

TECHNICAL REPORT



Selection of optical fibre cable specifications relative to mechanical, ingress, climatic or electromagnetic characteristics – Guidance

With norm.com: Click to view the full PDF of IEC/TR 62362:2010



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2010 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

TECHNICAL REPORT



Selection of optical fibre cable specifications relative to mechanical, ingress, climatic or electromagnetic characteristics – Guidance

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

R

ICS 33.180.10

ISBN 978-2-88910-941-8

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Acronyms	6
4 MICE attributes and severities	6
4.1 General.....	6
4.2 Mechanical.....	7
4.2.1 Shock/bump	7
4.2.2 Vibration.....	7
4.2.3 Tensile force.....	7
4.2.4 Crush	7
4.2.5 Impact	7
4.2.6 Bending, flexing and torsion	7
4.3 Ingress.....	7
4.3.1 Basic consideration	7
4.3.2 Particulate ingress.....	7
4.3.3 Water immersion	8
4.4 Climatic.....	8
4.4.1 General	8
4.4.2 Ambient temperature	8
4.4.3 Rate of change of temperature	8
4.4.4 Humidity.....	8
4.4.5 Solar radiation.....	8
4.4.6 Liquid pollution.....	9
4.4.7 Gaseous pollution.....	9
4.5 Electromagnetic	10
Annex A (informative) Details of MICE classification	11
Annex B (informative) IEC cable standards	13
Annex C (informative) Fibre specifications and tests	15
Bibliography.....	18
Table 1 – Resistance to solar radiation	8
Table 2 – Liquid pollution.....	9
Table 3 – Gaseous pollution resistance	10
Table 4 – Gaseous pollution resistance	10
Table A.1 – Details of MICE classification (Mechanical).....	11
Table A.2 – Details of MICE classification (Ingress).....	11
Table A.3 – Details of MICE classification (Chemical).....	11
Table A.4 – Details of MICE classification (Gas)	12
Table A.5 – Details of MICE classification (Electromagnetic)	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SELECTION OF OPTICAL FIBRE CABLE SPECIFICATIONS RELATIVE TO MECHANICAL, INGRESS, CLIMATIC OR ELECTROMAGNETIC CHARACTERISTICS – GUIDANCE

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.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 62362 which is a technical report, has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
86A/1297/DTR	86A/1302/RVC

Full information on the voting for the approval of this technical report 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.

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.

INTRODUCTION

Optical fibre cable specification standards are defined in the IEC 60794 series, which are listed in Annex B. They are organized in a hierarchy similar to the IECQ system. They differ from the IECQ system in that they are all performance standards. Optical fibre cable standards mainly cover the attributes and tests that protect the fibre from the environment, including installation, and the fibre attributes that may be affected by cabling. The attributes of the fibres within the cable are defined by reference to optical fibre specification standards of the IEC 60793 series, which are listed in Annex C. A complete and up-to-date listing of standards in the IEC 60793 and IEC 60794 series is available on website of the IEC: <http://www.iec.ch>.

The different levels of hierarchy are: general, sectional, family, and product. The primary distinction between these is the level of detail. Typically more options or wider ranges are present at the higher level. At a given level, the distinctions are with respect to application or cable construction. The references section of this document gives a more complete mapping. Parts of the family specification include blank detail specifications for various attributes that do not have normative requirements.

At the sectional specification level, two main categories are indoor and outdoor cables. Typically the outdoor cables have tougher tests than the indoor cables. At the product specification level, there are series of standards intended to support ISO/IEC 11801 for premises cabling, using both indoor and outdoor varieties.

This guidance will not attempt to reproduce the requirements of all the different specifications. For each of the MICE attributes, it will discuss the situation and mention the key options.

SELECTION OF OPTICAL FIBRE CABLE SPECIFICATIONS RELATIVE TO MECHANICAL, INGRESS, CLIMATIC OR ELECTROMAGNETIC CHARACTERISTICS – GUIDANCE

1 Scope

The purpose of this guidance is to provide information on the specification of optical fibre cables with respect to the mechanical, ingress, climatic or electromagnetic characteristics (MICE) as classified within ISO/IEC 24702.

In this classification system each letter of the four initials of the acronym are subscripted with a value of from one to three to indicate different severities. The current attributes and severities are found in Annex A.

