

© Copyright SEK. Reproduction in any form without permission is prohibited.

**Optical fibre cables –  
Sectional Specification:  
Optical cables to be used along electrical power lines (OCEPL)**

Som svensk standard gäller europastandarden EN 187200:2001. Den svenska standarden innehåller den officiella engelska språkversionen av EN 187200:2001.

---

ICS 33.180.10

Denna standard är fastställd av Svenska Elektriska Kommissionen, SEK,

som också kan lämna upplysningar om **sakinnehållet** i standarden.

Postadress: SEK, Box 1284, 164 29 KISTA

Telefon: 08 - 444 14 00. Telefax: 08 - 444 14 30

E-post: sek@sekom.se. Internet: www.sekom.se

---



EUROPEAN STANDARD

**EN 187200**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2001

ICS 33.180.10

English version

**Sectional Specification:  
Optical cables to be used along electrical power lines (OCEPL)**

Spécification intermédiaire:  
Câbles optiques équipant les lignes  
électriques aériennes (COLEA)

Rahmenspezifikation:  
Lichtwellenleiterkabel auf Starkstrom-  
Freileitungen (OCEPL)

This European Standard was approved by CENELEC on 1999-10-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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

This European Standard was prepared by a joint working group of the Technical Committees CENELEC TC 7, Overhead electrical conductors, and TC 86A, Optical fibres and optical fibre cables.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 187200 on 1999-10-01.

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)	2001-11-01
--	-------	------------

latest date by which national standards conflicting with the EN have to be withdrawn	(dow)	2002-10-01
--	-------	------------

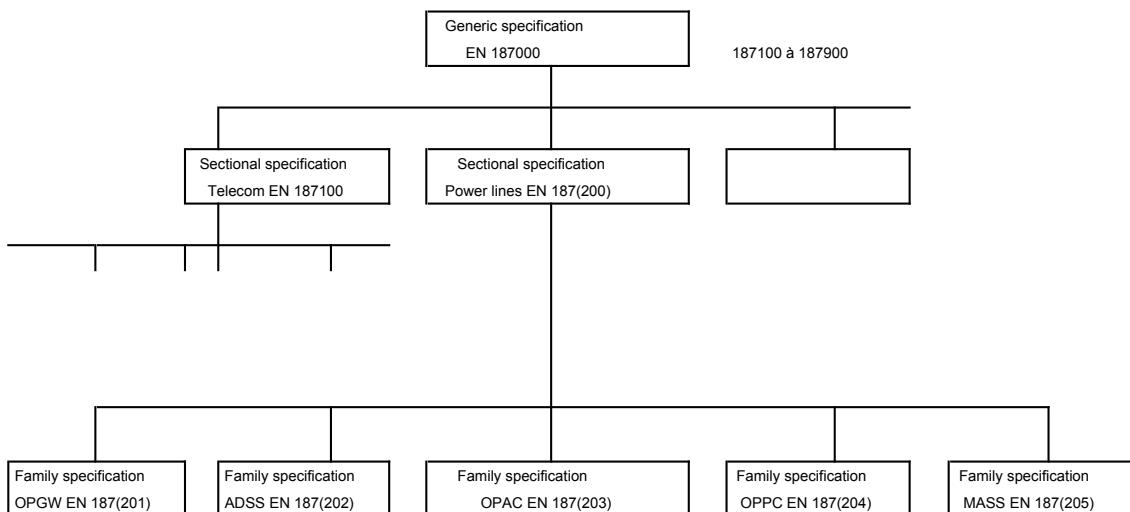
Annexes designated 'normative' are part of the body of the standard. Annexes designate 'informative' are given for information only. In this standard, Annexes B to G are normative and Annex A is informative.

This Sectional Specification is based, whenever possible, on European Standards (EN) or on publications of the International Electrotechnical Commission (IEC).

The chart hereafter presents the general architecture of the EN standardization of optical aerial cables to be used along electrical power lines.

A family specification can only be used when associated with the relevant sectional specification.

### **STANDARDIZATION OF OPTICAL AERIAL CABLES TO BE USED ALONG ELECTRICAL POWER LINES**



It was agreed that this standard will include all test methods or references needed for OCEPL.

At the moment, the tests methods for OPGW are included in the Sectional Specification and will be transferred to the Generic Specification EN 187000.

In case of special environment, additional requirements and tests may be taken into account, such as corrosion, bending, etc....

