SLOVENSKI STANDARD
SIST EN 50411-2-5:2009

01-julij-2009

Delilniki za optiļ na vlakna in kabelske spojnice za uporabo v optiļ nih komunikacijskih sistemih - Specifikacija izdelka - 2-5. del: Zatesnjena ohiģja kabelskih spojnic za mikrokanal z zraļ nim vpihovanjem optiļ nih vlaken, tip 1, za kategorijo S & A

Fibre organisers and closures to be used in optical fibre communication systems - Product specifications - Part 2-5: Sealed closures for air blown fibre microduct, type 1, for category S & A

LWL-Spleißkassetten und -Muffen für die Anwendung in LWL-Kommunikationssystemen - Produktnormen -- Teil 2-5: Abgedichtete LWL-Muffen für ABF-Mikrorohre, Bauart 1, für die Kategorien S und A

Organiseurs et boîtiers de fibres à utiliser dans les systèmes de communication par fibres optiques - Spécifications de produits - Partie 2-5: Boîtiers scellés pour microconduits de fibres soufflées à l'air comprimé, pour les catégories S & A

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ICS:

33.180.20	Povezovalne naprave za optiļ na vlakna	Fibre optic interconnecting devices

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English version

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This European Standard was approved by CENELEC on 2008-12-01. 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.

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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 European Standard was prepared by the Technical Committee CENELEC TC 86BXA, Fibre optic interconnect, passive and connectorised components.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50411-2-5 on 2008-12-01.

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)	2009-12-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2011-12-01

Fibre organisers and closures to be used in optical fibre communication systems – Product specifications

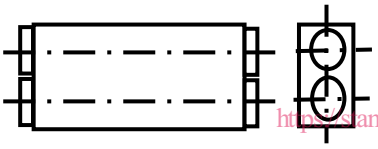
Sealed closures for air blown fibre microduct, type 1, for category S & A

Description		Performance	
Construction:	Multiple ported closure	**Applications:**	
Cable management:	Microduct , protected microduct, ducts and/or sub-ducts.	Blown optical fibre cable networks:	
Cable seals:	Heat activated and or cold applied	for underground:	EN 61753-1 Category S
		for aerial:	EN 61753-1 Category A

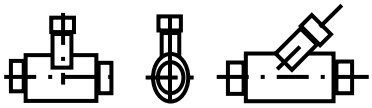
Related documents:

EN 60793-2-50	Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres (IEC 60793-2-50)
EN 60794-5	Optical fibre cables – Part 5: Sectional specification – Microduct cabling for installation by blowing (IEC 60794-5)
EN 61300 series	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures (IEC 61300 series)
EN 61753-1	Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards (IEC 61753-1)
EN 61756-1	Fibre optic interconnecting devices and passive components – Interface standard for fibre management systems – Part 1: General and guidance (IEC 61756-1)
EN 61758-1	Fibre optic interconnecting devices and passive components – Interface standard for closures – Part 1: General and guidance (IEC 61758-1)
ETSI EN 300 019 series	Environmental Engineering (EE) – Environmental conditions and environmental tests for telecommunications equipment

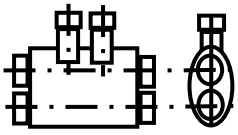
Construction:

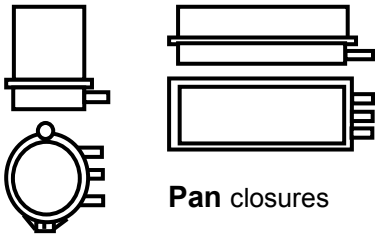


Inline closures

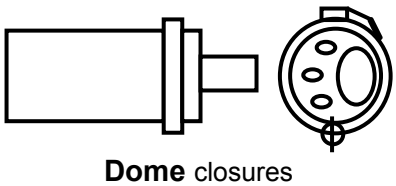


Tee closures





Pan closures



Dome closures

Duct and cable port entries and dimensions (Direct burial or jointing pit mounted)

Closure		Max sizes of protected microduct cables mm	Closure designs (Type and/or sub-group)	Maximum physical dimensions in mm Length L Width W Depth D
Central split access	**Inline (multiple ports)**	112	Type 1a	975 x 394 x 330
		35	Type 2a	648 x 274 x 152
		26	Type 2b	828 x 274 x 401
	Tee (single and double port)	32	Single port ends	300 x 200 x 100
		50	Double port ends	720 x 435 x 210
Single end entry	**Pan (circular or rectangular)**	30	Rectangular	710 x 515 x 148
		40	Circular	450 x 350 x 700
		40	Elliptical	520 x 450 x 300
	Dome (single end entry)	19	Type 1a	600 x 185 x 265
		26	Type 1b	750 x 270 x 310
		35	Type 1c	1 050 x 275 x 310

Contents

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1 Scope

1.1 Product definition

This specification contains the initial, start of life dimensional, optical, mechanical and environmental performance requirements which a fully installed blown fibre protected microduct closure must meet in order for it to be categorised as an EN standard product.

