

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

**Fibres optiques –
Partie 2-10: Spécifications de produits – Spécification intermédiaire pour les
fibres multimodales de catégorie A1**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2011 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 the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

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 It also gives information on projects, withdrawn and replaced publications.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

A propos de la CEI

La Commission Electrotechnique internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

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

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

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

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

**Fibres optiques –
Partie 2-10: Spécifications de produits – Spécification intermédiaire pour les
fibres multimodales de catégorie A1**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

W

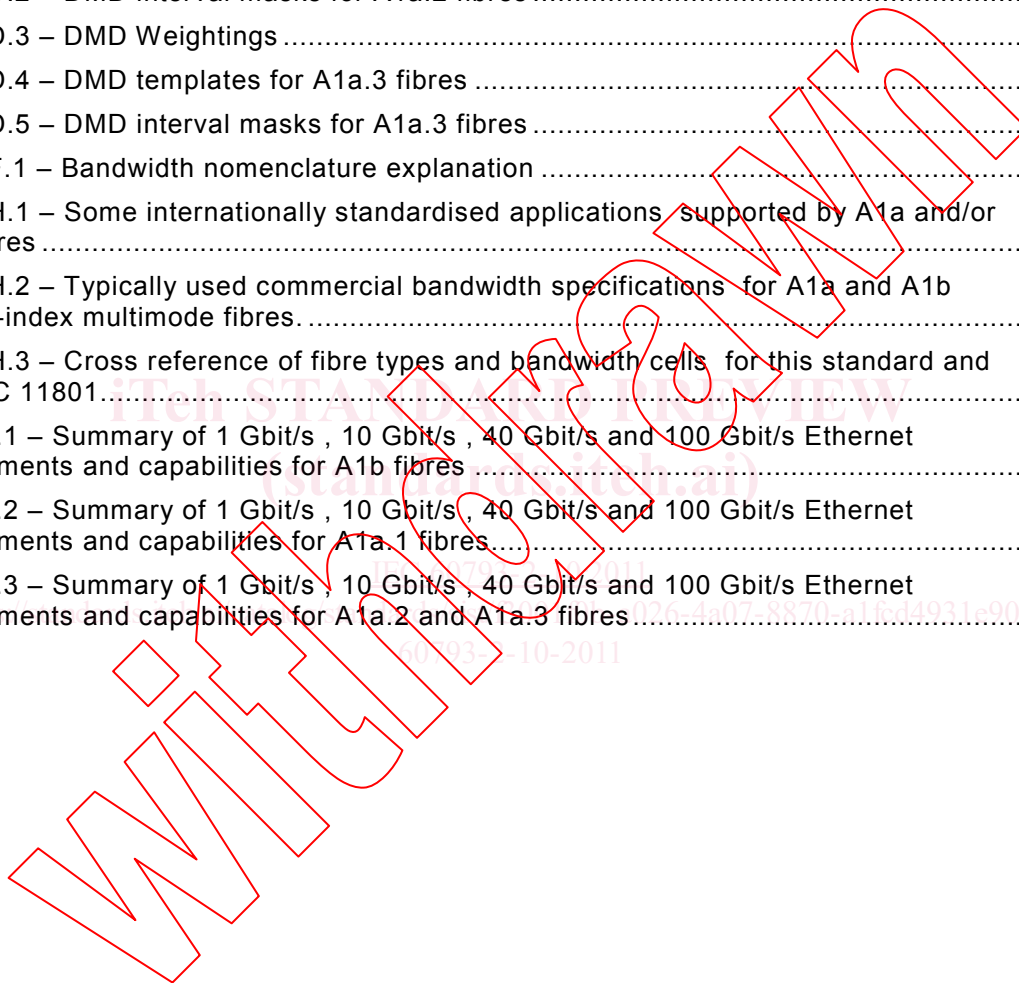
ICS 33.180.10

ISBN 978-2-88912-406-0

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Specifications.....	7
3.1 General requirements.....	7
3.2 Dimensional requirements	8
3.3 Mechanical requirements.....	9
3.4 Transmission requirements	9
3.5 Environmental requirements	11
3.5.1 Overview	11
3.5.2 Mechanical environmental requirements (common to all fibres in category A1).....	12
3.5.3 Transmission environmental requirements.....	13
Annex A (normative) Family specifications for A1a multimode fibres.....	14
Annex B (normative) Family specifications for A1b multimode fibres.....	16
Annex C (normative) Family specifications for A1d multimode fibres.....	18
Annex D (normative) Fibre differential mode delay (DMD) and calculated effective modal bandwidth (EMB_C) requirements.....	20
Annex E (informative) Modal bandwidth considerations and transmitter requirements	25
Annex F (informative) Bandwidth nomenclature explanation.....	27
Annex G (informative) Preliminary indications for items needing further study.....	28
Annex H (informative) Applications supported by A1 fibres	30
Annex I (informative) 1-Gbit, 10-Gbit, 40-Gbit and 100-Gbit Ethernet applications	34
Bibliography.....	38
Figure 1 – Relation between bandwidths at 850 nm and 1 300 nm	11
Figure D.1 – DMD template requirements	21
Table 1 – Dimensional attributes and measurement methods.....	8
Table 2 – Dimensional requirements common to category A1 fibres.....	8
Table 3 – Additional dimensional attributes required in the family specifications	8
Table 4 – Mechanical attributes and measurement methods	9
Table 5 – Mechanical requirements common to category A1 fibres	9
Table 6 – Transmission attributes and measurement methods	9
Table 7 – Additional transmission attributes required in family specifications	10
Table 8 – Environmental exposure tests	11
