

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Optical fibre cables – **STANDARD PREVIEW**
Part 6: Indoor-outdoor cables – Sectional specification for indoor-outdoor
cables (standards.iteh.ai)

Câbles à fibres optiques – **IEC 60794-6:2020**
Partie 6: Câbles intérieurs/extérieurs – **Specification intermédiaire pour**
les câbles intérieurs/extérieurs





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Optical fibre cables –
Part 6: Indoor-outdoor cables – Sectional specification for indoor-outdoor cables

Câbles à fibres optiques –
Partie 6: Câbles intérieurs/extérieurs – Specification intermédiaire pour les câbles intérieurs/extérieurs

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRE CABLES –

**Part 6: Indoor-outdoor cables –
Sectional specification for indoor-outdoor cables**

FOREWORD

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International Standard IEC 60794-6 has been prepared by subcommittee SC 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
86A/2042/FDIS	86A/2052/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

A list of all 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 this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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OPTICAL FIBRE CABLES –

Part 6: Indoor-outdoor cables – Sectional specification for indoor-outdoor cables

1 Scope

This part of IEC 60794 is a sectional specification covering general features of optical fibre cables applicable to outdoor as well as indoor environments, called "indoor-outdoor cables". Indoor-outdoor cables are deployed in outside plant environments as well as in premises thus fulfilling outdoor as well as indoor requirements. Typical application spaces are, for example, extension of a duct cable into a building or using this design for centralized cabling in the central office, the premises or local area network where the same cable is used for the entire length of the cabling link including both the indoor as well as the outdoor portions.

Cables which generally possess the characteristics associated with outdoor cable designs having the thermal and mechanical robustness that makes them suitable for use in the outside plant, while simultaneously being relatively flexible, compact and lightweight and exhibiting the fire performance required in indoor premises are specified in IEC 60794-6-10.

Flame retardant outdoor cables as specified in IEC 60794-6-20 are used when most of the cable length is deployed as an outdoor cable with a part of its length deployed indoors. The cable design can be derived from a typical outdoor cable design according to the product specifications described in IEC 60794-3. The specific performance related to bend radii according to the installation situation and fire performance according to the regional legislation mainly requires the appropriate selection of the jacket material in combination with other material and/or design considerations. Because of the use in buildings with tighter space restrictions, higher flexibility of the cable is often required for the installation. Often, smaller diameter cables are preferred.

Indoor cables which are weatherised as specified in (IEC 60794-6-30) are used when an indoor cable is used outdoors over a short distance (few meters), for example when the network access point (NAP) is very close to the building. The indoor-outdoor fibre optical cable design can be derived from an indoor design (see IEC 60794-2 and IEC TR 62901 for typical applications) with specific outdoor performance features added. Critical parameters are UV stability, and resistance against exposure to humidity.

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 60793-1-40, *Optical fibres – Part 1-40: Attenuation measurement methods*

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

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

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

IEC 60794-2:2017, *Optical fibre cables – Part 2: Indoor cables – Sectional specification*

IEC 60794-3:2014, *Optical fibre cables – Part 3: Outdoor cables – Sectional specification*

IEC 60794-6-10, *Optical fibre cables – Part 6-10: Indoor-outdoor cables – Family specification for universal indoor-outdoor cables*

IEC 60794-6-20, *Optical fibre cables – Part 6-20: Indoor-outdoor cables – Family specification for flame retardant outdoor cables*

IEC 60794-6-30, *Optical fibre cables – Part 6-30: Indoor-outdoor cables – Family specification for weatherised indoor cables*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms, definitions and abbreviated terms given in IEC 60794-1-1 and the following apply.

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>

3.1 Terms and definitions (standards.iteh.ai)

3.1.1

indoor-outdoor cable

cable used indoors as well as outdoors

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3.2 Abbreviated terms

CB carbon black

FR flame retardant

NAP network access point

4 Optical fibres

Optical fibre shall be used which meets the requirements of IEC 60793-2. The fibre type shall be agreed between the customer and supplier.

The attenuation, attenuation continuity, cut-off wavelength and PMD should conform with the appropriate sectional, family, detailed or product specification of IEC 60794 (all parts).

The attenuation coefficient shall be measured in accordance with IEC 60793-1-40 and IEC 60794-1-1.

5 Cable elements

5.1 General

Generally, optical cables comprise several elements (see IEC 60794-1-3) or individual constituents, depending on the cable design which takes into account the cable application, operating environment and manufacturing processes, as well as the need to protect the fibre during handling and cabling.

5.2 Materials compatibility

The material(s) used for a cable element shall be selected to be compatible with the other elements in contact with it. Compatibility testing should be in accordance with IEC 60794-1-219. Alternative ageing conditions and tests may be agreed between the customer and supplier.