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

IEC 60794-2 (all parts), *Optical fibre cables – Part 2: Indoor optical fibre cables*

IEC 60794-3 (all parts), *Optical fibre cables – Part 3: Outdoor cables*

ISO/IEC 24702, *Information technology – Generic cabling – Industrial premises*

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

3 Acronyms

MICE Mechanical, ingress, climatic and chemical, electromagnetic

4 MICE attributes and severities

4.1 General

The MICE classification system has three levels of severity:

- the first level of severity ($M_1I_1C_1E_1$) describes a typical environment such as that assumed within ISO/IEC 11801; (i.e. office premises etc.);
- the second level of severity ($M_2I_2C_2E_2$) describes a worst-case light industrial environment;
- the third level of severity ($M_3I_3C_3E_3$) describes a worst-case industrial environment.

See Annex A for a more detailed description of the MICE severity levels.

4.2 Mechanical

4.2.1 Shock/bump

Shock and bump are not specified for optical fibre cables. They are inherently robust in this respect. A more important attribute is bending.

4.2.2 Vibration

Vibration in the industrial premises (as opposed to wind induced vibration on aerially deployed cables) is not specified for optical fibre cables. They are inherently robust in this respect.

4.2.3 Tensile force

For outdoor premises cables specified in IEC 60794-3 series, manufacturers specify a rated tensile force. The requirement is that the fibre shall not exceed a percentage of the proof test strain (to be agreed between customer and supplier) when the cable is tested at the rated load.

For indoor cables, the different family specifications of IEC 60794-2 series have different requirements on the tensile load.

4.2.4 Crush

For optical fibre cables, the crushing force is applied in a plate to plate test.

For indoor cables, crush is specified at 500 N. For outdoor cables, different levels are specified depending on whether the cable is armoured or not. For unarmoured cable, values of between 1 500 N and 3 000 N may be specified. For armoured cable, values between 2 200 N and 10 000 N may be specified.

4.2.5 Impact

For indoor cables a value of 1 J with a 12,5 mm radius is specified. For un-armoured outdoor cables, a value of either 10 J with a 300 mm radius or 3 J with a 10 mm radius is specified.

4.2.6 Bending, flexing and torsion

All the family specifications have requirements on these attributes.

For bending, there are multiple tests such as bending under tension, repeated bending and simple bending. The bending diameter is typically 20 times the cable diameter.

For torsion, the test length, load, and number of turns varies depending on the family specification. For indoor cables, the length is from 250 mm to 1 000 mm, loaded at 20 N with 20 cycles applied.

4.3 Ingress

4.3.1 Basic consideration

Optical fibre cables come in a variety of constructions. Some examples are slotted core, loose tube, tight buffered. The slotted core and loose tube can be filled or unfilled. These different constructions have different ingress characteristics.

4.3.2 Particulate ingress

Particulate ingress is not specified for optical fibre cables. They are inherently robust in this respect.

4.3.3 Water immersion

On cables for which water immersion is specified, the test is different from that found in Annex A. The requirement is that a pressure equivalent to 1 m of water is applied at or near one end of a short (<3m) cable. After 24 h, the requirement is: No water found at the other end.

It is expected that cables passing this test would pass both I₂ and I₃ severities.

4.4 Climatic

4.4.1 General

Terminations such as cable closures are generally considered separately from the cables and are covered by IEC SC 86B.

NOTE The values that appear in Tables 1 to 3b below indicate levels of resistance to climatic phenomena. Values of 1 – 3 correspond to the relevant level of severity in the MICE classification system. A value of 0 indicates no effective resistance to the climatic phenomena described.

4.4.2 Ambient temperature

The different specifications allow different ranges of values to be specified by the customer, depending on the climate in which the cable will be installed. For the detailed specifications for premises cabling, –20 °C to +60 °C are specified. Other ranges and combinations from –45 °C to +70 °C are also found as options in the family specifications.

4.4.3 Rate of change of temperature

This is not specified. All the cables that pass the other requirements will, however, have the capability of 3 °C/min.

4.4.4 Humidity

For further study.

4.4.5 Solar radiation

Resistance to solar radiation in the industrial premises environment is not specified. Resistance to solar radiation is a property of the sheath material. The severities associated with some common generic materials are indicated in Table 1.

A specific grade of the generic material may have a different performance to that identified in the Table 1.

