

**Optical fibre cables - Part 3-40: Outdoor cables -
Family specification for sewer cables and conduits
for installation by blowing and/or pulling in non-
man accessible storm and sanitary sewers**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 60794-3-40:2009 sisaldab Euroopa standardi EN 60794-3-40:2008 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 19.01.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 03.12.2009.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 60794-3-40:2009 consists of the English text of the European standard EN 60794-3-40:2008.

This standard is ratified with the order of Estonian Centre for Standardisation dated 19.01.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

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The standard is available from Estonian standardisation organisation.

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**Optical fibre cables -
Part 3-40: Outdoor cables -
Family specification for sewer cables and conduits
for installation by blowing and/or pulling
in non-man accessible storm and sanitary sewers
(IEC 60794-3-40:2008)**

Câbles à fibres optiques -
Partie 3-40: Câbles extérieurs -
Spécification de famille
relative aux câbles et conduits
cheminant dans les égouts destinés
à être installés par soufflage et/ou tirage
dans les conduites d'eaux usées pluviales
et sanitaires inaccessibles
(CEI 60794-3-40:2008)

Lichtwellenleiterkabel -
Teil 3-40: Außenkabel -
Familienspezifikation
für Kabel in Abwasserkanälen
für die Verlegung durch Einblasen
und/oder Einziehen in nicht zugänglichen
Regenwasser- und Abwasserkanälen
(IEC 60794-3-40:2008)

This European Standard was approved by CENELEC on 2008-11-01. 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.

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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

Foreword

The text of document 86A/1228/FDIS, future edition 1 of IEC 60794-3-40, 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 60794-3-40 on 2008-11-01.

This standard is to be used in conjunction with EN 60794-1-1, EN 60794-1-2 and EN 60794-3.

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) 2009-08-02
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2011-11-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60794-3-40:2008 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

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	- ¹⁾	Optical fibres - Part 1-20: Measurement methods and test procedures - Fibre geometry	EN 60793-1-20	2002 ²⁾
IEC 60793-1-40 (mod)	- ¹⁾	Optical fibres - Part 1-40: Measurement methods and test procedures - Attenuation	EN 60793-1-40	2003 ²⁾
IEC 60793-1-44	- ¹⁾	Optical fibres - Part 1-44: Measurement methods and test procedures - Cut-off wavelength	EN 60793-1-44	2002 ²⁾
IEC 60793-2	- ¹⁾	Optical fibres - Part 2: Product specifications - General	EN 60793-2	2008 ²⁾
IEC 60793-2-50	- ¹⁾	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	EN 60793-2-50	2008 ²⁾
IEC 60794-1-1	- ¹⁾	Optical fibre cables - Part 1-1: Generic specification - General	EN 60794-1-1	2002 ²⁾
IEC 60794-1-2	- ¹⁾	Optical fibre cables - Part 1-2: Generic specification - Basic optical cable test procedures	EN 60794-1-2	2003 ²⁾
IEC 60794-3	- ¹⁾	Optical fibre cables - Part 3: Sectional specification - Outdoor cables	EN 60794-3	2002 ²⁾
IEC 60794-3-10 (mod)	- ¹⁾	Optical fibre cables - Part 3-10: Outdoor cables - Family specification for duct and directly buried optical telecommunication cables	EN 60794-3-10	2002 ²⁾
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⁾ Undated reference.

²⁾ Valid edition at date of issue.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60811-5-1 (mod)	1990	Insulating and sheathing materials of electric and optical cables - Common test methods - Part 5-1: Methods specific to filling compounds - 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

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OPTICAL FIBRE CABLES –

Part 3-40: Outdoor cables – Family specification for sewer cables and conduits for installation by blowing and/or pulling in non-man accessible storm and sanitary sewers

1 Scope

This part of IEC 60794 is a family specification that covers sewer cables and conduits for installation by blowing and/or pulling in non-man accessible storm and sanitary sewers, also applicable for man-accessible and lateral ones. Systems built with components covered by this standard are subject to the requirements of sectional specification IEC 60794-3.

Sewer cable and conduit constructions have to meet the different requirements of the sewer operating companies and/or associations regarding chemical, environmental, operational, cleaning and in general maintenance conditions.

Preferential applications, describing sewer cable characteristics versus methods of installation is reported in Annex A and Annex B for non-man accessible sewers.

Clause 4 describes a blank detail specification for sewer cables and conduits for installation by blowing and/or pulling in storm and sanitary sewers. It incorporates some minimum requirements.

Detail specifications may be prepared on the basis of this family specification.

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 should be interpreted with respect to this consideration.

The number of fibres tested is representative of the sewer cable and should be agreed between the customer and the supplier.

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

IEC 60793-1-20, *Optical fibres – Part 1-20: Measurement methods and test procedures – Fibre geometry*

IEC 60793-1-40, *Optical fibres – Part 1-40: Measurement methods and test procedures – Attenuation*

IEC 60793-1-44, *Optical fibres – Part 1-44: Measurement methods and test procedures – Cut-off wavelength*

IEC 60793-2, *Optical fibres – Part 2: Product specifications– General*

IEC 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode 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 60794-3, *Optical fibre cables – Part 3: Sectional specification – Outdoor cables*

IEC 60794-3-10, *Optical fibre cables – Part 3-10: Outdoor cables – Family specification for duct and directly buried optical telecommunication cables*

IEC 60811-1-1:1993, *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 60811-5-1:1990, *Insulating and sheathing materials of electric and optical cables – Common test methods – Part 5-1: Methods specific to filling compounds – Drop point – Separation of oil – Lower temperature brittleness – Total acid number – Absence of corrosive components – Permittivity at 23 °C – DC resistivity at 23 °C and 100 °C*

3 Symbols

For the purposes of this document, the following symbols apply.

APL Aluminium/polyethylene laminate

SPL Steel/polyethylene laminate

λ_{CC} cabled fibre cut-off wavelength

d nominal outer diameter of the sewer cable

d_c nominal outer diameter of the conduit

DS detail specification

$n \times d$ a value times cable outer diameter used for bends, mandrels, etc.

T_O threshold tensile load below which no attenuation and/or fibre strain increase should occur in the tensile performance test

T_M the acceptable amount of short-term tensile load that can be applied to the cable without permanent degradation of the characteristics of the fibres in the tensile performance test

T_{A1} temperature cycling test low-temperature limit according to IEC 60794-1-2, method FI

T_{A2} temperature cycling test low-temperature limit according to IEC 60794-1-2, method FI

T_{B1} temperature cycling test high-temperature limit according to IEC 60794-1-2, method FI

T_{B2} temperature cycling test high-temperature limit according to IEC 60794-1-2, method FI

t_1 temperature cycling dwell time