



IEC 60793-2-60

Edition 1.0 2008-02

INTERNATIONAL STANDARD

**Optical fibres –
Part 2-60: Product specifications – Sectional specification for category C single-
mode intraconnection fibres**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

T

ICS 33.180.10

ISBN 2-8318-9629-0

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	7
3 Terms, definitions, symbols and abbreviations.....	8
3.1 Terms and definitions	8
3.2 Symbols and abbreviations.....	8
4 Specifications	8
4.1 Dimensional requirements	8
4.2 Mechanical requirements.....	9
4.3 Transmission requirements	9
4.4 Environmental requirements	10
4.4.1 Transmission requirements.....	11
4.4.2 Mechanical requirements.....	11
Annex A (normative) Family specification for C1 single-mode fibre	13
Annex B (normative) Family specification for C2 single-mode fibre	16
Annex C (normative) Family specification for C3 single-mode fibre	19
Annex D (normative) Family specification for C4 single-mode fibre	21
Bibliography.....	23
Table 1 – List of families and main differences.....	6
Table 2 – Dimensional attributes and measurement methods.....	8
Table 3 – Requirements common to class C fibres.....	9
Table 4 – Mechanical attributes and measurement methods	9
Table 5 – Mechanical requirements common to class C fibres	9
Table 6 – Transmission attributes and measurement methods	10
Table 7 – Transmission requirements common to class C fibres	10
Table 8 – Transmission attributes required in family specifications	10
Table 9 – Environmental attributes and test methods	10
Table 10 – Environment dependant mechanical or transmission attributes and test methods.....	11
Table 11 – Tensile strength requirements common to class C fibres	11
Table 12 – Stress corrosion susceptibility requirements common to class C fibres.....	12
Table A.1 – Dimensional requirements for C1 fibres.....	13
Table A.2 – Mechanical requirements for C1 fibres	13
Table A.3 – Transmission requirements for C1 fibres	14
Table A.4 – Environment dependant transmission requirements for C1 fibres	14
Table A.5 – Environment dependant mechanical requirements for C1 fibres	15
Table B.1 – Dimensional requirements for C2 fibres.....	16
Table B.2 – Mechanical requirements for C2 fibres	16
Table B.3 – Transmission requirements for C2 fibres	17

Table B.4 – Environment dependant transmission requirements for C2 fibres 17

Table B.5 – Environment dependant mechanical requirements for C2 fibres 18

Table C.1 – Dimensional requirements for C3 fibres 19

Table C.2 – Mechanical requirements for C3 fibres 19

Table C.3 – Transmission requirements for C3 fibres 20

Table C.4 – Environment dependant transmission requirements for C3 fibres 20

Table C.5 – Environment dependant mechanical requirements for C3 fibres 20

Table D.1 – Dimensional requirements for C4 fibres 21

Table D.2 – Mechanical requirements for C4 fibres 21

Table D.3 – Transmission requirements for C4 fibres 22

Table D.4 – Environment dependant transmission requirements for C4 fibres 22

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRES –

**Part 2-60: Product specifications –
Sectional specification for category C
single-mode intraconnection 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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 60793-2-60 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

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

CDV	Report on voting
86A/1160A/CDV	86A/1201/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 of the IEC 60793 series can be found, under the general title *Optical Fibres*, on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

OPTICAL FIBRES –

Part 2-60: Product specifications – Sectional specification for category C single-mode intraconnection fibres

1 Scope

This part of IEC 60793 is applicable to optical fibre types C1, C2, C3, C4, as described in Table 1. These fibres are used for the intraconnections within or between components or photonic systems or subsystems. While the fibres are sold in lengths on the scale of kilometres, they are normally cut into short lengths for use in these intraconnections. While the fibres could be overcoated or buffered for the purpose of making protected pigtails, they may be used without overcoating. They may, however, be colour-coded.

The general requirements defined in IEC 60793-2 apply to these fibres. Specific requirements that are common to these fibres are found in the body of this text. Particular requirements for individual fibre types or applications are defined in Annexes A, B, C and D, which refer to normative family specifications. These family specifications are distinguished based on optimum transmission wavelengths and nominal Mode Field Diameter (MFD), which affects splice loss.

For each family specification, there are two sub-categories that are distinguished on the basis of the cladding diameter and other related attributes. The conventional nominal cladding diameter of 125 μm is augmented with the reduced cladding type product with a nominal diameter of 80 μm . These are distinguished with the suffixes: “_125” or “_80”. For example C1 fibre can be selected as either C1_125 or C1_80. The transmission characteristics of the two cladding diameter choices should be the same.

For each family specification except C1, there are two sub-categories that are distinguished on the basis of transmission characteristics that relate to MFD. To denote these sub-categories, a “_a” or “_b” suffix is added, for lower or higher MFD. In general, the fibres can be optimised for either splice loss or macro-bend loss using MFD as a main variable. A C2 fibre with 80 μm cladding diameter and lower MFD is designated as C2_80_a.

Fibres for the C1_125 family specification can be selected from category B1.1 or B1.3 single-mode fibres and are suitable for use with any category B single-mode fibre at wavelengths from 1 280 nm to 1 625 nm. Fibres for the C2 and C3 family specifications are optimized at nominal wavelengths of 1 310 nm and 1 550 nm respectively for connection to any category B single-mode fibre. Fibres for the C4 family specification are optimized for transporting optical amplifier pump light at 980 nm or higher.

Table 1 – List of families and main differences

Families	Nominal transmission wavelengths nm	Nominal MFDs
C1	1 260, 1 550 and 1 625	8,6 – 9,5 μm at 1 310 nm
C2	1 310	5,0 – 7,0 μm at 1 310 nm
C3	1 550 and 1 625	5,5 – 7,5 μm at 1 550 nm
C4	980	4,0 – 7,0 μm at 980 nm

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, *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*

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

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

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

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

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

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

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

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

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

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

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

IEC/TR 61931, *Fibre optic – Terminology*