

INTERNATIONAL STANDARD

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

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





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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRE CABLES –

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

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60794-2-21 edition 3.1 contains the third edition (2019-04) [documents 86A/1925/FDIS and 86A/1935RVD] and its amendment 1 (2020-11) [documents 86A/2012/CDV and 86A/2055/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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

This third edition constitutes a technical revision.

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

- a) incorporation of the OM5 cabled fibre performance category;
- b) incorporation of the OS1a cabled fibre performance category;
- c) cabled fibre performance categories OM1, OM2 and OS1 are no longer normative, and are retained for information.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 60794 series, published under the general title *Optical fibre cables*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment 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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INTRODUCTION to Amendment

This amendment adds an important update considered during the development of the base publication, IEC 60794-2-21:2019.

As regards minimum multimode fibre bandwidth requirements (Table 3), this amendment provides new guidance as concerns effective modal bandwidth in the 840 nm to 953 nm wavelength range which was not considered mature enough during the development of IEC 60794-2-21:2019.

It is expected that the content of this amendment will be incorporated into the future edition 4 of IEC 60794-2-21.

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OPTICAL FIBRE CABLES –

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

1 Scope

This part of IEC 60794 presents the detailed requirements specific to this type of cable to ensure compatibility with the series of International Standards ISO/IEC 11801, *Information technology – Generic cabling for customer premises* (Parts 1 to 6).

The requirements of family specification IEC 60794-2-20 are applicable to cables covered by this document.

Particular requirements detailed in Clause 4 define either a specific option in relation to the requirements of IEC 60794-2-20 or additional requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60793-2-10:—, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres*¹

IEC 60793-2-50:2018, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*

IEC 60794-1-1:2015, *Optical Fibre cables – Part 1-1: Generic specification – General*

IEC 60794-2-20:2013, *Optical fibre cables – Part 2-20: Indoor cables – Family specification for multi-fibre optical cables*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

¹ Edition 7 under preparation. Stage at the time of publication: IEC DECFDIS 60793-2-10:2019.

4 General requirements

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

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

- IEC 60793-2-50:2018, Annex A (single-mode B-652.D fibre);
- IEC 60793-2-50:2018, Annex F (single-mode B-657 fibres);
- IEC 60793-2-10:—2, Annex A (multimode A1-OM3 fibre);
- IEC 60793-2-10:—, Annex A (multimode A1-OM4 fibre);
- IEC 60793-2-10:—, Annex A (multimode A1-OM5 fibre).

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

- OS1a Single-mode fibre, categories B-652.D or B-657;
- OS2 Single-mode fibre, categories B-652.D or B-657;
- OM3 Multimode fibre, A1-OM3 category;
- OM4 Multimode fibre, A1-OM4 category;
- OM5 Multimode fibre, A1-OM5 category.

NOTE These codes are informative from the perspective of the requirements defined in this document. The OS1, OM1 and OM2 performance classification codes for cabled optical fibre are no longer normative in ISO/IEC 11801 (all parts). See ISO/IEC 11801-1:2017, Annex F, for more information.

5 Particular requirements

5.1 Fibre selection for cable testing

The fibre selection for cable testing shall be performed according to IEC 60794-1-1:2015, Annex B.

5.2 Environmental requirements – Temperature cycling

The cable shall be tested as per IEC 60794-2-20:2013, 4.4, and shall meet one of the following temperature ranges as per the MICE classification system:

- C₁: –10 °C to +60 °C;
- C₂: –25 °C to +70 °C;
- C₃: –40 °C to +70 °C.

The test shall be performed on a 50 m specimen.

The maximum increase in attenuation shall be agreed between customer and supplier.

5.3 Transmission requirements

5.3.1 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 cable maximum attenuation coefficient (dB/km)

Fibre	Attenuation coefficient at 850 nm	Attenuation coefficient at 1300 nm	Performance codes
IEC 60793-2-10, A1-OM3	3,0	1,5	OM3
IEC 60793-2-10, A1-OM4	3,0	1,5	OM4
IEC 60793-2-10, A1-OM5	3,0	1,5	OM5

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

Fibre	Wavelengths nm	Maximum attenuation coefficient	Performance codes
IEC 60793-2-50, B-652.D and B-657	1 310, 1 383, 1 550	1,0	OS1a
IEC 60793-2-50, B-652.D and B-657	1 310, 1 383, 1 550	0,4	OS2

5.3.2 Fibre bandwidth requirements

There are no bandwidth requirements for 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 launch bandwidth at 850 nm	Overfilled launch bandwidth at 953 nm	Overfilled launch bandwidth at 1 300 nm	Effective modal bandwidth at 850 nm	Effective modal bandwidth at 953 nm	Performance codes
IEC 60793-2-10, A1-OM3	50	1 500	n/a Not specified	500	2 000	n/a Not specified	OM3
IEC 60793-2-10, A1-OM4	50	3 500	n/a Not specified	500	4 700	n/a Not specified	OM4
IEC 60793-2-10, A1-OM5	50	3 500	1 850	500	4 700	2 470	OM5

NOTE Effective modal bandwidth guidance is provided at all wavelengths in the 840 nm to 953 nm range in IEC 60793-2-10. For OM3, the guidance is 1 033 MHz·km at 953 nm. For OM4, the guidance is 1 459 MHz·km at 953 nm.

Bibliography

IEC 60794-1-21, *Optical fibre cables – Part 1-21: Generic specification – Basic optical cable test procedures – Mechanical test methods*

IEC 60794-1-22, *Optical fibre cables – Part 1-22: Generic specification – Basic optical cable test procedures – Environmental test methods*

IEC 60794-1-23, *Optical fibre cables – Part 1-23: Generic specification – Basic optical cable test procedures – Cable element test methods*

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

IEC 60794-2-10:2011, *Optical fibre cables – Part 2-10: Indoor optical fibre cables – Family specification for simplex and duplex cables*

ISO/IEC 11801-1:2017, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

ISO/IEC 11801-2, *Information technology – Generic cabling for customer premises – Part 2: Office premises*

ISO/IEC 11801-3, *Information technology – Generic cabling for customer premises – Part 3: Industrial premises*

ISO/IEC 11801-4, *Information technology – Generic cabling for customer premises – Part 4: Single-tenant homes*

ISO/IEC 11801-5, *Information technology – Generic cabling for customer premises – Part 5: Data centres*

ISO/IEC 11801-6, *Information technology – Generic cabling for customer premises – Part 6: Distributed building services*
