SLOVENSKI STANDARD

SIST-TS CLC/TS 50431:2006

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Optični kabli – Kabli za polaganje v cevi s pitno vodo – Rodovna specifikacija za kable, namenjene za napeljavo po ceveh s pitno vodo

Optical fibre cables - Drinking water pipe cables - Family specification for cables to be installed in drinking water pipes

ICS 33.180.10

Referenčna številka
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TECHNICAL SPECIFICATION

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English version

Optical fibre cables – Drinking water pipe cables – Family specification for cables to be installed in drinking water pipes

Lichtwellenleiterkabel –
Kabel für Trinkwasserleitungen –
Familienspezifikation für Kabel zu Montage in Trinkwasserleitungen

This Technical Specification was approved by CENELEC on 2004-09-11.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

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

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Foreword

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

The text of the draft was submitted to the vote and was approved by CENELEC as CLC/TS 50431 on 2004-09-11.

The following date was fixed:

– latest date by which the existence of the CLC/TS has to be announced at national level (doa) 2005-03-11

Contents

1 Scope

This document is a family specification that covers drinking water pipe cables and sub-ducts for installation by blowing and/or pulling / dragging in drinking water pipes. Systems built with components covered by this standard are subject to the requirements of sectional specifications EN 60794-3 and EN 60794-4 where applicable.

Drinking water pipe cable and sub-duct constructions have to meet the different requirements of the drinking water companies and/or associations regarding chemical, environmental, operational interactions and in general maintenance conditions.

A table of preferential applications, describing drinking water pipe cable characteristics versus methods of installation is reported in Annex A for drinking water pipe cables.

Clause 4 describes a blank detail specification for drinking water pipe cables and sub-ducts for installation by blowing and/or pulling / dragging in / flowing drinking water pipes. 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 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.

EN 60068-2-2		*Environmental testing* (IEC 60068-2-2)
EN 60793-1-20		*Optical fibres - Part 1-20: Measurement methods and test procedures - Fibre geometry* (IEC 60793-1-20)
EN 60793-1-40		*Optical fibres - Part 1-40: Measurement methods and test procedures – Attenuation* (IEC 60793-1-40)
EN 60793-1-44		*Optical fibres - Part 1-44: Measurement methods and test procedures - Cut-off wavelength* (IEC 60793-1-44)
EN 60793-2		*Optical fibres - Part 2: Product specifications* (IEC 60793-2)
EN 60794-1-1		*Optical fibre cables - Part 1-1: Generic specification -General* (IEC 60794-1-1)
EN 60794-1-2		*Optical fibre cables - Part 1-2: Generic specification - Basic optical cable test procedures* (IEC 60794-1-2)
EN 60794-3		*Optical fibre cables - Part 3: Sectional specification - Outdoor cables – Duct, buried and aerial cables* (IEC 60794-3)
EN 60794-3-10		*Optical fibre cables - Part 3-11: Detailed specification - Outdoor cables - Duct and directly buried optical telecommunication cables (*IEC 60794-3-10)
EN 60794-4	2003	*Optical fibre cables - Part 3: Sectional specification – Aerial optical cables along electrical power lines* (IEC 60794-4:2003)

EN 60811-1-1	1995	*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 60811-1-1:1993)
EN 60811-5-1	1995	*Common test methods for insulating and sheathing materials of electric cables - Part 5: Methods specific to filling compounds. Section one - 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* (IEC 60811-5-1:1990, mod)
EN 187105		*Single mode optical cable (duct/direct buried installation)*
HD 402 S2	1984	*Standard colours for insulation for low-frequency cables and wires* (IEC 60304:1982)

3 Symbols

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

λ_{CC}	cabled fibre cut-off wavelength
d	nominal outer diameter of the sewer cable
DS	detail specification
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_{AI}	temperature cycling test low-temperature limit according to EN 60794-1-2, method FI
T_{A2}	temperature cycling test low-temperature limit according to EN 60794-1-2, method FI
T_{B1}	temperature cycling test high-temperature limit according to EN 60794-1-2, method FI
T_{B2}	temperature cycling test high-temperature limit according to EN 60794-1-2, method FI
t_1	temperature cycling dwell time
$n \times d$	a value times cable outer diameter used for bends, mandrels, etc.

4 Family specification for drinking water pipe cables and sub-ducts for installation by blowing and/or pulling/dragging in / floating into drinking water pipes (blank detail specification and minimum requirements)

4.1 Construction

4.1.1 General

In addition to the constructional requirements of sectional specifications EN 60794-3 and EN 60794-4, where applicable, the following considerations apply to the drinking water pipe cables and/or sub-ducts.

