
Kabli iz optičnih vlaken – 3-10. del: Zunanji kabli - Rodovna specifikacija za cevovodne in neposredno zakopane optične telekomunikacijske kable (IEC 60794-3-10:2002, spremenjen)*

Optical fibre cables - Part 3-10: Outdoor cables - Family specification for duct and directly buried optical telecommunication cables (IEC 60794-3-10:2002, modified)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 60794-3-10:2004](https://standards.iteh.ai/catalog/standards/sist/5f14126f-01cb-485d-8e2f-e5bbe25c888f/sist-en-60794-3-10-2004)

<https://standards.iteh.ai/catalog/standards/sist/5f14126f-01cb-485d-8e2f-e5bbe25c888f/sist-en-60794-3-10-2004>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60794-3-10:2004

<https://standards.iteh.ai/catalog/standards/sist/5f14126f-01cb-485d-8e2f-e5bbe25c888f/sist-en-60794-3-10-2004>

EUROPEAN STANDARD

EN 60794-3-10

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2002

ICS 33.180.10

Supersedes EN 187101:1995

English version

Optical fibre cables
Part 3-10: Outdoor cables -
Family specification for duct and directly buried
optical telecommunication cables
(IEC 60794-3-10:2002, modified)

Câbles à fibres optiques
Partie 3-10: Câbles extérieurs -
Spécification de famille pour les câbles
optiques de télécommunication
destinés à être installés dans des conduites
ou à être directement enterrés
(CEI 60794-3-10:2002, modifiée)

Lichtwellenleiterkabel
Teil 3-10: Außenkabel -
Familienspezifikation
für LWL-Fernmelde-Erd- und Röhrenkabel
(IEC 60794-3-10:2002, modifiziert)

STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 60794-3-10:2004](https://standards.iteh.ai/catalog/standards/sist/5f14126f-01cb-485d-8e2f-e5bbe25c888f/sist-en-60794-3-10-2004)

<https://standards.iteh.ai/catalog/standards/sist/5f14126f-01cb-485d-8e2f-e5bbe25c888f/sist-en-60794-3-10-2004>

This European Standard was approved by CENELEC on 2002-03-05. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and 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/749/FDIS, future edition 1 of IEC 60794-3-10, 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 60794-3-10 on 2002-03-05.

A draft amendment, prepared by the Technical Committee CENELEC TC 86A, Optical fibres and optical fibre cables, was submitted to the formal vote and was approved by CENELEC for inclusion in EN 60794-3-10 on 2002-03-05.

This European Standard supersedes EN 187101:1995

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) 2003-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-03-01

Annexes designated "normative" are part of the body of the standard.

In this standard, annex ZA normative.

Annex ZA has been added by CENELEC.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60794-3-10:2004

<https://standards.iteh.ai/catalog/standards/sist/5f14126f-01cb-485d-8e2f-e5bbe25c888f/sist-en-60794-3-10-2004>

Endorsement notice

The text of the International Standard IEC 60794-3-10:2002 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

Replace subclause 4.5 by:

4.5 Installation and operating conditions

4.5.1 Tests applicable

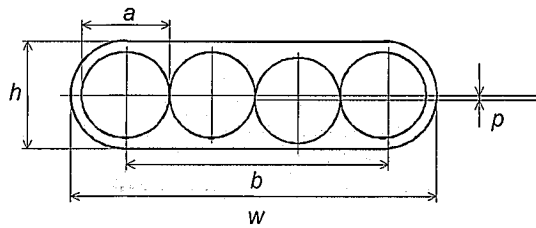
Characteristics (9)	IEC 60794-3 Clause (10)	Family (11) requirements	Test methods (12)	Remarks (13)
General requirements	8.1	Agreement between user and manufacturer		
Bend of cable element	8.2.1.2	According to DS	IEC 60794-1-2 Method G1	
Tube kinking	8.2.2.1	According to DS	IEC 60794-1-2 Method G7	
Ribbons:				
- dimensions	8.2.3.1	IEC 60794-3 Table 1	IEC 60794-3 8.2.3.1	
- separability of individual fibres from ribbon	8.2.3.2.1	IEC 60794-3 8.2.3.2.1 or according to DS	IEC 60794-1-2 Method G5 or according to DS	
- ribbon stripping	8.2.3.2.2	According to DS		
- torsion	8.2.3.2.3	According to DS	IEC 60794-1-2 Method G6	
- characterization of encapsulated 4 & 8 fibre ribbons	8.2.3	See 4.5.2	See 4.5.2	

