BRITISH STANDARD

BS EN
60794-2:2003

Optical fibre cables —

Part 2: Indoor cables — Sectional specification

The European Standard EN 60794-2:2003 has the status of a British Standard

ICS 33.180.10

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 60794-2:2003. It is identical with IEC 60794-2:2002.

The UK participation in its preparation was entrusted by Technical Committee GEL/86, Fibre optics, to Subcommittee GEL/86/1, Optical fibres and cables, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

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Summary of pages

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EUROPEAN STANDARD **EN 60794-2**

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English version

Optical fibre cables
Part 2: Indoor cables - Sectional specification
(IEC 60794-2:2002)

Câbles à fibres optiques
Partie 2: Câbles intérieurs - Spécification intermédiaire
(CEI 60794-2:2002)

Lichtwellenleiterkabel
Teil 2: Innenkabel - Rahmenspezifikation
(IEC 60794-2:2002)

This European Standard was approved by CENELEC on 2002-12-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC
European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 60794-2:2003 E

Foreword

The text of document 86A/819/FDIS, future edition 3 of IEC 60794-2, prepared by SC 86A, Fibres and cables, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60794-2 on 2002-12-01.

This standard shall be used in conjunction with EN 60794-1-1:2002 and EN 60794-1-2:1999.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2003-09-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2005-12-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60794-2:2002 was approved by CENELEC as a European Standard without any modification.

CONTENTS

OPTICAL FIBRE CABLES –

Part 2: Indoor cables – Sectional specification

1 Scope

This part of IEC 60794 is a sectional specification. It gives the requirements that apply to optical fibre cables for indoor use with applications such as transmission, telephone and data processing equipment and communication and transmission networks.

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).

IEC 60304:1982, *Standard colours for insulation for low-frequency cables and wires*

IEC 60332-3-24:2000, *Tests on electric cables under fire conditions – Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C*

3 Construction

3.1 General

None.

3.2 Optical fibres and primary coating

The optical fibre and fibre primary coating shall conform to the requirements of IEC 60793-2.

3.3 Buffer

The buffer, if any, shall consist of a suitable material applied loosely or tightly over the coated fibre. The interstices between the coated fibre and loose buffer can be filled with a suitable and easily deformable material. The buffer shall be easily removable.

3.4 Ruggedized fibre

Further protection can be provided to tight secondary coated fibres by surrounding one or two with non-metallic strength members within a sheath of suitable material.

3.5 Slotted core

The slotted core is obtained by extruding a suitable material with a defined number of slots, providing helical or SZ configuration along the core. One or more primary coated fibres or optical elements such as ribbons or fibre bundles are located in each slot.

3.6 Tube

If the fibres are deployed in a tube, one or more individual primary coated fibres or ribbons are packaged (loosely or not) in a tube construction which may be filled. The tube may be reinforced with a composite wall.

3.7 Stranded loose tube

None.

3.8 Ribbon structure

If the fibres are deployed in the form of a ribbon, the ribbon structure shall conform to 6.5 and 8.2.3 of IEC 60794-3. Fibres shall be formed into units of typically two, four, six, eight, or 12 fibres each. The fibres within the units shall remain parallel and not cross.

3.9 Strength and anti-buckling members

In general the cable shall be designed with sufficient strength members to meet installation and service conditions so that the fibres are not subjected to strain in excess of limits agreed between the customer and the manufacturer.

The strength and/or anti-buckling members 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.

3.10 Ripcord

None.

3.11 Sheath

The cable core shall be uniformly covered with a protective sheath.

3.12 Sheath marking

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

3.13 Identification

NOTE The fibre, tube and sheath colour codes that follow are examples of possible standard colour identification systems. The final decision on the acceptable system is taken by the user (agreement between the customer and the manufacturer).

