

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



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

**Câbles à fibres optiques –  
Partie 2-21: Câbles à fibres optiques intérieurs – Spécification particulière pour  
les câbles optiques multi-fibres de distribution utilisés dans le câblage de  
locaux**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## OPTICAL FIBRE CABLES –

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

## FOREWORD

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International Standard IEC 60794-2-21 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2005. It constitutes a technical revision.

The main changes are listed below:

- Incorporation of the OM4 cabled fibre performance category
- Incorporation of the OS2 cabled fibre performance category
- Incorporation of the B6\_a1 and B6\_a2 fibre category as per IEC 60793-2-50:2008

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

FDIS	Report on voting
86A/1441/FDIS	86A/1450/RVD

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.

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

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## OPTICAL FIBRE CABLES –

### Part 2-21: Indoor optical fibre cables – Detailed specification for multi-fibre optical distribution cables for use in premises cabling

#### 1 Scope

This International Standard presents the detailed requirements specific to this type of cable to ensure compatibility with ISO/IEC 11801, *Information technology – Generic cabling for customer premises*. The requirements of the Family Specification IEC 60794-2-20:2008 are applicable to cables covered by this standard.

Particular requirements detailed in clause 4 either define a specific option relative to the requirements of IEC 60794-2-20:2008 or define additional requirements.

#### 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.

They complete the normative references already listed in the generic specification (IEC 60794-1-1:2011 and IEC 60794-1-2:2003), and in the sectional specification (IEC 60794-2:2002, Clause 2) or in the family specification (IEC 60794-2-20:2011, Clause 2).

IEC 60793-2-10:2007, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres*

IEC 60793-2-50:2008, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*

IEC 60794-1-1:2011, *Optical Fibre cables – Part 1-1: Generic specification – General*

IEC 60794-1-2:2003, *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures*

IEC 60794-2:2002, *Optical fibre cables – Part 2: Indoor cables – Sectional specification*

IEC 60794-2-20:2008, *Optical fibre cables – Part 2-20: Indoor cables – Family specification for multi-fibre optical distribution cable*

#### 3 General requirements

The cable shall comply with the family specification (IEC 60794-2-20:2008) and meet the requirements that are defined in it.

The optical fibre contained in the cables which are covered by this standard shall comply with one of the following standards and meet the normative requirements defined within them as applicable:

- IEC 60793-2-50:2008, Annex A [Single-mode B1.1 fibre]
- IEC 60793-2-50:2008, Annex C [Single-mode B1.3 fibre]
- IEC 60793-2-50:2008, Annex G [Single-mode B6\_a1 and B6\_a2 fibre]
- IEC 60793-2-10:2007, Annex A [Multimode A1a.1, 50 µm core fibre]
- IEC 60793-2-10:2007, Annex A [Multimode A1a.2, 50 µm core fibre]
- IEC 60793-2-10:2007, Annex A [Multimode A1a.3, 50 µm core fibre]
- IEC 60793-2-10:2007, Annex B [Multimode A1b, 62.5 µm core fibre]

To ensure compatibility with ISO/IEC 11801, optical performance level requirements are presented in terms of the performance classification codes for cabled optical fibre as follows:

- OS1 Single-mode fibre, B1.1, B1.3 category or sub-category B6\_a1 and B6\_a2;
- OS2 Single-mode fibre, B1.3 or sub-category B6\_a1 and B6\_a2;
- OM1 Multimode fibre, Model A1a.1 or sub-category A1b;
- OM2 Multimode fibre, Model A1a.1 or sub-category A1b;
- OM3 Multimode fibre, Model A1a.2;
- OM4 Multimode fibre, Model A1a.3;

NOTE These codes are informative from the perspective of the requirements defined in this detailed specification.

## 4 Particular requirements

### 4.1 Fibre selection for cable testing

The fibre selection for cable testing shall be performed according to the 60794-1-1:2011, Annex B.

### 4.2 Environmental requirements – Temperature cycling

The cable shall meet the requirement of IEC 60794-2-20:2008, clause 4.3 Table 2, option c (–20 °C to +60 °C).

The test shall be performed on a 50 m specimen.

No attenuation changes (according to the IEC 60794-1-1 annex B3) shall be allowed during the test.

### 4.3 Transmission requirements

#### 4.3.1 Attenuation of cabled fibre

Depending on the fibre category, the attenuation coefficient of the cabled fibre shall be less than the maximum values in Table 1 for the multimode fibres and less than the maximum values in Table 2 for single-mode fibres – for the wavelengths listed in Table 2. The fibre category shall be agreed between customer and supplier.



**Table 1 – Multimode maximum cable attenuation coefficient (dB/km)**

Fibre	Attenuation coefficient at 850 nm	Attenuation coefficient at 1300 nm	Performance codes
IEC 60793-2-10:2007, A1a.1	3,5	1,5	OM1 OM2
IEC 60793-2-10:2007, A1a.2	3,5	1,5	OM1 OM2 OM3
IEC 60793-2-10:2007, A1a.3	3,5	1,5	OM1 OM2 OM3 OM4
IEC 60793-2-10:2007, A1b	3,5	1,5	OM1 OM2

**Table 2 – Single-mode maximum cable attenuation coefficient (dB/km)**

Fibre 0	Wavelengths (nm)	Maximum attenuation coefficient	Performance codes
IEC 60793-2-50:2008, B1.1, B1.3, B6_a1, B6_a2	1 310, 1 550	1,0	OS1
IEC 60793-2-50:2008, B1.1, B1.3, B6_a1, B6_a2	1 310, 1 383, 1 550	0,4	OS2

#### 4.3.2 Fibre bandwidth requirements

There are no bandwidth requirements on single-mode fibre.

For cables containing multimode fibres, the uncabled fibre shall be specified at one of performance levels defined in Table 3 in terms of minimum bandwidth (MHz × km), wavelength, and type of measurement.

The fibre category and performance level shall be agreed between customer and supplier.

**Table 3 – Minimum multimode fibre bandwidth (MHz × km)**

Fibre	Nominal core diameter (µm)	Overfilled bandwidth at 850 nm	Overfilled bandwidth at 1300 nm	Effective modal bandwidth at 850 nm*	Performance codes
IEC 60793-2-10:2007, A1a.1	50	200	500	na	OM1
IEC 60793-2-10:2007, A1a.1	50	500	500	na	OM2
IEC 60793-2-10:2007, A1a.2	50	1 500	500	2 000	OM3
IEC 60793-2-10:2007, A1a.3	50	3 500	500	4 700	OM4
IEC 60793-2-10:2007, A1b	62,5	200	500	na	OM1
IEC 60793-2-10:2007, A1b	62,5	500	500	na	OM2

## Bibliography

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

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