *Macrobending loss*
- 248 IEC 60793-1-48, *Optical fibres – Part 1-48: Measurement methods and test procedures –*
249 *Polarization mode dispersion*
- 250 IEC 60793-1-50, *Optical fibres – Part 1-50: Measurement methods and test procedures – Damp*
251 *heat (steady state) tests*
- 252 IEC 60793-1-51, *Optical fibres – Part 1-51: Measurement methods and test procedures – Dry*
253 *heat (steady state) tests*
- 254 IEC 60793-1-52, *Optical fibres – Part 1-52: Measurement methods and test procedures –*
255 *Change of temperature tests*
- 256 IEC 60793-1-53, *Optical fibres – Part 1-53: Measurement methods and test procedures – Water*
257 *immersion tests*
- 258 IEC 60793-2, *Optical fibres – Part 2: Product specifications – General*
- 259 IEC 60794-2, *Optical fibre cables – Part 2: Indoor cables – Sectional specification*
- 260 **3. Terms and definitions**
- 261 For the purposes of this document, the terms and definitions given in IEC 60793-2 and the
262 IEC 60793-1 series apply.

263 ISO and IEC maintain terminological databases for use in standardization at the following
264 addresses:

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

267 NOTE General definitions for fibres are provided in IEC 60793-2. The definitions of the specified attributes are
268 contained in the relevant test methods standard of the IEC 60793-1 series, while general definitions for testing are
269 provided in IEC 60793-1-1.

270 4. Abbreviated terms and symbols

271 For the purposes of this document, the following abbreviated terms and symbols apply:

272	F_{avg}	Average strip force
273	F_{peak}	Peak strip force
274	λ_0	Zero dispersion wavelength
275	λ_c	Fibre cut-off wavelength
276	λ_{cc}	Cable cut-off wavelength
277	MFD	Mode field diameter
278	n_d	Stress corrosion parameter – dynamic
279	PMD	Polarization mode dispersion
280	PMD_Q	PMD link design value

281 5. Specifications

282 5.1 General

283 The fibre shall consist of a glass core and glass cladding in accordance with the construction
284 of optical fibre class B – single-mode fibre – as given in IEC 60793-2.

285 The term “glass” usually refers to material consisting of non-metallic oxides. The composition
286 of some fibres may be all glass, or glass and glass/hard polymeric composites.

287 5.2 Dimensional requirements

288 Relevant dimensional attributes and measurement methods are given in Table 2.

289 Requirements common to all categories of class B single-mode fibres are given in Table 3.

290 Cladding diameter, cladding non-circularity, and core – cladding concentricity error shall be
291 specified in the family specifications

292

Table 2 – Dimensional attributes and measurement methods

Attribute	Measurement method
Cladding diameter	IEC 60793-1-20
Cladding non-circularity	IEC 60793-1-20
Core – cladding concentricity error	IEC 60793-1-20
Primary coating diameter	IEC 60793-1-21
Primary coating non-circularity	IEC 60793-1-21
Primary coating-cladding concentricity error	IEC 60793-1-21
Fibre length	IEC 60793-1-22

293

294

Table 3 – Dimensional requirements common to all category B fibres

Attribute	Unit	Limit
Primary coating diameter – uncoloured	µm	235 to 255 ^a
Primary coating diameter – coloured	µm	235 to 265 ^a
Primary coating-cladding concentricity error	µm	≤ 12,5
Fibre length	km	^b
^a The above limits on primary coating diameter are most commonly used in telecommunications cables. There are other applications, such as fibre for use within optical sub-systems, pigtails, or specialty applications such as for submarines cables or for compact FTTH cables, which use other primary coating diameters, several of which are listed below. 180 µm to 210 µm uncoloured; 180 µm to 220 µm coloured 400 µm ± 40 µm 500 µm ± 50 µm 700 µm ± 70 µm 900 µm ± 90 µm Alternative coating diameters may impact fibre connectivity such as ribbons, multi-fibre connectors, mechanical splices, and fusion splice protectors; they may also need adjustments to connectivity tools and/ or tighter coating tolerances.		
^b Length requirements vary and should be agreed between supplier and customer.		

295

296 5.3 Mechanical requirements

297 Relevant mechanical attributes and test methods are given in Table 4. The relationship between
298 some of these attributes and mechanical reliability are described in IEC TR 62048 and ITU-T
299 G.Sup.59.

300 Requirements common to all categories of class B single-mode fibres are given in Table 5.

301

Table 4 – Mechanical attributes and test methods

Attribute	Test method
Proof test	IEC 60793-1-30
Tensile strength	IEC 60793-1-31
Coating strippability	IEC 60793-1-32
Stress corrosion susceptibility	IEC 60793-1-33
Fibre curl	IEC 60793-1-34

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