SLOVENSKI STANDARD
SIST EN 60793-2-50:2016

01-maj-2016

Nadomešča:
SIST EN 60793-2-50:2013
SIST EN 60793-2-50:2013/AC:2015

Optična vlakna - 2-50. del: Specifikacije izdelka - Področna specifikacija za enorodna vlakna razreda B (IEC 60793-2-50:2015)

Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres (IEC 60793-2-50:2015)

Ta slovenski standard je istoveten z: **EN 60793-2-50:2016**

ICS:

33.180.10 (Optična) vlakna in kabli Fibres and cables

SIST EN 60793-2-50:2016 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60793-2-50

February 2016

ICS 33.180.10

Supersedes EN 60793-2-50:2013

English Version

Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres (IEC 60793-2-50:2015)

Fibres optiques - Partie 2-50: Spécifications de produits - Spécification intermédiaire pour les fibres unimodales de classe B (IEC 60793-2-50:2015)

Lichtwellenleiter - Teil 2-50: Produktspezifikationen - Rahmenspezifikation für Einmodenfasern der Kategorie B (IEC 60793-2-50:2015)

This European Standard was approved by CENELEC on 2015-12-24. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 60793-2-50:2016 E

European foreword

The text of document 86A/1571/CDV, future edition 5 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 approved by CENELEC as EN 60793-2-50:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-09-24
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-12-24

This document supersedes EN 60793-2-50:2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60793-2-50:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 60794-2	NOTE	Harmonized as EN 60794-2.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60793-1	series	Optical fibres - Part 1: Measurement methods and test procedures	EN 60793-1	series
IEC 60793-1-1	-	Optical fibres - Part 1-1: Measurement methods and test procedures - General and guidance	EN 60793-1-1	-
IEC 60793-1-20	-	Optical fibres - Part 1-20: Measurement methods and test procedures - Fibre geometry	EN 60793-1-20	-
IEC 60793-1-21	-	Optical fibres - Part 1-21: Measurement methods and test procedures - Coating geometry	EN 60793-1-21	-
IEC 60793-1-22	-	Optical fibres - Part 1-22: Measurement methods and test procedures - Length measurement	EN 60793-1-22	-
IEC 60793-1-30	-	Optical fibres - Part 1-30: Measurement methods and test procedures - Fibre proof test	EN 60793-1-30	-
IEC 60793-1-31	-	Optical fibres - Part 1-31: Measurement methods and test procedures - Tensile strength	EN 60793-1-31	-
IEC 60793-1-32	-	Optical fibres - Part 1-32: Measurement methods and test procedures - Coating strippability	EN 60793-1-32	-
IEC 60793-1-33	-	Optical fibres - Part 1-33: Measurement methods and test procedures - Stress corrosion susceptibility	EN 60793-1-33	-
IEC 60793-1-34	-	Optical fibres - Part 1-34: Measurement methods and test procedures - Fibre curl	EN 60793-1-34	-

Publication	Year	Title	EN/HD	Year
IEC 60793-1-40 (mod)	2001	Optical fibres - Part 1-40: Measurement methods and test procedures - Attenuation	EN 60793-1-40	2003
IEC 60793-1-42	-	Optical fibres - Part 1-42: Measurement methods and test procedures - Chromatic dispersion	EN 60793-1-42	-
IEC 60793-1-44	-	Optical fibres - Part 1-44: Measurement methods and test procedures - Cut-off wavelength	EN 60793-1-44	-
IEC 60793-1-45	-	Optical fibres - Part 1-45: Measurement methods and test procedures - Mode field diameter	EN 60793-1-45	-
IEC 60793-1-46	-	Optical fibres - Part 1-46: Measurement methods and test procedures - Monitoring of changes in optical transmittance	EN 60793-1-46	-
IEC 60793-1-47	-	Optical fibres - Part 1-47: Measurement methods and test procedures - Macrobending loss	EN 60793-1-47	-
IEC 60793-1-48	-	Optical fibres - Part 1-48: Measurement methods and test procedures - Polarization mode dispersion	EN 60793-1-48	-
IEC 60793-1-50	-	Optical fibres - Part 1-50: Measurement methods and test procedures - Damp heat (steady state) tests	EN 60793-1-50	-
IEC 60793-1-51	-	Optical fibres - Part 1-51: Measurement methods and test procedures - Dry heat (steady state) tests	EN 60793-1-51	-
IEC 60793-1-52	-	Optical fibres - Part 1-52: Measurement methods and test procedures - Change of temperature tests	EN 60793-1-52	-
IEC 60793-1-53	-	Optical fibres - Part 1-53: Measurement methods and test procedures - Water immersion tests	EN 60793-1-53	-
IEC 60793-2	-	Optical fibres - Part 2: Product specifications - General	EN 60793-2	-
IEC 60794-3	-	Optical fibre cables - Part 3: Outdoor cables - Sectional specification	EN 60794-3	-
IEC/TR 62316	-	Guidance for the interpretation of OTDR backscattering traces	-	-

