## SLOVENSKI STANDARD

### SIST-TS CLC/TS 50430:2006

marec 2006

Optični kabli – Kabli za polaganje v plinske cevi – Rodovna specifikacija za kable, namenjene za napeljavo po visokotlačnih plinskih ceveh

Optical fibre cables - Gas pipe cables - Family specification for cables to be installed in high pressure gas pipes

## iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST-TS CLC/TS 50430:2006</u> https://standards.iteh.ai/catalog/standards/sist/e798b6f7-7ee0-4cfc-97f0-51eafa143bd3/sist-ts-clc-ts-50430-2006

ICS 33.180.10

Referenčna številka SIST-TS CLC/TS 50430:2006(en)

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### **TECHNICAL SPECIFICATION**

### **CLC/TS 50430**

SPECIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

February 2005

ICS 33.180.10

English version

Optical fibre cables –
Gas pipe cables –
Family specification for cables to be installed in high pressure gas pipes

Lichtwellenleiterkabel – Kabel für Gasleitungen – Familienspezifikation für Kabel zu Montage in Hochdruckgasleitungen

## iTeh STANDARD PREVIEW (standards.iteh.ai)

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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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 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 50430 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

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#### 1 Scope

This document is a family specification that covers gas pipe cables and sub-ducts for installation by blowing and/or pulling / dragging in high pressure gas 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.

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

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

Clause 4 describes a blank detail specification for gas pipe cables and sub-ducts for installation by blowing and/or pulling / dragging in/into high pressure gas 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 TANDARD PREVIEW

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	https://	Environmental testing (IEC 60068-2-2) -4cfc-97f0-
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	1999	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:

1	applied fibre out off wavelength
$\lambda_{CC}$	cabled fibre cut-off wavelength
d	nominal outer diameter of the sewer cable
DS	detail specification
$T_{O}$	threshold tensile toad 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 https://standards.iteh.ai/catalog/standards/sist/e798b6f7-7ee0-4cfc-97f0-
$T_{AI}$	temperature cycling stest 14 low-temperature 43 limit 6 according to EN 60794-1-2, method FI
$T_{A2}$	temperature cycling test low-temperature limit according to EN 60794-1-2, method Fl
$T_{B1}$	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 x d	a value times cable outer diameter used for bends, mandrels, etc.

4 Family specification for gas pipe cables and sub-ducts for installation by blowing and/or pulling/dragging in/into gas 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 gas pipe cables and/or sub-ducts.

The gas 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 gas pipe throughout the operational lifetime. The materials in the gas pipe cable and/or as well as accessories including fixing 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 gas pressure within the gas 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 natural gas itself, as for instance the PE 100. Inner- and outer-diameter and overall minimum wall thickness shall be specified.

### (standards.iteh.ai)

#### 4.1.3 Gas pipe cables

#### SIST-TS CLC/TS 50430:2006

A gas pipe cable in accordance to this specification should be suitable for installation in high pressure gas pipes by the following installation methods, also applicable the access gas pipe network:

- blowing and /or pulling into a sub-duct, previously installed into the high pressure gas pipe between two I/O ports;
- ∇ direct installation into the gas 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 Gas pipe cables description

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

Fibre count: up to 288.

Such gas 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:	EN 60794-1-1 and EN 60794-1-2	
	Sectional specification:	EN 60794-3	
(5) Additional references:			
Construction		Additional remarks	
- Tube – filled			
Additional armouring			
- Metallic armouring			
Outer sheath			
Marking identification Teh	STANDARD PREV	VIEW	
- Customer requirement	(standards.iteh.ai)		
- Identification of manufactur	er		
(8) Application information:	SIST-TS CLC/TS 50430:2006		
https://standards	iteh.ai/catalog/standards/sist/e798b6f7-7	ee0-4cfc-97f0-	
Maximum outer diameter (d)	51eafa143bd3/sist-ts-clc-ts-50430-2006		
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 gas pipe

Fibre count: up to 288.

Such cables are directly installed into the high pressure gas pipe with the help of a - pressure reduced - gas flow of the natural gas itself and/or compressed air\* using a stabilized parachute within the high pressure gas pipe.

The cable should have a low coefficient of friction with respect to the inner surface of the gas 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		Additional remarks	
- Tube – filled			
- Inner sheath (optional)			
- Metallic armouring			
Outer sheath iTeh	STANDARD P	REVIEW	
Marking identification			
- Customer requirement (standards.iteh.ai)			
- Identification of manufacturer	SIST-TS CLC/TS 50430:2	006	
(8) Application information: //standa	rds.iteh.ai/catalog/standards/sist/e7	98b6f7-7ee0-4cfc-97f0-	
	51eafa143bd3/sist-ts-clc-ts-504	30-2006	
Maximum outer diameter (d)			
Rated maximum tensile load			
Minimum bending radius for no-load	l bending		
Minimum bending radius for rated-lo	oad bending		
Temperature range			
- Transport and storage			
- Installation			
- Operation			
Manufacturing length			
- Typical			
- Nominal/tolerances			

<sup>\*</sup> Before pressurizing with air the gas pipe-section has to be inerted by nitrogen.

#### 4.2.2 Sub-duct description

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

(1) Prepared by		(2) Document No.:	
		Issue: Date:	
(3) Available from:			
(5) Additional references:			
All dielectric construction			
- Single layer wall			
- Double layer wall			
Marking identification			
- Customer requirement			
- Identification of the manufacturer			
(8) Application information:			
	STANDARD PREV	<b>IEW</b>	
Minimum bending radius for no-loa	(bending dards.iteh.ai)		
Minimum bending radius for rated-	load bending		
Temperature range	SIST-TS CLC/TS 50430:2006		
- transport and storage/standard	ls.iteh.ai/catalog/standards/sist/e798b6f7-7ee	0-4c <del>fc-97f0-</del> under	
- installation	51eafa143bd3/sist-ts-clc-ts-50430-2006	consideration	
- operation			
Manufacturing tube length			
- typical			
- nominal/tolerances			