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SPECIFICATION

IEC
PAS 60794-2-50

Pre-Standard

First edition
2004-11

Optical fibre cables –

**Part 2-50:
Indoor optical fibre cables –
Family specification for simplex and duplex
cables for use in patch cords**

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRE CABLES –

Part 2-50: Indoor optical fibre cables – Family specification for simplex and duplex cables for use in patch cords

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IEC-PAS 60794-2-50 has been processed by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre Optics.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
86A/856/NP	86A/878/RVN

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned will transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of three years starting from 2004-12. The validity may be extended for a single three-year period, following which it shall be revised to become another type of normative document or shall be withdrawn.

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OPTICAL FIBRE CABLES –

Part 2-50: Indoor optical fibre cables – Family specification for simplex and duplex cables for use in patch cords

1 Scope

This part of IEC 60794 is a family specification that covers simplex and duplex optical fibre cables for use in patch cords. The requirements of the Sectional specification IEC 60794-2 are applicable to cables covered by this document.

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.

They complete the normative references already listed in the generic specification (IEC 60794-1-1, Clause 2, and IEC 60794-1-2, Clause 2) or in the sectional specification (IEC 60794-2, Clause 2).

IEC 60068-2-14: *Environmental testing – Part 2: Tests – Test N: Change of temperature*

IEC 60189-1:1986, *Low-frequency cables and wires with PVC insulation and PVC sheath – Part 1: General test and measuring methods*

IEC 60332-1: *Tests on electric and optic fibre cables under fire conditions – Part 1: Test for vertical flame propagation for a single insulated wire or cable*

IEC 60332-3: *Tests on electric and optic fibre cables under fire conditions – Part 3: Test for vertical flame spread of vertically-mounted bunched wires or cables*

IEC 60754-1: *Test on gases evolved during combustion of electric cables – Part 1: Determination of the amount of halogen acid gas*

IEC 60754-2: *Test on gases evolved during combustion of electric cables – Part 2: Determination of degree of acidity of gases evolved during the combustion of material taken from electric cables by measuring pH and conductivity*

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

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

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

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

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

IEC 60811-1-4:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section Four: Test at low temperatures*

IEC 61034-1: *Measurement of smoke density of cables burning under defined conditions – Part 1: Test apparatus*

IEC 61034-2: *Measurement of smoke density of cables burning under defined conditions – Part 2: Test procedure and requirements*

3 Construction

3.1 General

In addition to the constructional requirements in IEC 60794-2, the following considerations apply to simplex and duplex indoor cables for use in patch cords.

It is not the intention of this document to specify the finished patchcord assembly with terminations.

The cable shall be designed and manufactured for an expected operating lifetime of 15 years. The materials in the cable shall not present a health hazard within its intended use.

There shall be no fibre splice in a delivery length unless otherwise agreed by the customer and supplier.

It shall be possible to identify each individual fibre throughout the length of the cable.

3.2 Optical fibres and primary coating

Multimode or single-mode optical fibres meeting the requirements of IEC 60793-2 shall be used.

3.3 Buffer

If a tight or semi-tight (loosely applied) buffer is required, it shall consist of one or more layers of inert material. Unless otherwise specified, for tight buffers, the buffer and fibre primary coating shall be removable in one operation over a length of 15 mm, depending on user requirements.

Buffer dimensions are shown in Table 1.

Table 1 – Dimensions of buffered fibres

Buffer type mm	Semi-tight buffer	Tight buffer
Nominal diameter	0,3 – 1,3	0,3 – 1,0
Tolerances	± 0,05	± 0,05

3.4 Ruggedized fibre

Further protection can be provided to tight or semi-tight (loosely applied) fibres by surrounding one or two with non-metallic strength members within a sheath of suitable material.

3.5 Tube

One or two primary coated or buffered fibres are packaged (loosely or not) in a tube construction that may be filled. The tube may be reinforced with a composite wall.

If required the suitability of the tube shall be determined by an evaluation of its kink resistance in accordance with IEC 60794-1-2 Method G7.

3.6 Strength and anti-buckling members

The cable shall be designed with sufficient strength members to meet the requirements of this specification.

The strength and/or anti-buckling member may be either metallic or non-metallic and may be located in the cable core and/or under the sheath and/or in the sheath.

3.7 Sheath

The cable shall have an overall protective sheath. The cable diameter shall be specified in the relevant product specification.

3.8 Sheath marking

If required, the cable shall be marked as agreed between the customer and supplier.

3.9 Examples of cable constructions

Examples of some main types of cable construction are shown in Figures 1-7. Other configurations are not excluded if they meet the mechanical, environmental and transmission requirements given in this specification.

4 Tests

Compliance with specification requirements shall be verified by carrying out tests selected from the following subclauses.

Unless otherwise specified, all tests shall be carried out at ambient temperature.

4.1 Dimensions

The fibre dimensions and tolerances shall be checked in accordance with test method IEC 60793-1-20 or IEC 60793-1-21. The diameter of the buffer and of the cable, as well as the thickness of the sheath, shall be measured in accordance with the methods of IEC 60189-1.

4.2 Mechanical requirements

Some of the following tests can be performed on a short sample length of cable that is still an integral part of a longer length. Thus, it becomes possible to detect permanent changes in attenuation.

4.2.1 Tensile performance

Method: IEC 60794-1-2-E1A.

Diameter of chuck drums and transfer devices: approximately 250 mm.

Rate of transfer device: Either 100 mm/min or 100 N/min.

Load: 100 N applied for 5 min for simplex cables, 200 N for 5 min for duplex cables.

Length of sample: sufficient to achieve the desired accuracy of measurement of attenuation change.

Requirements: $\leq 0,1$ dB /10 m during the test and no change in attenuation after the test. There shall be no damage to the cable elements.

4.2.2 Crush

Method: IEC 60794-1-2-E3.

Force: 500 N.

Duration: 1 min.

Length between test locations: 500 mm.

Requirements: no change in attenuation after the test, and there shall be no damage to the cable elements.

NOTE In the case of flat cables the force shall be applied on the flat sides of the cable.

4.2.3 Impact

Method: IEC 60794-1-2-E4.

Radius of striking surface: 12,5 mm.

Impact energy: 1,0 Joules.

Number of impacts: at least 3, each separated by at least 500 mm.

Requirements: no fibre breakage.

NOTE In the case of flat cables, the force shall be applied on the flat sides of the cable.

4.2.4 Repeated bending

Method: IEC 60794-1-2-E6.

Bending radius: 30 mm for simplex, 20 times cable diameter for duplex (for flat cables, the diameter is the minor dimension).

Number of cycles: 300.

Mass of weight: 2 kg.