4.5.2 Details of family requirements and test conditions for encapsulated optical 4-fibre and 8-fibre ribbons

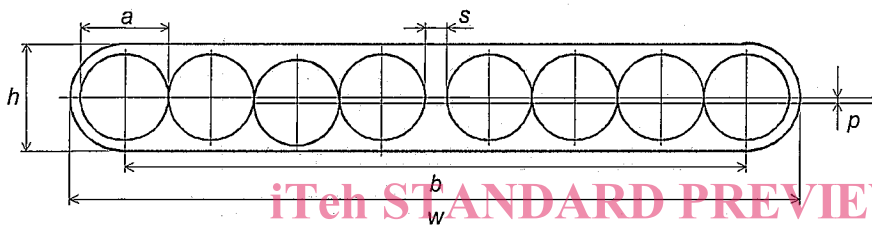
NOTE The expression of "no change in attenuation" means that any change in measurement value, either positive or negative, within the uncertainty of measurement shall be ignored.

4.5.2.1 Dimensions

The ribbon dimensions shall be:



4-fibre ribbons



8-fibre ribbons

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Dimension	Number of fibres	
	4	8
Centre-centre distance between extreme fibres	https://standards.iteh.ai/catalog/standards/sist/5f14126f-01cb-485d-8e2f-c5bbe25c888f/sist-en-60794-3-10-2004	
b (μm) splittable		$1\ 760 \pm 50$
unsplittable	750 ± 40	$1\ 720 \pm 50$
Width - w (μm)	$1\ 100 \pm 100$	$2\ 200 \pm 100$
Height - h (μm)	375 ± 50	375 ± 50
or *	310 ± 30	310 ± 30
Planarity - p (μm)	≤ 30	≤ 40
Ribbon separation - s (μm)	N.A.	u.c.
* = to be agreed between the user and the manufacturer. N.A. = not applicable. u.c. = under consideration.		

4.5.2.2 Mechanical tests

4.5.2.2.1 Strippability

The strippability test shall be done with a heat jacket remover in a tensile test machine on the ribbon according to the following:

Test conditions:	Strip length:	25 mm
	Stripping speed:	100 mm/min
	Pre-heating temperature:	(100 ± 5) °C
	Time of pre-heating:	30 seconds
	Sample size:	10
	Preconditioning:	24 hours, (23 ± 2) °C, (50 ± 10) % RH

Acceptance criteria: There shall be no fibre breakage during the test.

The test results shall include the following:

- average of results obtained for the maximum and mean strip force, excluding the first peak;
- standard deviation for the strip force;
- number of ribbons tested containing fibres which broke before completely removing the coating;
- number of fibres which broke before completely removing the coating;
- if any residue of the coating is still left on the fibre glass after the strippability test.

4.5.2.2.2 Macrobend

The fibre ribbon shall be tested in accordance with EN 60794-1-2, method G1.

Test conditions: One hundred turns of fibre ribbon shall be wound on a mandrel with a diameter of 60 mm

Acceptance criteria: The attenuation change shall be ≤ 0,20 dB

4.5.2.2.3 Torsion

The ribbon shall be tested in accordance with EN 60794-1-2, method G6.

Test conditions:	Sample length:	500 mm
	Load:	5 N
	Number of cycles:	5 with ± 360° and then 1 with ± 1 080°

Acceptance criteria: No change in attenuation

4.5.2.2.4 Crush test

The ribbon shall be tested in accordance with EN 60794-1-2, method E3.

Test conditions: Each fibre in the ribbon shall be measured separately.

Load plate/plate: 500 N

Duration: 5 min

Acceptance criteria: No change in attenuation after test. The values during test shall be stated.

4.5.2.3 Environmental tests

4.5.2.3.1 Temperature cycling

The ribbon shall be tested in accordance with EN 60793-1-52.

