

Optical fibres —

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

The European Standard EN 60793-2-50:2002 has the status of a
British Standard

ICS 33.180.10

National foreword

This British Standard is the official English language version of EN 60793-2-50:2002. It is identical with IEC 60793-2-50:2002. It supersedes individual subclauses in BS EN 188000:1994, and BS EN 188100:1995, BS EN 188101:1995, BS EN 188102:1996, BS EN 188200:1996, BS EN 188201:1996 and BS EN 188202:1996 which will be withdrawn on 2005-03-01.

The UK participation in its preparation was entrusted by Technical Committee GEL/86, Fibre optics, to Subcommittee GEL/86/1, Optical fibres and cables, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

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Optical fibres
Part 2-50: Product specifications –
Sectional specification for class B single-mode fibres
(IEC 60793-2-50:2002)

Fibres optiques
Partie 2-50: Spécifications de produits -
Spécification intermédiaire
pour les fibres unimodales
de classe B
(CEI 60793-2-50:2002)

Lichtwellenleiter
Teil 2-50: Produktspezifikationen -
Rahmenspezifikation für Einmodenfasern
der Kategorie B
(IEC 60793-2-50:2002)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Foreword

The text of document 86A/738/FDIS, future edition 1 of IEC 60793-2-50, prepared by SC 86A, Fibres and cables, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60793-2-50 on 2002-03-05.

This European Standard supersedes EN 188100:1995, EN 188101:1995 and EN 188102:1995.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2002-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-03-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A, B, C, D, E and ZA are normative and annex F is informative.

Annex ZA has been added by CENELEC.

Compared to IEC 60793-1:1989 and IEC 60793-2:1992, IEC/SC 86A has adopted a revised structure of the new IEC 60793 series: The individual measurement methods and test procedures for optical fibres are published as "Part 1-XX"; the product standards are published as "Part 2-XX".

The general relationship between the new series of EN 60793 and the superseded European Standards of the EN 188000 series is as follows:

EN	Title	supersedes
EN 60793-1-XX	Optical fibres -- Part 1-XX: Measurement methods and test procedures	Individual subclauses of EN 188000:1992
EN 60793-2-XX	Optical fibres -- Part 2-XX: Product specifications	EN 188100:1995 EN 188101:1995 EN 188102:1995 EN 188200:1995 EN 188201:1995 EN 188202:1995

Endorsement notice

The text of the International Standard IEC 60793-2-50:2002 was approved by CENELEC as a European Standard without any modification.

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OPTICAL FIBRES –

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

1 Scope

This part of IEC 60793-2 is applicable to optical fibre types B1.1, B1.2, B1.3, and categories B2, and B4. These fibres are used or can be incorporated in information transmission equipment and optical fibre cables.

Three types of requirements apply to these fibres:

- general requirements, as defined in IEC 60793-2;
- specific requirements common to the class B single-mode fibres covered in this standard and which are given in clause 3;
- particular requirements applicable to individual fibre types or specific applications, which are defined in the normative family specification annexes.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60793-1-20:2001, *Optical fibres – Part 1-20: Measurement methods and test procedures – Fibre geometry*

IEC 60793-1-21:2001, *Optical fibres – Part 1-21: Measurement methods and test procedures – Coating geometry*

IEC 60793-1-22:2001, *Optical fibres – Part 1-22: Measurement methods and test procedures – Length measurement*

IEC 60793-1-30:2001, *Optical fibres – Part 1-30: Measurement methods and test procedures – Fibre proof test*

IEC 60793-1-31:2001, *Optical fibres – Part 1-31: Measurement methods and test procedures – Tensile strength*

IEC 60793-1-32:2001, *Optical fibres – Part 1-32: Measurement methods and test procedures – Coating strippability*

IEC 60793-1-33:2001, *Optical fibres – Part 1-33: Measurement methods and test procedures – Stress corrosion susceptibility*

IEC 60793-1-34:2001, *Optical fibres – Part 1-34: Measurement methods and test procedures – Fibre curl*

IEC 60793-1-40:2001, *Optical fibres – Part 1-40: Measurement methods and test procedures – Attenuation*