Table 1 – Resistance to solar radiation

Material	Natural	Stabilized	With ~2,5 % of active carbon black content
Medium-density polyethylene	0	3	3
Track-resistant medium-density polyethylene	0	3	3
High-density polyethylene	0	3	3
Thermoplastic (co)polyester elastomer	0	3	3
Polyvinyl chloride	1	3	3

Material	Natural	Stabilized	With ~2,5 % of active carbon black content
Polyvinylidene fluoride	1	3	3
Nylon 12 (polyamide)	1	3	3
Thermoplastic polyurethane (TPU)	1	3	3

4.4.6 Liquid pollution

Resistance to liquid pollution is not specified. Resistance to liquid pollution is a property of the sheath material. The severities associated with some common generic materials are indicated in Table 2.

A specific grade of the generic material may have a different performance to that identified in the Table 1.

Table 2 – Liquid pollution

Material	Pollutant				
	Sodium chloride (salt/sea water)	Oil (dry-air concentration)	Sodium stearate (soap)	Detergent	Conductive materials in solution
Low-density polyethylene	3	3	3	3	3
Medium-density polyethylene	3	3	3	3	3
Track-resistant medium-density polyethylene	3	3	3	3	3
High-density polyethylene	3	3	3	3	3
Thermoplastic (co)polyester elastomer	3	3	3	3	3
Polyvinyl chloride	2	2	2	2	3
Polyvinylidene fluoride	3	3	3	3	3
Nylon (polyamid 12)	2	2	2	2	3
Thermoplastic polyurethane (TPU)	3	3	3	3	3

4.4.7 Gaseous pollution

Resistance to gaseous pollution is not specified. Resistance to gaseous pollution is a property of the sheath material. The severities associated with some common generic materials are indicated in Tables 3 and 4.

A specific grade of the generic material may have a different performance to that identified in the Table 1.

Table 3 – Gaseous pollution resistance

Material	Pollutant				
	Hydrogen sulphide	Sulphur dioxide	Chlorine wet	Chlorine dry	Hydrogen chloride 10%
Low-density polyethylene	2	2	0	0	2
Medium-density polyethylene	2	2	0	0	2
Track resistant medium-density polyethylene	2	2	0	0	2
High-density polyethylene	2	2	0	0	2
Thermoplastic (co)polyester elastomer	2	2	1	1	0
Polyvinyl chloride	3	3	1	0	3
Polyvinylidene fluoride	3	2	3	3	3
Nylon (polyamid 12)	3	1	0	0	0
Thermoplastic polyurethane (TPU)	3	3	2	2	3

Table 4 – Gaseous pollution resistance

Material	Pollutant				
	Hydrogen chloride 37 %	Hydrogen fluoride	Ammonia	Oxides of nitrogen	Ozone 100 %
Low-density polyethylene	2	2	3	0	0
Medium-density polyethylene	2	0	3	0	0
Track resistant medium-density polyethylene	2	0	3	0	0
High-density polyethylene	2	0	3	0	0
Thermoplastic (co)polyester elastomer	0	0	0	0	0
Polyvinyl chloride	3	2	3	1	1
Polyvinylidene fluoride	3	3	3	2	2
Nylon (polyamid 12)	0	0	3	1	1
Thermoplastic polyurethane (TPU)	3	2	3	3	3

4.5 Electromagnetic

Cables can be dielectric, or can contain metallic elements such as armour, strength members or sheaths. With the exception of possible damage on cables with metallic sheaths due to lightning strikes, optical fibre cables are immune to the all the attributes for this category.

Annex A (informative)

Details of MICE classification

The details associated with ISO/IEC 24702 are presented in the following tables.

Table A.1 – Details of MICE classification (Mechanical)

Mechanical	M ₁	M ₂	M ₃
Shock/bump ^(a)			
Peak acceleration	40 ms ²	100 ms ²	250 ms ²
Vibration			
Displacement amplitude (2 Hz to 9 Hz)	1,5 mm	7,0 mm	15,0 mm
Acceleration amplitude (9 Hz to 500 Hz)	5 ms ²	20 ms ²	50 ms ²
Tensile force	See ^b	See ^b	See ^b
Crush	45 N over 25 mm (linear) min.	1 100 N over 150 mm (linear) min.	2 200 N over 150 mm (linear) min.
Per IEC 60794-1-2, Method E.3	180 N	735 N	1470 N
Impact	1 J	10 J	30 J
Bending, flexing and torsion	See ^b	See ^b	See ^b