The coated fibre or buffer shall be distinguishable by means of colour coding or positioning. Cable tubes shall be distinguishable by means of numbering or colour coding. Standard colours shall be used, as near as possible (reasonable match) to IEC 60304. The colours for fibres are given in Table 1 and the colours for tubes are given in Table 2. The cable sheath shall be colour coded or alternatively, a printing in the sheath indicate the fibre type, for example, G50/125 for multimode fibre with 50 μm core diameter. The colours for sheaths are given in Table 3.

Table 1 – Colour-coding sequence for individual fibres or buffers

Fibre number	Colour
1	Blue
2	Yellow
3	Red
4	White
5	Green
6	Violet
7	Orange
8	Grey
9	Turquoise
10	Black
11	Brown
12	Pink
NOTE For fibre counts above 12, additional groups of 12 fibres should be identified by combining the above sequence with an added identification (for example, ring marking, dashed mark or tracer).	

Table 2 – Colour-coding scheme for tubes in hybrid cables

Fibre type	Fibre diameter μm	Tube colour
Multimode	50/125	Green
	62,5/125	Blue
Single-mode dispersion unshifted	All diameters	Yellow
Single-mode dispersion shifted	All diameters	Red or yellow

Table 3 – Colour coding of cable outer sheaths

Cables with fibre type	Colour of sheath
Single-mode fibre	Yellow
Multimode fibre with 50 μm core diameter	Orange
Multimode fibre with 62,5 μm core diameter	Grey
Multimode fibre with 100 μm core diameter	Black
Dispersion-shifted fibre	Red

3.14 Examples of cable constructions

None.

4 Tests

Compliance with specification requirements shall be verified by carrying out tests as required by the relevant cable specification. It is not intended that all tests shall be carried out; the frequency of testing shall be agreed between the customer and the manufacturer.

NOTE Tests for cables for use as patch cords are under consideration.

4.1 Dimensions

The fibre dimensions and tolerances shall be checked in accordance with test Method C of 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

4.2.1 Cable tensile performance

The cable shall be tested in accordance with IEC 60794-1-2, Method E1.

4.2.2 Cable crush

The cable shall be tested in accordance with IEC 60794-1-2, Method E3.

4.2.3 Cable impact

The cable shall be tested in accordance with IEC 60794-1-2, Method E4.

4.2.4 Cable bending

The cable shall be tested in accordance with IEC 60794-1-2, Method E11.

4.2.5 Cable repeated bending

The cable shall be tested in accordance with IEC 60794-1-2, Method E6.

4.2.6 Cable bending under tension

The cable shall be tested in accordance with IEC 60794-1-2, Method E18.

4.2.7 Cable bending at low temperature

The cable shall be tested in accordance with IEC 60794-1-2, Method E11.

4.2.8 Cable flexing

The cable shall be tested in accordance with IEC 60794-1-2, Method E8.

4.2.9 Cable torsion

The cable shall be tested in accordance with IEC 60794-1-2, Method E7.

4.2.10 Cable kink

The cable shall be tested in accordance with IEC 60794-1-2, Method E10.

4.3 Environmental requirements

4.3.1 Temperature cycling

The cable shall be tested in accordance with Method F1 of IEC 60794-1-2.

4.4 Transmission requirements

The transmission requirements shall be verified in accordance with IEC 60793-2 and shall be agreed between the customer and the manufacturer. Maximum cable attenuation shall comply with IEC 60794-1-1.

4.5 Fire performance

The cable shall be tested in accordance with IEC 60332-1, IEC 60332-3-24, IEC 60754-1, IEC 60754-2, IEC 61034-1, IEC 61034-2 or to any other test method agreed between the customer and manufacturer.

5 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.

6 Quality assurance

Compliance with specification requirements shall be verified by carrying out tests as indicated in the relevant part of IEC 60794-2. It is not intended that all tests shall be carried out on every length of cable; the frequency of testing shall be agreed between the customer and manufacturer.

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

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60304	1982	Standard colours for insulation for low-frequency cables and wires	HD 402 S2	1984
IEC 60332-3-24	2000	Tests on electric cables under fire conditions Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C	-	-

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