

# INTERNATIONAL STANDARD



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

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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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INTERNATIONAL  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## OPTICAL FIBRES –

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

## FOREWORD

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International Standard IEC 60793-2-20 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

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

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

- a)  $Na_{th}$  has been replaced by  $NA_{ff}$ ;
- b) specified test specimen length and measurement details for core diameter and  $NA_{ff}$  measurements.

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

CDV	Report on voting
86A/1602/CDV	86A/1628A/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 website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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## OPTICAL FIBRES –

### Part 2-20: Product specifications – Sectional specification for category A2 multimode fibres

#### 1 Scope

This part of IEC 60793 is applicable to sub-categories A2a, A2b, and A2c. These fibres are used or can be incorporated in information transmission equipment and optical fibre cables (typically up to 2 km).

Three types of requirements apply to these fibres:

- general requirements as defined in IEC 60793-2;
- specific requirements common to the category A2 multimodal fibres covered in this standard and which are given in Clause 3;
- particular requirements applicable to individual sub-categories or specific applications, which are defined in the normative family specification annexes.

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

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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 60793-1-40, *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 60793-1-43, *Optical fibres – Part 1-43: Measurement methods and test procedures – Numerical aperture measurement*

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



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

IEC 60793-1-51, *Optical fibres – Part 1-51: Measurement methods and test procedures – Dry heat (steady state) tests*

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

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

### 3 Specifications

#### 3.1 General

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

#### 3.2 Dimensional requirements

Relevant dimensional attributes and measurement methods are indicated in Table 1.

Dimensional requirements common to all sub-categories appear in Table 2.

Table 3 lists additional dimensional attributes that shall be specified by each sub-category.

**Table 1 – Relevant dimensional attributes and measurement methods**

Attribute	Measurement method
Cladding diameter	IEC 60793-1-20
Core diameter <sup>a</sup>	IEC 60793-1-20
Core non-circularity	IEC 60793-1-20
Core-cladding concentricity error	IEC 60793-1-20
Coating diameter	IEC 60793-1-21
Fibre length	IEC 60793-1-22
<sup>a</sup> Core diameter is specified at $850 \text{ nm} \pm 10 \text{ nm}$ with a test specimen length of $2,0 \text{ m} \pm 0,2 \text{ m}$ and a threshold value $k_{\text{CORE}}$ of 0,5 (IEC 60793-1-20 Method B).	

**Table 2 – Dimensional requirements common to all category A2 fibres**

Attribute	Unit	Limit
Core non-circularity	%	$\leq 4$
Coating diameter	$\mu\text{m}$	<sup>a</sup>
Fibre length	km	<sup>b</sup>
<sup>a</sup> The diameter of the coating is dependent on the cable structure and applications.		
<sup>b</sup> Length requirements vary and should be agreed between supplier and customer.		

**Table 3 – Additional dimensional attributes required for each sub-category**

Attribute
Cladding diameter
Core diameter

### 3.3 Mechanical requirements

Relevant mechanical attributes and test methods are indicated in Table 4.

Mechanical requirements common to all sub-categories are given in Table 5.

**Table 4 – Relevant mechanical attributes and test methods**

Attribute	Test method
Tensile strength	IEC 60793-1-31 (0,5 m specimen length) Strain rate 3 %/min to 5 %/min
Proof test	IEC 60793-1-30

**Table 5 – Mechanical requirements common to all category A2 fibres**

Attribute	Unit	Limit
Proof stress level	GPa	$\geq 0,345^a$
<sup>a</sup> For the relation between different units, see 7.4 of IEC TR 62048:2014.		

### 3.4 Transmission requirements

Relevant transmission attributes and measurement methods are given in Table 6.

Requirements common to all sub-categories are given in Table 7.

**Table 6 – Relevant transmission attributes and measurement methods**

Attribute	Test
Attenuation coefficient <sup>a</sup>	IEC 60793-1-40
Modal bandwidth <sup>a</sup>	IEC 60793-1-41
Numerical aperture $NA_{ff}^{a,b}$	IEC 60793-1-43
Change of optical transmission	IEC 60793-1-46
<sup>a</sup> When measuring attenuation, modal bandwidth and numerical aperture, the appropriate launching conditions should be applied as specified in the corresponding measurement methods (IEC 60793-1-40, IEC 60793-1-41 and IEC 60793-1-43).	
<sup>b</sup> Numerical aperture ( $NA_{ff}$ ) is specified at a test specimen length of 2,0 m $\pm$ 0,2 m with a threshold value, $k_{NA}$ of 0,5 measured at 850 nm.	