The drinking water pipe cables and/or sub-ducts shall be designed and manufactured for an expected operating lifetime of at least 10 years. It shall be possible to install or remove the cable in or from the drinking water pipe throughout the operational lifetime. The materials in the drinking water pipe cable and/or as well as accessories including sealing elements i.e. I/O-ports and sub-ducts shall not present a health hazard within its intended use.

4.1.2 Sub-ducts

In case of use, the sub-duct with outer nominal diameters ranging from xx mm to yy mm shall be able to resist pressure differences needed for installation by blowing and able to withstand the water pressure within the drinking water pipe. They shall be circular and the outer and inner surfaces a low coefficient of friction. The material shall withstand all possible chemical attacks by the drinking water itself, as for instance the PE 100. Inner- and outer-diameter and overall minimum wall thickness shall be specified.

4.1.3 Drinking water pipe cables

A drinking water pipe cable in accordance to this specification should be suitable for installation in drinking water pipes by the following installation methods, also applicable the access drinking water pipe work:

- blowing and/or pulling into a sub-duct, previously installed into drinking water pipe between two I/O - ports;
- direct installation into the drinking water pipe in between two adjacent I/O-ports.

The attenuation of the installed cable at the operational wavelength(s) shall not exceed values agreed between the customer and supplier.

There shall be no fibre splice in a delivery length unless otherwise agreed by the customer and supplier.

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

4.2 Product descriptions

4.2.1 Drinking water pipe cables description

4.2.1.1 Cable for installation within sub-ducts (previously installed into the drinking water pipe in between two adjacent I/O-ports)

Fibre count: up to 288.

Such drinking water pipe cable has to be blown or pulled into the sub-duct described in 4.2.2.

(1) Prepared by		(2) Document No.: Issue: Date:
(3) Available from:	(4) Generic specifications: Sectional specification:	EN 60794-1-1 and EN 60794-1-2 EN 60794-3
(5) Additional references:		
Construction - Tube – filled Inner sheath (optional) Additional armouring - Non-metallic armouring Metallic armouring Outer sheath Marking identification - Customer requirement - Identification of manufacturer		Additional remarks
(8) Application information:		
Maximum outer diameter (d) Rated maximum tensile load Minimum bending radius for no-load bending Minimum bending radius for rated-load bending Temperature range: - Transport and storage - Installation - Operation Manufacturing length - Typical - Nominal/tolerances		

4.2.1.2 Cables for direct installation into the drinking water pipes

Fibre count: up to 288

Such cables are directly installed into the drinking water pipes with the help of a proper flow of water using a stabilized parachute within the drinking water pipe or other suitable techniques.

The cable should have a low coefficient of friction with respect to the inner surface of the drinking water pipe which consists of steel, casted iron and/or PE.

(1) Prepared by		(2) Document No.: Issue: Date:
(3) Available from:	(4) Generic specifications: Sectional specifications:	EN 60794-1-1 and EN 60794-1-2 EN 60794-3 and EN 60794-4
(5) Additional references:		
Construction - Tube – filled Additional armouring - Non-metallic armouring Metallic armouring Outer sheath Additional outer sheath - Marking identification - Customer requirement - Identification of manufacturer		Additional remarks
(8) Application information:		
Maximum outer diameter (d) Rated maximum tensile load Minimum bending radius for no-load bending Minimum bending radius for rated-load bending Temperature range: - Transport and storage - Installation - Operation Manufacturing length - Typical - Nominal/tolerances		

4.2.2 Sub-duct description

Such sub-ducts are directly inserted into the inner space of the drinking water pipe guided by guide tubes to the bottom of the drinking water pipe.

(1) Prepared by		(2) Document No.: Issue: Date:
(3) Available from:	(4) Generic specifications: EN 60794-1-1 and EN 60794-1-2 Sectional specification: EN 60794-3 (all as applicable to conduits)	
(5) Additional references:		
Construction - Single layer wall - Double layer wall Additional armouring - Metallic/Non metallic Additional outer sheath - Marking identification - Customer requirement - Identification of the manufacturer		
8) Application information:		
Maximum outer diameter (d) Rated maximum tensile load Minimum bending radius for no-load bending Minimum bending radius for rated-load bending Temperature range: - Transport and storage - Installation - Operation Manufacturing tube length - Typical - Nominal/tolerances		