

Optical fibre cables —

Part 2-42: Indoor optical fibre cables — Product specification for simplex and duplex cables with A4 fibres

ICS 33.180.10

National foreword

This British Standard is the UK implementation of EN 60794-2-42:2008. It is identical to IEC 60794-2-42:2008.

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

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 29 August 2008

© BSI 2008

ISBN 978 0 580 55793 4

Amendments/corrigenda issued since publication

Date	Comments

**Optical fibre cables -
Part 2-42: Indoor optical fibre cables -
Product specification for simplex and duplex cables with A4 fibres
(IEC 60794-2-42:2008)**

Câbles à fibres optiques -
Partie 2-42: Câbles intérieurs
à fibres optiques -
Spécification de produit pour les câbles
simplex et duplex munis de fibres A4
(CEI 60794-2-42:2008)

Lichtwellenleiterkabel -
Teil 2-42: LWL-Innenkabel -
Produktspezifikation für Simplex- und
Duplexkabel mit Fasern der Kategorie A4
(IEC 60794-2-42:2008)

This European Standard was approved by CENELEC on 2008-05-01. 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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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

Foreword

The text of document 86A/1126/CDV, future edition 1 of IEC 60794-2-42, prepared by SC 86A, Fibres and cables, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel Unique Acceptance Procedure and was approved by CENELEC as EN 60794-2-42 on 2008-05-01.

This standard is to be used in conjunction with EN 60794-1-1, EN 60794-1-2 and EN 60794-2.

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) 2009-02-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2011-05-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60794-2-42:2008 was approved by CENELEC as a European Standard without any modification.

CONTENTS

1	Scope	4
2	Normative references	4
3	Construction	5
3.1	General	5
3.2	Optical fibres	5
3.3	Buffer	5
3.4	Ruggedized fibre	5
3.5	Tube	5
3.6	Strength and anti-buckling members	6
3.7	Sheath	6
3.8	Sheath marking	6
3.9	Examples of cable constructions	6
4	Tests	6
4.1	General	6
4.2	Dimensions	6
4.3	Mechanical requirements	6
4.4	Environmental requirements – Temperature cycling	9
4.5	Transmission requirements	9
4.6	Fire performance	9
	Annex A (informative) Examples of cable constructions	10
	Annex B (informative) Blank Detail Specification (BDS)	13
	Annex ZA (normative) Normative references to international publications with their corresponding European publications.....	24
	Bibliography.....	23
	Figure A.1 – Simplex loose non-buffered fibre cable	10
	Figure A.2 – Simplex ruggedized fibre cable	10
	Figure A.3 – Duplex loose non-buffered fibre cable	10
	Figure A.4 – Duplex ruggedized fibre cable.....	11
	Figure A.5 – Duplex ruggedized fibre zip cord.....	11
	Figure A.6 – Duplex flat cable	11
	Figure A.7 – Duplex round cable	12
	Figure A.8 – Duplex flat cable	12
	Table 1 – Temperature cycling.....	9

OPTICAL FIBRE CABLES –**Part 2-42: Indoor optical fibre cables –
Product specification for simplex and duplex cables with A4 fibres****1 Scope**

This part of IEC 60794 covers simplex and duplex optical fibre cables containing A4 fibres for indoor use. The requirements of the sectional specification IEC 60794-2 are applicable to cables covered by this standard.

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.

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

IEC 60654-4, *Operating conditions for industrial-process measurement and control equipment – Part 4: Corrosive and erosive influences*

IEC 60721-1, *Classification of environmental conditions – Part 1: Environmental parameters and their severities*

IEC 60721-3-3, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weather protected locations*

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 60793-2-40, *Optical fibres – Part 2-40: Product specifications – Sectional specification for category A4 multimode fibres*

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 60811-1-1, *Common test methods for insulating and sheathing materials of electric cables and optical cables – Part 1-1: Methods for general application – Measurement of thickness and overall dimensions – Tests for determining the mechanical properties*

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

IEC 61000-2-5, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 5: Classification of electromagnetic environments – Basic EMC publication*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*

IEC 61326 (all parts), *Electrical equipment for measurement, control and laboratory use – EMC*

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

ISO/IEC 24702: *Information technology – Generic cabling – Industrial premises*

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.

The cable shall be designed and manufactured for an expected operating lifetime of at least 15 years. In this context, the attenuation of the installed cable at the operational wavelength(s) shall not exceed values agreed between customer and supplier. 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 customer and supplier.

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

3.2 Optical fibres

Multimode category A4a through A4g optical fibres shall be used that meet the requirements of IEC 60793-2-40.

3.3 Buffer

The buffer, if any, shall consist of one or more layers of inert material. For tight buffer, the buffer shall be easily removable in one operation over a length of 15 mm to 25 mm, depending on customer requirements. For semi-tight buffers, the buffer shall be easily removable over a length of 0,2 m to 2,0 m.

3.4 Ruggedized fibre

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

3.5 Tube

One or two identified primary coated or buffered fibres may be packaged (loosely or not) in a tube construction, which 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 installation and service conditions thus enabling fibres not to be subjected to strain in excess of limits in 4.2.1.

The strength and/or anti-buckling member 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 by agreement between customer and supplier.

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 A.1 to A.8. Other configurations are not excluded if they meet the mechanical, environmental and transmission requirements given in this specification.

4 Tests

4.1 General

Compliance with specification requirements shall be verified by carrying out tests selected from the following subclauses. It is not intended that all tests shall be performed. The frequency of testing shall be agreed between customer and supplier.

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

4.2 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.

4.3 Mechanical requirements

4.3.1 General

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. Launch conditions to measure changes in attenuation shall be in conformity with IEC 60793-2-40.

4.3.2 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 and shall be agreed between customer and supplier.

Requirements: change in attenuation less than 0,2 dB after the test and there shall be no damage to the cable elements.

4.3.3 Crush

Method: IEC 60794-1-2-E3.

Force: 1 000 N.

Duration: 1 min.

Number of test locations: 3, at least 500 mm apart.

Requirements: change in attenuation shall not exceed 0,2 dB after the test. Under visual examination, there shall be no damage to the cable elements.

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

4.3.4 Impact

Method: IEC 60794-1-2-E4.

Radius of striking surface: 12,5 mm.

Impact energy: 1J.

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

Requirements: change in attenuation shall not exceed 0,2 dB after the test. Under visual examination without magnification there shall be no damage to the sheath and to the cable elements. The imprint of the striking surface on the sheath is not considered mechanical damage.

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

4.3.5 Bend

Method: IEC 60794-1-2-E11A

Mandrel diameter: 10 times cable diameter (for flat cables, the diameter is the minor dimension).

Number of turns per helix: 6.

Number of cycles: 10.

Requirements: change in attenuation should be less than 0,2 dB after test. Under visual examination, there shall be no damage to the sheath or cable element.

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

4.3.6 Repeated bending

Method: IEC 60794-1-2-E6.