Table 9 – Attributes measured for environmental tests.....	11
Table 10 – Strip force for environmental tests	12
Table 11 – Tensile strength for environmental tests	12
Table 12 – Stress corrosion susceptibility for environmental tests.....	12
Table 13 – Change in attenuation for environmental tests.....	13
Table A.1 – Dimensional requirements specific to A1a fibres	14
Table A.2 – Mechanical requirements specific to A1a fibres.....	14

Table A.3 – Transmission requirements specific to A1a fibres	15
Table B.1 – Dimensional requirements specific to A1b fibres	16
Table B.2 – Mechanical requirements specific to A1b fibres	16
Table B.3 – Transmission requirements specific to A1b fibres	17
Table C.1 – Dimensional requirements specific to A1d fibres	18
Table C.2 – Mechanical requirements specific to A1d fibres	18
Table C.3 – Transmission requirements specific to A1d fibres	19
Table D.1 – DMD templates for A1a.2 fibres	20
Table D.2 – DMD interval masks for A1a.2 fibres	22
Table D.3 – DMD Weightings	23
Table D.4 – DMD templates for A1a.3 fibres	24
Table D.5 – DMD interval masks for A1a.3 fibres	24
Table F.1 – Bandwidth nomenclature explanation	27
Table H.1 – Some internationally standardised applications supported by A1a and/or A1b fibres	30
Table H.2 – Typically used commercial bandwidth specifications for A1a and A1b graded-index multimode fibres	31
Table H.3 – Cross reference of fibre types and bandwidth cells for this standard and ISO/IEC 11801	32
Table I.1 – Summary of 1 Gbit/s , 10 Gbit/s , 40 Gbit/s and 100 Gbit/s Ethernet requirements and capabilities for A1b fibres	35
Table I.2 – Summary of 1 Gbit/s , 10 Gbit/s , 40 Gbit/s and 100 Gbit/s Ethernet requirements and capabilities for A1a.1 fibres	36
Table I.3 – Summary of 1 Gbit/s , 10 Gbit/s , 40 Gbit/s and 100 Gbit/s Ethernet requirements and capabilities for A1a.2 and A1a.3 fibres	37



INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRES –

Part 2-10: Product specifications – Sectional specification for category A1 multimode 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 60793-2-10 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

This fourth edition cancels and replaces the third edition published in 2007. This edition constitutes a technical revision.

The major changes with respect to the previous edition are listed below:

- addition of type A1a.3 fibre;
- reduction of core diameter tolerance from 3,0 to 2,5 μm for A1a fibres.

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

CDV	Report on voting
86A/1295/CDV	86A/1328/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, 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.

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 2-10: Product specifications – Sectional specification for category A1 multimode fibres

1 Scope

This part of IEC 60793 is applicable to optical fibre types A1a, A1b, and A1d. These fibres are used or can be incorporated in information transmission equipment and optical fibre cables.