Table A.2 – Details of MICE classification (Ingress)

Ingress	I ₁	I ₂	I ₃
Particulate ingress (dia. max)	12,5 µm	50 µm	50 µm
Immersion	None	Intermittent liquid jet ≤12,5 l/min >= 6,3 mm jet > 2,5 m distance	Intermittent liquid jet ≤12,5 l/min >= 6,3 mm jet > 2,5 m distance and immersion (≤1 m for ≤30 min)

Table A.3 – Details of MICE classification (Chemical)

Climatic and chemical	C ₁	C ₂	C ₃
Ambient temperature	–10° C to +60° C	–25° C to +70° C	–40° C to +70° C
Rate of change of temperature	0,1° C per minute	1,0° C per minute	3,0° C per minute
Humidity	5 % to 85 % (non-condensing)	5 % to 95 % (condensing)	5 % to 95 % (condensing)
Solar radiation	700 Wm ²	1 120 Wm ²	1 120 Wm ²
Liquid pollution ^c Contaminants	Concentration × 10 ^{–6}	Concentration × 10 ^{–6}	Concentration × 10 ^{–6}
Sodium chloride (salt/sea water)	0	<0,3	<0,3
Oil (dry-air concentration) (for oil types see ^b)	0	<0,005	<0,5
Sodium stearate (soap)	None	5 × 10 ⁴ aqueous non-gelling	>5 × 10 ⁴ aqueous gelling

Climatic and chemical	C ₁	C ₂	C ₃
Detergent	None	For further study	For further study
Conductive materials	None	Temporary	Present

Table A.4 – Details of MICE classification (Gas)

Gaseous pollution (see Note 3) Contaminants	Mean/Peak (Concentration × 10 ⁻⁶)	Mean/Peak (Concentration × 10 ⁻⁶)	Mean/Peak (Concentration × 10 ⁻⁶)
Hydrogen sulphide	<0,003/<0,01	<0,05/<0,5	<10/<50
Sulphur dioxide	<0,01/<0,03	<0,1/<0,3	<5/<15
Sulphur trioxide (ffs)	<0,01/<0,03	<0,1/<0,3	<5/<15
Chlorine wet (>50 % humidity)	<0,000 5/<0,001	<0,005/<0,03	<0,05/<0,3
Chlorine dry (<50 % humidity)	<0,002/<0,01	<0,02/<0,1	<0,2/<1,0
Hydrogen chloride	-/<0,06	<0,06/<0,3	<0,6/3,0
Hydrogen fluoride	<0,001/<0,005	<0,01/<0,05	<0,1/<1,0
Ammonia	<1/<5	<10/<50	<50/<250
Oxides of nitrogen	<0,05/<0,1	<0,5/<1	<5/<10
Ozone	<0,002/<0,005	<0,025/<0,05	<0,1/<1

Table A.5 – Details of MICE classification (Electromagnetic)

Electromagnetic	E1	E2	E3
Electrostatic discharge – Contact (0,667 µC)	4 kV	4 kV	4 kV
Electrostatic discharge – Air (0,132 µC)	8 kV	8 kV	8 kV
Radiated RF – AM	3 V/m @ (80 to 1 000) MHz 3 V/m @ (1 400 to 2 000) MHz 1 V/m @ (2 000 to 2 700) MHz	3 V/m @ (80 to 1 000) MHz 3 V/m @ (1 400 to 2 000) MHz 1 V/m @ (2 000 to 2 700) MHz	10 V/m @ (80 to 1 000) MHz 3 V/m @ (1 400 to 2 000) MHz 1 V/m @ (2 000 to 2 700) MHz
Conducted RF	3 V@ 150 kHz to 80 MHz	3 V@ 150 kHz to 80 MHz	10 V@ 150 kHz to 80 MHz
EFT/B (comms)	500 V	1 000 V	1 000 V
Surge (transient ground potential difference) – signal, line to earth	500 V	1 000 V	1 000 V
Magnetic field (50/60 Hz)	1 Am-1	3 Am-1	30 Am-1
Magnetic field (60 Hz to 20 000 Hz)	For further study.	For further study.	For further study.
a Bump: the repetitive nature of the shock experienced by the channel shall be taken into account. b This aspect of environmental classification is installation-specific and should be considered in association with IEC 61918 and the appropriate component specification. c A single dimensional characteristic, i.e. concentration × 10⁻⁶, was chosen to unify limits from different standards."			