IEC 60793-2-50

Edition 5.0 2015-11

INTERNATIONAL STANDARD

colour inside

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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 33.180.10

ISBN 978-2-8322-3023-7

CONTENTS

FOREWORD 5
1 Scope 7
2 Normative references 7
3 Terms and definitions 8
4 Abbreviations and symbols 9
5 Specifications 9
5.1 General 9
5.2 Dimensional requirements 9
5.3 Mechanical requirements 10
5.4 Transmission requirements 11
5.5 Environmental requirements 12
5.5.1 General 12
5.5.2 Optical environmental requirements – Attenuation 13
5.5.3 Mechanical environmental requirements 13
Annex A (normative) Family specification for category B1.1 single-mode fibres 15
A.1 General 15
A.2 Dimensional requirements 15
A.3 Mechanical requirements 15
A.4 Transmission requirements 16
A.5 Environmental requirements 16
Annex B (normative) Family specification for category B1.2 single-mode fibres 17
B.1 General 17
B.2 Dimensional requirements 17
B.3 Mechanical requirements 17
B.4 Transmission requirements 18
B.5 Environmental requirements 18
Annex C (normative) Family specification for category B1.3 single-mode fibres 19
C.1 General 19
C.2 Dimensional requirements 19
C.3 Mechanical requirements 19
C.4 Transmission requirements 20
C.5 Hydrogen ageing for category B1.3 20
C.6 Environmental requirements 21
Annex D (normative) Family specification for category B2 single-mode fibres 22
D.1 General 22
D.2 Dimensional requirements 22
D.3 Mechanical requirements 22
D.4 Transmission requirements 23
D.4.1 General 23
D.4.2 Chromatic dispersion coefficient requirement for sub-category B2_a fibres 23
D.4.3 Chromatic dispersion coefficient requirement for sub-category B2_b fibres 24
D.5 Environmental requirements 24
Annex E (normative) Family specification for category B4 single-mode fibres 25
E.1 General 25

E.2 Dimensional requirements ... 25
E.3 Mechanical requirements ... 25
E.4 Transmission requirements ... 26
E.4.1 General ... 26
E.4.2 Chromatic dispersion coefficient limits for sub-category B4_c fibres ... 26
E.4.3 Chromatic dispersion coefficient limits for sub-category B4_d fibres ... 27
E.4.4 Chromatic dispersion coefficient limits for sub-category B4_e fibres ... 27
E.5 Environmental requirements ... 27
Annex F (normative) Family specification for category B5 single-mode fibres ... 28
F.1 General ... 28
F.2 Dimensional requirements ... 28
F.3 Mechanical requirements ... 28
F.4 Transmission requirements ... 29
F.4.1 General ... 29
F.4.2 Chromatic dispersion coefficient for category B5 fibres ... 29
F.5 Environmental requirements ... 30
Annex G (normative) Family specification for category B6 single-mode fibres ... 31
G.1 General ... 31
G.2 Dimensional requirements ... 31
G.3 Mechanical requirements ... 32
G.4 Transmission requirements ... 32
G.5 Environmental requirements ... 33
Annex H (informative) System design information for category B4 single-mode fibres ... 34
H.1 General ... 34
H.2 One standard deviation limits for sub-category B4_d fibres ... 34
H.3 One standard deviation limits for sub-category B4_e fibres ... 35
Annex I (informative) Map from IEC nomenclature to ITU-T recommendations ... 36
Bibliography ... 37