Type A1a fibre is a 50/125 μm graded index fibre. Type A1a.1 applies to 50/125 μm fibre, while A1a.2 and A1a.3 apply to two bandwidth grades of 850 nm laser-optimised 50/125 μm fibre. Type A1b applies to 62,5/125 μm graded index fibre and A1d applies to 100/140 μm graded index fibre.

Other applications include, but are not restricted to, the following: short reach, high bit-rate systems in telephony, distribution and local networks carrying data, voice and/or video services; on-premises intra-building and inter-building fibre installations including Data Centres, LANs, Storage Area Networks, PBXs, video, various multiplexing uses, outside telephone cable plant use, and miscellaneous related uses.

Three types of requirements apply to these fibres:

- general requirements, as defined in IEC 60793-2;
- specific requirements common to the category A1 multimode 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 60793-1-1, *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*

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

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

IEC 60793-1-41, *Optical fibres – Part 1-41: Measurement methods and test procedures – Bandwidth*

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

IEC 60793-1-43, *Optical fibres – Part 1-43: Measurement methods and test procedures – Numerical aperture*

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 60793-1-49, *Optical fibres – Part 1-49: Measurement methods and test procedures – Differential mode delay*

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

IEC 60793-2:2007, *Optical fibres – Part 2: Product specifications - General*

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

IEC/TR 62048:2002, *Optical fibres – Reliability – Power law theory*

ISO/IEC 11801:2002, *Information technology – Generic cabling for customer premises*

3 Specifications

3.1 General requirements

The fibre shall consist of a glass core with a graded index profile and a glass cladding in accordance with 5.1 in IEC 60793-2.

The term “glass” usually refers to material consisting of non-metallic oxides.

3.2 Dimensional requirements

Dimensional attributes and measurement methods are given in Table 1.

Requirements common to all fibres in category A1 are indicated in Table 2.

Table 3 lists additional attributes that shall be specified by each family specification.

Table 1 – Dimensional attributes and measurement methods

Attributes	Measurement methods
Cladding diameter	IEC 60793-1-20
Core diameter	IEC 60793-1-20
Cladding non-circularity	IEC 60793-1-20
Core 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

Table 2 – Dimensional requirements common to category A1 fibres

Attributes	Unit	Limits
Core non-circularity	%	≤6
Primary coating diameter – uncoloured ^a	µm	245 ± 10
Primary coating diameter – coloured ^a	µm	250 ± 15
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, which use other primary coating diameters, several of which are listed below. Alternative nominal primary coating diameters and tolerance (µm): 400 ± 40 500 ± 50 700 ± 100 900 ± 100		
^b Length requirements vary and should be agreed between the supplier and the customer.		

Table 3 – Additional dimensional attributes required in the family specifications

Attributes
Cladding diameter
Cladding non-circularity
Core diameter
Core-cladding concentricity error

3.3 Mechanical requirements

Mechanical attributes and measurement methods are given in Table 4.

Requirements common to all fibres in category A1 are in Table 5.

Table 4 – Mechanical attributes and measurement 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 5 – Mechanical requirements common to category A1 fibres

Attributes	Unit	Limits
Proof stress level	GPa	$\geq 0,69$ ^a
Strip force (average) ^b	N	$1,0 \leq F_{ave.strip} \leq 5,0$
Strip force (peak) ^b	N	$1,0 \leq F_{peak.strip} \leq 8,9$
Tensile strength (median) for 0,5 m specimen length	GPa	$\geq 3,8$
Stress corrosion susceptibility constant	n_d	≥ 18
^a The proof stress of 0,69 GPa equals about 1 % strain or about 8,8 N force, for A1a and A1b fibres. For the relation between these different units, see 7.4 of IEC/TR 62048.		
^b Either average strip force or peak strip force, which are defined in the test procedure, may be specified by agreement between the supplier and the customer.		

3.4 Transmission requirements

Transmission attributes and measurement methods are given in Table 6.

Table 7 lists additional attributes that shall be specified by each family specification.

