SLOVENSKI STANDARD

SIST EN 187103:2004

september 2004

Rodovne specifikacije – Kabli z optičnimi vlakni za notranjo uporabo*

Family specification - Optical fibre cables for indoor applications

ICS 33.180.10

Referenčna številka
SIST EN 187103:2004(en)

EUROPEAN STANDARD **EN 187103**

NORME EUROPÉENNE

EUROPÄISCHE NORM January 2003

ICS 33.180.20

English version

Family specification – Optical fibre cables for indoor applications

Spécification – Câbles à fibres optiques pour applications intérieures

Familienspezifikation - Lichtwellenleiterkabel zur Anwendung in Innenräumen

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.

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

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Ref. No. EN 187103:2003 E

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 86A, Optical fibres and optical fibre cables.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 187103 on 2002-03-05.

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) 2003-08-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-03-01

This standard has been produced in accordance with a specialised agreement on work repartition and co-operation for standardization concerning fibre optics and is part of the CEN/CENELEC/ETSI (European Telecommunications Standards Institute) co-operation agreement.

It uses information provided by the ETSI on functional and system related aspects by means of an Interim European Telecommunication Standard (I-ETS).

The document I-ETS 300 644, *Optical fibre cables for indoor applications*, prepared by ETSI/TM1/WG1, has been reviewed and completed by the CENELEC TC 86A for incorporation within the set of EN 1871xx standards prepared using a similar process.

Contents

1 Scope

This family specification covers optical cables for telecommunication application to be used indoor. This specification does not cover cable assemblies, such as connectorized jumper cable, or the functional requirements for cable break-out (fan out). It also not covers cables for LAN applications and cables incorporating multimode fibres.

Clause 5 of this standard describes a blank detail specification for optical telecommunication cables to be used for indoor cables. It incorporates some minimum requirements common to all European countries.

Detail specifications may be prepared based on this family specification following in particular requirements of clause 5.

2 General

The parameters specified in this standard may be affected by measurement uncertainty arising either from measurement errors or calibration errors due to lack of suitable standards. Acceptance criteria shall be interpreted with respect to this consideration. The total uncertainty of measurement for this standard shall be less than or equal to 0,05 dB for attenuation.

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.

The number of fibres tested shall be representative of the cable design and shall be agreed between the user and the manufacturer.

3 Normative references

This standard incorporates by dated and 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 standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

[1]	EN 188101	1995	Family specification: Single-mode dispersion unshifted (B1.1) optical fibre
[2]	EN 188102	1996	Family specification: Single-mode dispersion shifted (B2) optical fibre
[3]	EN 188103	200x	Family specification: Single-mode non zero dispersion shifted optical fibre (B4)
[4]	EN 187000	1995	Generic specification: Optical fibre cables
[5]	EN 188000	1995	Generic specification: Optical fibres
[6]	HD 624.7	1994	Materials used in communication cables – Part 7: Halogen free flame retardant thermoplastic sheathing compounds
[7]	IEC 60304	1982	Standard colours for insulation for low-frequency cables and wires
[8]	IEC 60332-1	1993	Tests on electric cables under fire conditions – Part 1: Test on a single vertical insulated wire or cable
[9]	IEC 60332-3	1992	Tests on electric cables under fire conditions – Part 3: Tests on bunched wires or cables

[10] IEC 60754-2 1991 Test on gases evolved during combustion of electric cables – Part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity

[11] IEC 60811-4-2 1990 Common test methods for insulating and sheathing materials of electric cables – Part 4: Methods specific to polyethylene and polypropylene compounds – Section 2: Elongation at break after preconditioning - Wrapping test after preconditioning - Wrapping test after thermal ageing in air - Measurement of mass increase - Long-term stability test (Appendix A) - Test method for copper-catalysed oxidative degradation (Appendix B)

[12] IEC 60811-5-1 1990 Common test methods for insulating and sheathing materials of electric cables – 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

[13] IEC 61034-1 1990 Measurement of smoke density of electric cables burning under defined conditions – Part 1: Test apparatus

[14] IEC 61034-2 1991 Measurement of smoke density of electric cables burning under defined conditions – Part 2: Test procedure and requirements

[15] IEC 60754-1 1994 Test on gases evolved during combustion of electric cables – Part 1: Determination of the amount of halogen acid gas

[16] IEC 60794-1 1999 Optical fibre cables – Part 1: Generic specification

[17] IEC 60794-3 1998 Optical fibre cables – Part 3: Duct, buried & aerial cables Sectional specification

[18] IEC 60708-1 1981 Low-frequency cables with polyolefin insulation and moisture barrier polyolefin sheath – Part 1: General design details and requirements

4 Symbols and abbreviations

4.1 Symbols

For the purposes of this standard, the following symbols apply:

λ_{cc} Cabled fibre cut-off wavelength

SZ A technique in which the lay reverses direction periodically

T_0 Threshold below which no attenuation and/or fibre strain increase should occur in the tensile strength test

T_m The acceptable amount of transient stress that can be applied to the cable without permanent degradation of the characteristics of the fibres in the tensile strength test