Figure H.1 – Sub-category B4_d chromatic dispersion coefficient limits ... 35
Figure H.2 – Sub-category B4_e chromatic dispersion coefficient limits ... 35

Table 1 – Dimensional attributes and measurement methods ... 9
Table 2 – Dimensional requirements common to all category B fibres ... 10
Table 3 – Mechanical attributes and test methods ... 10
Table 4 – Mechanical requirements common to all class B fibres ... 11
Table 5 – Transmission attributes and measurement methods ... 11
Table 6 – Transmission, requirements common to all class B fibres ... 12
Table 7 – Additional transmission attributes required in the family specifications ... 12
Table 8 – Environmental exposure tests ... 12
Table 9 – Attributes measured in environmental exposure tests ... 12
Table 10 – Change in attenuation for environmental tests ... 13
Table 11 – Coating strip force for environmental tests ... 13
Table 12 – Tensile strength for environmental tests ... 13
Table 13 – Stress corrosion susceptibility for environmental tests ... 14
Table A.1 – Dimensional requirements specific to category B1.1 fibres ... 15

Table A.2 – Mechanical requirements specific to category B1.1 fibres 15
Table A.3 – Transmission requirements specific to category B1.1 fibres 16
Table B.1 – Dimensional requirements specific to category B1.2 fibres 17
Table B.2 – Mechanical requirements specific to category B1.2 fibres 18
Table B.3 – Transmission requirements specific to category B1.2 fibres 18
Table C.1 – Dimensional requirements specific to category B1.3 fibres 19
Table C.2 – Mechanical requirements specific to category B1.3 fibres 19
Table C.3 – Transmission requirements specific to category B1.3 fibres 20
Table D.1 – Dimensional requirements specific to category B2 fibres 22
Table D.2 – Mechanical requirements specific to category B2 fibres 23
Table D.3 – Transmission requirements specific to category B2 fibres 23
Table E.1 – Dimensional requirements specific to category B4 fibres 25
Table E.2 – Mechanical requirements specific to category B4 fibres 26
Table E.3 – Transmission requirements specific to category B4 fibres 26
Table F.1 – Dimensional requirements specific to category B5 fibres 28
Table F.2 – Mechanical requirements specific to category B5 fibres 29
Table F.3 – Transmission requirements specific to category B5 fibres 29
Table G.1 – Dimensional requirements specific to category B6 fibres 32
Table G.2 – Mechanical requirements specific to category B6 fibres 32
Table G.3 – Transmission requirements specific to category B6 fibres 33
Table H.1 – Examples for λ_{min} = 1 530 nm and λ_{max} = 1 565 nm 34
Table I.1 – Map of IEC to ITU 36

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

OPTICAL FIBRES –

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

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60793-2-50 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

This fifth edition cancels and replaces the fourth edition, published in 2012. This edition constitutes a technical revision.

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

a) aligns the requirements with the ITU-T Recommendations G.654 (2012-10) and G.657 (2012-10);
b) adds a new sub-category B1.2_d;
c) modifies B6 sub-categories in terms of attenuation and chromatic dispersion coefficient.

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

CDV	Report on voting
86A/1571/CDV	86A/1614/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

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

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

OPTICAL FIBRES –

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

1 Scope

This part of IEC 60793 is applicable to optical fibre categories B1.1, B1.2, B1.3, B2, B4, B5 and B6. A map illustrating the connection of IEC designations to ITU-T designations is shown in Annex I. 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 5;

– particular requirements applicable to individual fibre categories or specific applications, which are defined in Annexes A to G.

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 (all parts), *Optical fibres – Measurement methods and test procedures*

IEC 60793-1-1, *Optical fibres – Measurement methods and test procedures – Part 1-1: General and guidance*

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

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

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

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

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