Table 6 – Transmission attributes and measurement methods

Attributes	Measurement methods
Attenuation coefficient ^a	IEC 60793-1-40
Modal bandwidth ^a	IEC 60793-1-41
Numerical aperture	IEC 60793-1-43
Chromatic dispersion ^b	IEC 60793-1-42
Change of optical transmission	IEC 60793-1-46
Macrobending loss	IEC 60793-1-47
Differential mode delay	IEC 60793-1-49
^a When measuring attenuation and modal bandwidth, the appropriate launching conditions should be applied. These may differ from those prescribed in the test methods to which reference is made.	
^b Specification compliance of chromatic dispersion can be assured by compliance to the numerical aperture specification.	

Table 7 – Additional transmission attributes required in family specifications

Attributes
Attenuation coefficient
Modal bandwidth
Chromatic dispersion
Numerical aperture
Macrobending loss

For attenuation coefficient and modal bandwidth, the family specification contains ranges of specifiable values instead of fixed limits. The actual values of the maximum attenuation coefficient and minimum modal bandwidth, at both 850 nm and 1 300 nm (or just at one of these wavelengths) are to be agreed between the supplier and the customer. For commercial purposes, the modal bandwidth is linearly normalized to 1 km.

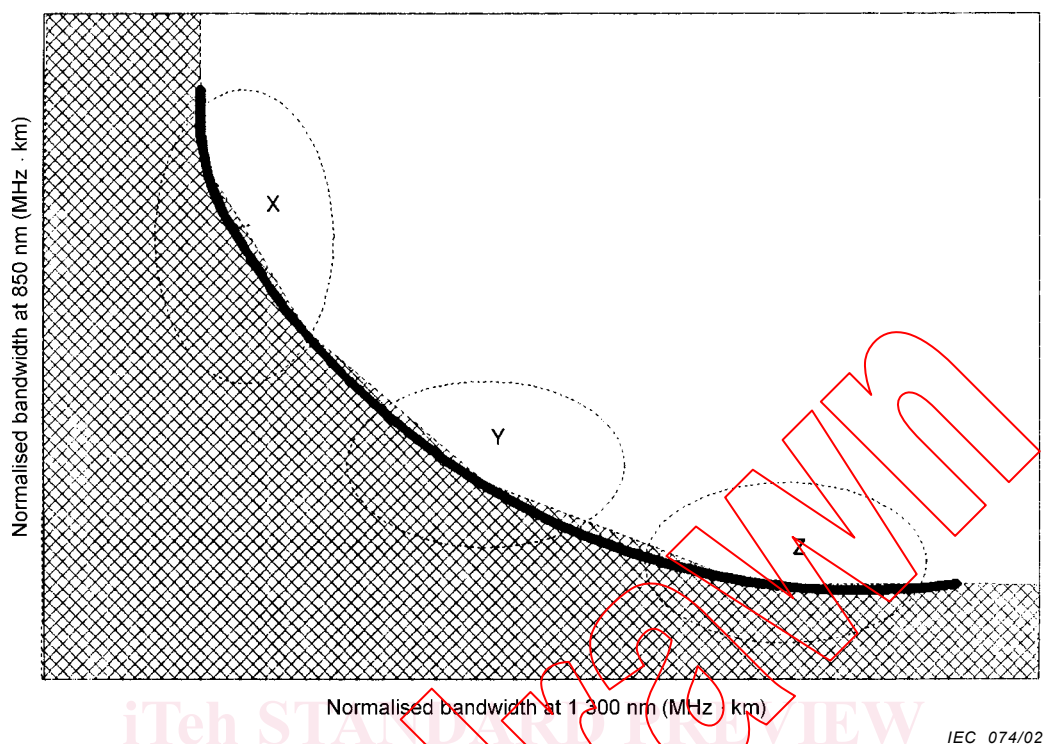
For guidance purposes on bandwidth, Table H.1 shows a number of internationally standardised applications supported by A1 fibres, and Table H.2 gives a (limited) number of frequently used commercial bandwidth specifications for A1a and A1b fibres.

The indicated maximum attenuation values apply to uncabled optical fibres; for the maximum cabled attenuation values, reference is made to IEC 60794-1-1, which can be used in conjunction with this standard.