5.3 Optical elements

Optical elements are cable elements containing optical fibres and are designed to be a primary functional unit of the cable core. Optical elements and each fibre within a cable element shall be uniquely identified as described in IEC 60794-2 and IEC 60794-3.

5.4 Testing of cable elements

Tests may be performed on cable elements either in non-cabled form or in finished cables. Unless otherwise specified, testing shall be performed on cable elements in a finished cable. This means that testing shall be performed only on a finished cable if the cable element manufacturing operation is done by the same manufacturer as the cabling operation. Testing shall be performed on cable elements only if the cable element is supplied by a third party; this does not exclude testing of the finished cable. Testing of elements as defined in IEC 60794-1-23 can, of course, be used as a guide for internal verification by a manufacturer.

5.5 Cable elements to be used for indoor-outdoor cable

All relevant cable elements to be used for indoor-outdoor cables are described in IEC 60794-2 and IEC 60794-3.

6 Common specifications for indoor-outdoor cables

Indoor-outdoor cables are defined as cables which fulfill the following common specifications:

- resistance against humidity;
- UV resistance according to IEC 60794-3:2014, 6.6.3, IEC 60794-1-22, method F14, and the following Table 1;
- flame retardance according to IEC 60794-2:2017, 7.4, and the following Table 1.

Table 1 – Key cable performance parameters for indoor-outdoor cables compared to indoor and outdoor cables

Reference	Water blocking	UV resistance ^c	Resistance against humidity	Other environmental exposure ^a	Temperature of operation	Small bend performance	Flame retardancy
IEC 60794-6-10 universal	X	X	X	X	X	X	X
IEC 60794-6-20 outdoor FR	X	X	X	X	X	Not required	X
IEC 60794-6-30 weatherised indoor	Optional	X	X	Not required ^b	X	X	X
IEC 60794-2-xx indoor	Not required	Not required	Not required	Not required ^b	X	X	X
IEC 60794-3-xx outdoor	X	X	X	X	X	Not required	Not required

Key
X: required

NOTE Cables which consist of a typical indoor cable surrounded by a removable humidity/UV resistant jacket are considered as outdoor FR (and thus compliant to IEC 60794-6-20); however, only the part of the cable design which is installed indoors need to fulfil FR requirements.

^a Examples are exposure to various fluids (e.g. long term storage in water, acids, bases, strong solvents), exposure to mould growth, exposure to rodents, birds or insects, exposure to freezing water (ice), etc.

^b Short-term storage in water, as well as use of cleaning agents, is required.

^c However, other methods of UV stabilization might be needed as a consequence of the use of FR jacket which might consist of a different polymer than PE and have a colour other than black so CB cannot be used;

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7 Installation and operating conditions

Installation and operating conditions shall be as required by the indoor-outdoor family specifications:

- IEC 60794-6-10 for universal cables;
- IEC 60794-6-20 for flame retardant outdoor cables;
- IEC 60794-6-30 for weatherised indoor cables.

8 Characterization of cable elements

Cable elements as described in 5.5 can be tested as described in IEC 60794-2:2017, 7.2, and IEC 60794-3:2014, Clause 8.

9 Test conditions for indoor-outdoor cables

9.1 Test methods applicable for indoor-outdoor cables

Compliance with the specification requirements shall be verified by carrying out tests detailed in the relevant family specification. It is not intended that all tests be carried out in all cases. The tests to be applied and the frequency of testing shall be agreed between the customer and supplier.

9.2 Fire performance

All cables according to this document shall pass fire performance specifications. The requirements may differ in different regions (e.g. North America, EU). But they also can differ from country to country.

NOTE 1 IEC TR 62222 provides guidance and recommendations for the requirements and test methods for the fire performance of communication cables when installed in buildings. The recommendations relate to typical applications and installation practices, and an assessment of the fire hazards presented. Account is also taken of applicable legislation and regulation.

IEC TR 62222 references several IEC fire performance test methods and also other test methods that can be required by local or national legislation and regulation. It is important that the tests to be applied fulfil the national legislation and regulation and the specific requirements by its intended use.

NOTE 2 Flame retardant cables, including flame retardant indoor-outdoor cables for European applications, require CE marking according to the so-called CPR (construction product regulation – see CLCEN 50575 and subordinate standards) when permanently installed in buildings. Without the appropriate marking of the product and the supply of a declaration of performance, the use is not allowed in the European Union.

10 Quality assurance

It is the responsibility of the manufacturer to establish quality assurance by quality control procedures which ensure that the product meets the requirements of this specification. When the customer wishes to specify acceptance tests to other quality procedures, it is essential that an agreement is reached between the customer and supplier at the time of ordering.

11 Packaging

Cable shall be supplied on reels or in coils suitably protected for transport and the cable ends shall be sealed, if necessary, to prevent the ingress of moisture.

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