Test conditions: Sample length: > 1 000 m

T_A : -45 °C

T_B : +70 °C

Dwell time: 4 hours

Rate of heating and cooling: 5 °C/min

Number of cycles: 10

The attenuation shall be measured in each cycle at T_A and T_B . The strip force shall be measured according to 4.5.2.2.1.

Acceptance criteria: No change in attenuation.

The strip force shall not change more than ± 30 % of the value measured in 4.5.2.2.1.

4.5.2.3.2 Dry heat

The ribbon shall be tested in accordance with EN 60793-1-51.

Test conditions: 21 days, +70 °C according to IEC 60068-2-2, test Bb

The attenuation shall be measured every 24 hours during the complete test.

Acceptance criteria: No change in attenuation.

The strip force shall not change more than ± 30 % of the value measured in 4.5.2.2.1.

4.5.2.3.3 Damp heat

The ribbon shall be tested in accordance with EN 60793-1-50.

Test conditions: 72 days, +40 °C, 90 % - 95 % RH according to IEC 60068-2-3, test Ca

The attenuation shall be measured every 24 hours during the complete test.

Acceptance criteria: No change in attenuation.

The strip force shall not change more than ± 30 % of the value measured in 4.5.2.2.1.

4.5.2.3.4 Water immersion

The ribbon shall be tested in accordance with EN 60793-1-53.

Test conditions:	Sample length:	at least 1 000 m
	Temperature:	(23 \pm 2) °C
	Dwell time:	30 days
	Water:	tap water

The ribbon shall be loosely coiled.

Acceptance criteria: No attenuation change.

The strip force shall not change more than ± 30 % of the value measured in 4.5.2.2.1.

4.5.2.3.5 Ageing in filling compound

Test conditions:	Sample length:	at least 1 000 m
	Temperature:	(70 \pm 2) °C
	Dwell time:	30 days
	Filling compound:	The test shall be done in the filling compound to be used in the cable

The ribbon shall be loosely coiled.

Acceptance criteria: No change in attenuation.

The strip force shall not change more than ± 30 % of the value measured in 4.5.2.2.1.

4.5.2.4 Separability

4.5.2.4.1 Ribbon

If required, it shall be possible to split 8-fibre ribbon into two 4-fibre ribbons, with no damage to the 4-fibre ribbons.

4.5.2.4.2 Fibres

It shall be possible to divide the ribbon into individual fibres. The fibres shall remain easily identifiable and the fibre coating shall remain undamaged.

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60304	1982	Standard colours for insulation for low-frequency cables and wires	HD 402 S2	1984
IEC 60793-1-20	2001	Optical fibres Part 1-20: Measurement methods and test procedures - Fibre geometry	EN 60793-1-20	2002
IEC 60793-1-40	2001	Part 1-40: Measurement methods and test procedures - Attenuation	EN 60793-1-40	¹⁾
IEC 60793-1-44	2001	Part 1-44: Measurement methods and test procedures - Cut-off wavelength	EN 60793-1-44	2002
IEC 60793-2	1998	Part 2: Product specifications	-	-
IEC 60794-1-1	2001	Optical fibre cables Part 1-1: Generic specification - General	EN 60794-1-1	2002
IEC 60794-1-2	1999	Part 1-2: Generic specification - Basic optical cable test procedures	EN 60794-1-2	1999
IEC 60794-3	2001	Part 3: Sectional specification - Outdoor cables	EN 60794-3	2002
IEC 60811-1-1	1993	Insulating and sheathing materials of electric and optical cables - Common test methods Part 1-1: General application - Measurement of thickness and overall dimensions - Tests for determining the mechanical properties	EN 60811-1-1	1995

¹⁾ To be published.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60811-5-1 (mod)	1990	Part 5: Methods specific to filling compounds Section 1: Drop point - Separation of oil - Lower temperature brittleness - Total acid number - Absence of corrosive components - Permittivity at 23 °C - D.C. resistivity at 23 °C and 100 °C	EN 60811-5-1	1999

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 60794-3-10:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/5f14126f-01cb-485d-8e2f-e5bbe25c888f/sist-en-60794-3-10-2004>