## Contents

1	Scope .....	6
2	Normative references .....	6
3	Abbreviations and definitions .....	7
4	Optical fibre .....	7
	4.1 - General .....	7
	4.2 - Attenuation .....	8
	4.2.1- Attenuation coefficient.....	8
	4.2.2 - Attenuation uniformity .....	8
	4.3 - Cut-off wavelength of cabled fibre .....	8
	4.4 - Fibre identification.....	8
5	Optical units .....	8
	5.1 - Slotted core .....	9
	5.2 - Plastic tube .....	9
	5.3 - Ribbon.....	9
	5.4 - Metallic tube .....	9
	5.4.1 - Metallic tube on the optical core.....	9
	5.4.2 - Fibres directly located in a metallic tube .....	9
6	Optical fibre cable construction.....	9
	6.1 - General .....	9
	6.2 - Lay-up of the cable elements.....	10
	6.3 - Cable core filling .....	10
	6.4 - Strength members.....	10
	6.4.1 - OPGW, OPPC and MASS .....	11
	6.4.2 - ADSS and OPAC .....	11
	6.5 - Inner sheath .....	11
	6.6 - Outer sheath .....	11
	6.7 - Sheath marking .....	11
7	Main requirements for installation and operating conditions .....	12
	7.1 - General .....	12
	7.2 - Characterization of optical units for splicing purpose .....	12
8	Design characteristics .....	12
9	Optical fibre cable tests .....	13
	9.1 - Classification of tests.....	13
	9.1.1 - Type tests.....	13
	9.1.2 - Sample tests.....	13
	9.1.3 - Routine tests.....	13

9.2 - Tensile performance.....	13
9.3 - Stress-strain test on metallic cables.....	14
9.4 - Installation capability .....	14
9.4.1 - Bending under tension .....	14
9.4.2 - Repeated bending.....	14
9.4.3 - Impact .....	14
9.4.4 - Crush.....	14
9.4.5 - Kink .....	14
9.4.6 - Torsion .....	14
9.4.7 - Cable bend .....	14
9.4.8 - Sheave test .....	15
9.5 - Temperature cycling.....	15
9.6 - Short-circuit.....	15
9.7 - Lightning test.....	17
9.7.1 - Proof test for given lightning condition .....	17
9.7.2 - Evaluation test for determining endurance capability of OPGW component.....	17
9.8 - Ageing.....	17
9.8.1 - Fibre coating compatibility .....	17
9.8.2 - Finished cable .....	17
9.9 - Hydrogen gas .....	17
9.10 - Aeolian vibration.....	18
9.11 - Creep .....	18
9.12 - Self damping .....	18
9.13 - Galloping (where applicable) .....	18
9.14 - Fitting compatibility .....	18
9.15 - Tension stringing .....	18
9.16 - Water penetration.....	18
9.17 - Bleeding .....	19
9.18 - Armouring test.....	19
9.19 - Attenuation.....	19
9.20 - Tracking and erosion resistance test on ADSS and OPAC.....	19
9.21 - Weathering resistance test on ADSS and OPAC .....	19
9.22 - Shotgun resistance on ADSS and OPAC .....	19
10 Quality assurance.....	19
11 Packaging and marking .....	19

Annex A (informative)	Recommended methods of calculating RTS, CSA of a layer of trapezoidal or Z shaped wires, modulus, linear expansion, d.c. resistance and ovality of optical unit .....	20
Annex B.1 (normative)	Sheave test method (1).....	23
Annex B.2 (normative)	Sheave test method (2).....	24
Annex C (normative)	Short-circuit test method .....	25
Annex D.1 (normative)	Proof test for given lightning condition.....	27
Annex D.2 (normative)	Test method for determining endurance capability of OPGW and OPPC ..... against lightning strike	28
Annex E (normative)	Aeolian vibration test method .....	29
Annex F (normative)	Self damping measurement .....	31
Annex G (normative)	Tensile performance in a suspension clamp .....	34

## 1 Scope

This standard specifies the requirements of single-mode and graded index optical fibre cables for OCEPL.

## 2 Normative references

This 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 standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 50182	Conductors for overhead lines - Round wire concentric lay stranded conductors
EN 50183	Conductors for overhead lines - Aluminium-magnesium-silicon alloy wires
EN 50189	Conductors for overhead lines - Zinc coated steel wires
EN 50326 <sup>1)</sup>	Characteristics of grease for bare overhead line conductors
EN 60794-1-2	Optical fibre cables -- Part 1-2 : Generic specification - Basic optical cable test procedures
EN 60794-3	Optical fibre cables -- Part 3: Telecommunication cables - Sectional specification
EN 60889	Hard-drawn aluminium wire for overhead line conductors
EN 61232	Aluminium-clad steel wire for electrical purposes (IEC 61232:1995, modified)
EN 61395	Overhead electrical conductors - Creep test procedure for stranded conductors
EN 187000	Generic specification : Optical fibre cables.
EN 188000	Generic specification : Optical fibres
EN 188100	Sectional specification : Single-mode (SM) optical fibre
EN 188101	Family specification : Single-mode dispersion unshifted (B1.1) optical fibre
EN 188102	Family specification : Single-mode dispersion shifted (B2) optical fibre
EN 188200	Sectional specification : Optical fibre A1 category graded index multimode fibres
EN 188201	Family specification : A1a graded index multimode optical fibres
EN 188202	Family specification : A1b graded index multimode optical fibres
IEC 60304	Standard colours for insulation for low-frequency cables and wires (harmonized as HD 402 S2:1984)
IEC 60708-1	Low-frequency cables with polyolefin insulation and moisture barrier polyolefin sheath -- Part 1 : General design details and requirements
IEC 61312-1	Protection against lightning electromagnetic impulse -- Part 1 : General principles

---

<sup>1)</sup> In preparation.