Remarks on the specification of modal bandwidth:

Care should be taken in writing dual wavelength bandwidth specifications. For category A1 fibres, the bandwidth at 850 nm may be related to the bandwidth at 1 300 nm in a way shown in Figure 1, depending on the refractive index parameter, g , (see 5.1 of IEC 60793-2). The shaded region under the curve of Figure 1 can be defined as the dual window area. In this area, regions X, Y, and Z are examples of where a fibre manufacturer may choose to optimise the process. That is, centre the production at 850 nm, 1 300 nm, or between these two wavelengths.

Due to this optimisation of the manufacturing process, there will be combinations of bandwidth that are not possible. For example, it is practically impossible to produce a fibre with the maximum of both indicated bandwidth ranges (e.g. 800 MHz.km /1 000 MHz.km for A1b multimode fibres).



IEC 074/02

Figure 1 – Relation between bandwidths at 850 nm and 1300 nm

3.5 Environmental requirements

3.5.1 Overview

Environmental exposure tests and measurement methods are documented in two forms:

- Relevant environmental attributes and test procedures are given in Table 8.
- Measurements of a particular mechanical or transmission attribute that may change on the application of the environment are listed in Table 9.

Table 8 – Environmental exposure tests

Environmental exposure	Test
Damp heat	IEC 60793-1-50
Dry heat	IEC 60793-1-51
Change of temperature	IEC 60793-1-52
Water immersion	IEC 60793-1-53

Table 9 – Attributes measured for environmental tests

Attribute	Measurement method
Change in optical transmission	IEC 60793-1-46
Attenuation	IEC 60793-1-40
Strip force	IEC 60793-1-32
Tensile strength	IEC 60793-1-31
Stress corrosion susceptibility	IEC 60793-1-33

These tests are normally conducted periodically as type-tests for a fibre and coating design. Unless otherwise indicated, the recovery period allowed between the completion of the environmental exposure and performing the attribute measurements shall be as stated in the particular environmental test method.

3.5.2 Mechanical environmental requirements (common to all fibres in category A1)

3.5.2.1 Overview

These tests are, in practice, the most severe requirements amongst the environments defined in Table 8.

Tables 10, 11, and 12 give the prescriptions for strip force, tensile strength and stress corrosion susceptibility respectively.

3.5.2.2 Strip force

The following attributes shall be verified following removal of the fibre from the particular environment.

Table 10 – Strip force for environmental tests

Environment	Average strip force N	Peak strip force N
Damp heat	$1,0 \leq F_{avg.strip} \leq 5,0$	$1,0 \leq F_{peak.strip} \leq 8,9$
Water immersion	$1,0 \leq F_{avg.strip} \leq 5,0$	$1,0 \leq F_{peak.strip} \leq 8,9$

3.5.2.3 Tensile strength

The following attribute shall be verified following removal of the fibre from the environment.

Table 11 – Tensile strength for environmental tests

Environment	Median tensile strength Specimen length: 0,5 m GPa	15th percentile tensile strength Specimen length: 0,5 m GPa
Damp heat	$\geq 3,03$	$\geq 2,76$
NOTE These requirements do not apply to hermetically coated fibre.		

3.5.2.4 Stress corrosion susceptibility

The following attribute shall be verified following removal of the fibre from the environment.

Table 12 – Stress corrosion susceptibility for environmental tests

Environment	Stress corrosion susceptibility constant, <i>nd</i>
Damp heat	≥ 18
NOTE This requirement does not apply to hermetically coated fibre.	

3.5.3 Transmission environmental requirements

Change in attenuation from the initial value shall be less than the values in Table 13. Attenuation shall be measured periodically during the entire exposure to each environment and after removal.

Table 13 – Change in attenuation for environmental tests

Environment	Wavelength nm	Attenuation increase dB/km
Damp heat	850	≤ 0,20
	1 300	≤ 0,20
Dry heat	850	≤ 0,20
	1 300	≤ 0,20
Change of temperature	850	≤ 0,20
	1 300	≤ 0,20
Water immersion	850	≤ 0,20
	1 300	≤ 0,20

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 60793-2-10:2011

<https://standards.iteh.ai/catalog/standards/sis/2901f0b-a026-4a07-8870-a1fcd4931e90/iec-60793-2-10-2011>

Withhold