Annex B **(informative)**

IEC cable standards

The following is a list of existing IEC optical cable standards:

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

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

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

IEC 60794-2-10, *Optical fibre cables – Part 2-10: Indoor cables – Family specification for simplex and duplex cables*

IEC 60794-2-11, *Optical fibre cables – Part 2-11: Indoor optical fibre cables – Detailed specification for simplex and duplex cables for use in premises cabling*

IEC 60794-2-20, *Optical fibre cables – Part 2-20: Indoor cables – Family specification for multi-fibre optical distribution cables*

IEC 60794-2-21, *Optical fibre cables – Part 2-21: Indoor optical fibre cables – Detailed specification for multi-fibre optical distribution cables for use in premises cabling*

IEC 60794-2-30, *Optical fibre cables – Part 2-30: Indoor cables – Family specification for optical fibre ribbon cables*

IEC 60794-2-31, *Optical fibre cables – Part 2-31: Indoor optical fibre cables – Detailed specification for optical fibre ribbon cables for use in premises cabling*

IEC 60794-2-40, *Optical fibre cables – Part 2-40: Indoor cables – Family specification for cables with plastic optical fibres*

IEC 60794-3, *Optical fibre cables – Part 3: Sectional specification – Outdoor cables*

IEC 60794-3-10, *Optical fibre cables – Part 3-10: Outdoor cables – Family specification for duct and directly buried optical telecommunication cables*

IEC 60794-3-11, *Optical fibre cables – Part 3-11 Outdoor cables – Duct and directly buried optical telecommunication cables – Detailed specification*

IEC 60794-3-12, *Optical fibre cables – Part 3-12: Outdoor cables – Detailed specification for duct and directly buried optical telecommunication cables for use in premises cabling*

IEC 60794-3-20, *Optical fibre cables – Part 3-20: Outdoor cables – Family specification for optical self-supporting aerial telecommunication cables*

IEC 60794-3-21, *Optical fibre cables – Part 3-21: Outdoor cables – Detailed specification for optical self-supporting aerial telecommunication cables for use in premises cabling*

IEC 60794-3-30, *Optical fibre cables – Part 3-30: Outdoor cables – Family specification for optical telecommunication cables for lake and river crossings*

IEC 60794-4, *Optical fibre cables – Part 4: Sectional specification – Aerial optical cables along electrical power lines*

IEC 60794-4-10, *Optical fibre cables – Part 4-10: Aerial optical cables along electrical power lines – Family specification for OPGW (Optical Ground Wire)*

IEC 60794-5, *Optical fibre cables – Part 5: Sectional specification – Microduct cabling for installation by blowing*

IEC 60794-2-41, *Optical fibre cables – Part 2-41: Indoor cables – Product specification for simplex and duplex buffered A4 fibres*

IEC 60794-2-42, *Optical fibre cables – Part 2-42: Indoor optical fibre cables – Product specification for simplex and duplex cables with A4 fibres*

IEC 60794-2-50, *Optical fibre cables – Part 2-50: Indoor cables – Family specification for simplex and duplex cables for use in terminated cable assemblies*

IECNORM.COM: Click to view the full PDF of IEC TR 62362:2010

Annex C (informative)

Fibre specifications and tests

C.1 Specifications

The fibre specifications are organized as a series of sectional specification standards beneath a general specification. Within each sectional specification there is a series of normative annexes that define the requirements for the different family specifications. Within the single-mode fibre sectional specification, IEC 60793-2-50, for example, are the family specifications for the B1.1, B1.2, B1.3, B2, B4, B5 and B6 fibre categories.

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

IEC 60793-2-10, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres*

IEC 60793-2-20, *Optical fibres – Part 2-20: Product specifications – Sectional specification for category A2 multimode fibres*

IEC 60793-2-30, *Optical fibres – Part 2-30: Product specifications – Sectional specification for category A3 multimode fibres*

IEC 60793-2-40, *Optical fibres – Part 2-40: Product specifications – Sectional specification for category A4 multimode fibres*

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

C.2 Measurements and tests

The fibre tests and measurements are under a general and guidance standard and organized into groups relating to dimensional, mechanical, optical, and environmental attributes. When multiple measurement methods are defined, they appear as different normative annexes of these documents.

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