T_{A1} Temperature cycling lower limit for acceptance criteria 1

T_{A2} Temperature cycling lower limit for acceptance criteria 2

T_{B1} Temperature cycling upper limit for acceptance criteria 1

T_{B2} Temperature cycling upper limit for acceptance criteria 2

t_1 Temperature cycling test dwell time

4.2 Abbreviations

DS Detail Specification

EN Europäische Norm (European Standard)

HD Harmonization Document

IEC International Electrotechnical Commission

5 Family specification for optical telecommunication cables for indoor application (Blank detail specification and minimum requirements)

5.1 Cable description

(1) Prepared by		(2) Document N°: Issue: Date:
(3) Available from:	(4) Generic specification : EN 187000 [4] Sectional specification : IEC/EN 60794-3 [17]	
(5) Additional references:		
(6) Cable description: (Drawing)		
(7) Cable construction:		
OPTICAL FIBRES		
RANGE OF FIBRE COUNT		
MODULARITY		
CONSTRUCTION		Additional remarks
- Single coloured fibre	S-c-f	
- Tube - filled	F-l-t	
- Tube - unfilled	U-l-t	
- Slotted core - filled	F-s-c	
- Slotted core - unfilled	U-s-c	
- Tight secondary coating	T-s-c	
- Ribbon in slotted core	R-s-c	
- Ribbon in tube	R-l-t	
- Central (strength) member - metallic	M-c-m	
- Central (strength) member - non metallic	N-m-c-m	
- Core filling - continuous	C-f	
- Core filling - regular water blocking	R-b	
Lay-up		
- Stranding (helical or SZ)	Str	
- Single unit	S-u	
- Hybrid configuration	H-c	
……..		

(7) Cable construction (continued)		Additional remarks
<u>Conductors</u> ……..		
<u>Inner sheath</u> ……..		
<u>Peripheral strength member</u> - Metallic - Non-metallic ……..	 M-p-m N-m-p-m	
<u>Moisture barrier</u> - Coated aluminium tape - Double coated aluminium tape - Double coated steel tape ……..	 C-a-t D-c-a-t D-c-s-t	
<u>Outer sheath</u> ……..		
<u>Additional armouring</u> - Metallic armouring - Non-metallic armouring ……..	 M-a N-m-a	
<u>Additional outer sheath</u> ……..		
<u>Marking identification</u> - Customer requirement - Identification of manufacturer		
(8) Application information:		
Application Nominal outer diameter (d) Minimum bending radius for static bending Minimum bending radius for dynamic bending Temperature range: - Transport and storage - Installation - Operation Manufacturing cable length: - Typical - Nominal/tolerances: according customer requirement	 mm mm or nxd mm or nxd °C °C °C m m	

5.2 Optical fibres

5.2.1 Single mode dispersion unshifted (B1.1) optical fibre

Characteristics (9)	EN 60794-3 [17] Clause (10)	Family (11) requirements	Test methods (12)	Remarks (13)
Uncabled optical fibre	4.1	EN 188101 [1]		
Attenuation coefficient (cabled fibre) at 1310 nm at 1550 nm Attenuation discontinuities Attenuation linearity	4.2	according to DS Typical values: ≤ 0,45 dB/km ≤ 0,30 dB/km ≤ 0,10 dB under consideration	EN 188000 [5]- 301, - 302, - 303 under consideration	
Cable cut-off wavelength	4.3	$\lambda_{cc} < \lambda_{operational}$	EN 188000 [5]- 313	
Fibre colouring Outer diameter including colouring	4.4 7.2.1.1	IEC 60304 [7] 250 ± 15 µm	visual inspection EN 188000 [5]- 104	

5.2.2 Single mode dispersion shifted (B1.2) optical fibre

Characteristics (9)	EN 60794-3 [17] Clause (10)	Family (11) requirements	Test methods (12)	Remarks (13)
Uncabled optical fibre	4.1	EN 188102 [2]		
Attenuation coefficient (cabled fibre) at 1310 nm at 1550 nm Attenuation discontinuities Attenuation linearity	4.2	according to DS typical values: ≤ 0,45 dB/km ≤ 0,30 dB/km ≤ 0,10 dB under consideration	EN 188000 [5]- 301, - 302, - 303 under consideration	
Cable cut-off wavelength	4.3	$\lambda_{cc} < \lambda_{operational}$	EN 188000 [5]- 313	
Fibre colouring Outer diameter including colouring	4.4 7.2.1.1	IEC 60304 [7] 250 ± 15 µm	visual inspection EN 188000 [5]- 104	

5.2.3 Single mode non zero dispersion shifted (B4) optical fibre

Characteristics (9)	EN 60794-3 [17] Clause (10)	Family (11) requirements	Test methods (12)	Remarks (13)
Uncabled optical fibre	4.1	EN 188103 [3]		
Attenuation coefficient (cabled fibre) at 1550 nm at 16xx nm (note xx ≤ 25 nm) Attenuation discontinuities Attenuation linearity	4.2	according to DS Typical values: ≤ 0,30 dB/km ≤ 0,40 dB/km ≤ 0,10 dB under consideration	EN 188000 [5]- 301, - 302, - 303 under consideration	
Cable cut-off wavelength	4.3	$\lambda_{cc} < 1480$nm	EN 188000 [5]- 313	
Fibre colouring Outer diameter including colouring	4.4 7.2.1.1	IEC 60304 [7] 250 ± 15 µm	visual inspection EN 188000 [5]- 104	