IEC 60793-1-42:2001, *Optical fibres – Part 1-42: Measurement methods and test procedures – Chromatic dispersion*

IEC 60793-1-44:2001, *Optical fibres – Part 1-44: Measurement methods and test procedures – Cut-off wavelength*

IEC 60793-1-45:2001, *Optical fibres – Part 1-45: Measurement methods and test procedures – Mode field diameter*

IEC 60793-1-46:2001, *Optical fibres – Part 1-46: Measurement methods and test procedures – Monitoring of changes in optical transmittance*

IEC 60793-1-47:2001, *Optical fibres – Part 1-47: Measurement methods and test procedures – Macrobending loss*

IEC 60793-1-50:2001, *Optical fibres – Part 1-50: Measurement methods and test procedures – Damp heat (steady state)*

IEC 60793-1-51:2001, *Optical fibres – Part 1-51: Measurement methods and test procedures – Dry heat*

IEC 60793-1-52:2001, *Optical fibres – Part 1-52: Measurement methods and test procedures – Change of temperature*

IEC 60793-1-53:2001, *Optical fibres – Part 1-53: Measurement methods and test procedures – Water immersion*

IEC 60793-2, *Optical fibres – Part 2: Product specifications* ¹

IEC 61941, *Optical fibres – Polarization mode dispersion measurement techniques for single-mode optical fibres*

IEC 62048:2001, *The power-law theory of optical fibre reliability*

¹ The future fifth edition of IEC 60793-2, currently under consideration, will bear the following title: *Fibre optics – Part 2: Product specifications – General*

3 Specifications

The fibre shall consist of a glass core and glass cladding in accordance with 4.2 of IEC 60793-2.

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

3.1 Dimensional requirements

Relevant dimensional attributes and measurement methods are given in table 1.

Requirements common to all fibres in class B are in table 2.

Table 1 – Relevant dimensional attributes and measurement methods

Attributes	Measurement methods
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
Coating-cladding concentricity error	IEC 60793-1-21
Fibre length	IEC 60793-1-22

Table 2 – Requirements common to class B fibres

Attributes	Unit	Limits
Cladding diameter	µm	125 ± 1
Cladding non-circularity	%	≤2,0
Core concentricity error	µm	≤0,8
Primary coating diameter – uncoloured	µm	245 ± 10
Primary coating diameter – coloured	µm	250 ± 15
Coating-cladding concentricity error	µm	≤12,5
Fibre length	km	a
^a Length requirements vary and should be agreed between supplier and customer. 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 speciality applications such as for submarines, which use other primary coating diameters, several of which are listed below. Alternative nominal primary coating diameters and tolerance (µm): 400 ± 40 700 ± 100 900 ± 100		

3.2 Mechanical requirements

Relevant mechanical attributes and test methods are given in table 3.

Requirements common to all fibres in class B are in table 4.

Table 3 – Relevant mechanical attributes and test methods

Attributes	Test methods
Proof test	IEC 60793-1-30
Tensile strength	IEC 60793-1-31
Primary coating strippability	IEC 60793-1-32
Stress corrosion susceptibility	IEC 60793-1-33
Fibre curl	IEC 60793-1-34

Table 4 – Requirements common to class B fibres

Attributes	Unit	Limits
Proof stress level	GPa	$\geq 0,69^a$
Strip force (average) ^b	N	$1 \leq F_{ave.strip} \leq 5$
Strip force (peak) ^b	N	$1,0 \leq F_{peak.strip} \leq 8,9$
Fibre curl radius	m	$\geq 2^c$
^a The proof test value of 0,69 GPa equals about 1 % strain or about 8,8 N force. For the relation between these different units, see 4.4 of IEC 62048. ^b Either average strip force or peak strip force, which are defined in the test procedure, may be specified with agreement between supplier and customer. ^c Depending on splicing methods, a minimum of 4 m may be specified for fibre intended to be used in some cable constructions – such as ribbon cable.		

3.3 Transmission requirements

Relevant transmission attributes and measurement methods are given in table 5.

Requirements common to all fibres in class B are indicated in table 6.

Requirements that shall be specified in the family specifications are listed in table 7.