These products are suitable for installation of and use with microduct fibre units, microduct optical fibre cables, microduct and protected microduct as defined within EN 60794-5.

1.2 Operating environment

The tests selected combined with the severities and duration are representative of an outside plant for subterranean and/or aerial environment defined by:

- ETSI EN 300 019 series: Class 8.1: underground locations (without earthquake requirement);
- EN 61753-1: Category S: subterranean environment;
  Category A: aerial environment.

1.3 Reliability

Whilst the anticipated service life expectancy of the product in this environment is a minimum of 20 years, compliance with this specification does not guarantee the reliability of the product. This should be predicted using a recognised reliability assessment programme.

1.4 Quality assurance

Compliance with this specification does not guarantee the manufacturing consistency of the product. This should be maintained using a recognised quality assurance programme.

1.5 Allowed fibre and cable types

This closure standard covers all IEC standard optical fibre microducts, and protected microducts with their various fibre capacities, types and designs. This includes, but is not limited to, optical fibre cable standard EN 60794-5.

This product specification has only considered protected microduct cables containing microducts of same outside diameters. There are other hybrid protected microduct cables with microducts of differing OD's, with too many variants to be included in this PS.

1.6 Allowed microduct connector types

This closure standard covers all EN standard microduct connectors, including: straight, reducer/enlarger stem, reducer/enlarger, close down, liquid block, liquid block with barb end, and end stop connectors. This includes, but is not limited to, EN 50411-2-8.

1.7 Microduct storage constraints

Microduct excess storage is not required in all air blown fibre closures. Some closure types do not have sufficient internal space to provide storage. The need for microduct storage is provided inside the closure when opened, typically to ensure that there is enough microduct to fulfil the following functions:

- remove the coiled microduct attached to the 'closedown' connectors, to a remote location, close to blowing equipment, in the process uncoiling the microducts to aid blowing;
- provide additional microduct if repeated cut backs for connectors are planned or likely to be fitted throughout the closure life.

The minimum microduct storage bend radius is based on the outside diameter and material selection, typically based on 12 times the outside diameter (below 8 mm) and 20 times above. During fibre blowing the bend radius is typically 20 times the microduct diameter.

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 50411-2-8	Fibre organisers and closures to be used in optical fibre communication systems – Product specifications – Part 2-8: Microduct connectors, for air blown optical fibres, Type 1
EN 60068-2-10	Environmental testing – Part 2-10: Tests – Test J and guidance: Mould growth (IEC 60068-2-10)
EN 60794-1-2:2003	Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures (IEC 60794-1-2:2003)
EN 60794-5	Optical fibre cables – Part 5: Sectional specification – Microduct cabling for installation by blowing (IEC 60794-5)
EN 61300 series	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures (IEC 61300 series)
EN 61300-2-1	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibration (sinusoidal) (IEC 61300-2-1)
EN 61300-2-4	Part 2-4: Tests – Fibre/cable retention (IEC 61300-2-4)
EN 61300-2-5	Part 2-5: Tests – Torsion/twist (IEC 61300-2-5)
EN 61300-2-10	Part 2-10: Tests – Crush resistance (IEC 61300-2-10)
EN 61300-2-12:2005	Part 2-12: Tests – Impact (IEC 61300-2-12:2005)
EN 61300-2-22	Part 2-22: Tests – Change of temperature (IEC 61300-2-22)
EN 61300-2-23:1997	Part 2-23: Tests – Sealing for non-pressurized closures of fibre optic devices (IEC 61300-2-23:1995)
EN 61300-2-26	Part 2-26: Tests – Salt mist (IEC 61300-2-26)
EN 61300-2-33	Part 2-33: Tests – Assembly and disassembly of closures (IEC 61300-2-33)
EN 61300-2-34	Part 2-34: Tests – Resistance to solvents and contaminating fluids (IEC 61300-2-34)
EN 61300-2-37	Part 2-37: Tests – Cable bending for fibre optic closures (IEC 61300-2-37)
EN 61300-2-38:2006	Part 2-38: Tests – Sealing for pressurized fibre optic closures (IEC 61300-2-38:2006)
EN 61300-3-1	Part 3-1: Examinations and measurements – Visual examination (IEC 61300-3-1)
EN 61300-3-3:2003	Part 3-3: Examinations and measurements – Active monitoring of changes in attenuation and return loss (IEC 61300-3-3:2003)
EN 61300-3-28	Part 3-28: Examinations and measurements – Transient loss (IEC 61300-3-28)
EN 61753-1	Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards (IEC 61753-1)
ETSI EN 300 019 series	Environmental Engineering (EE) – Environmental conditions and environmental tests for telecommunications equipment
ISO 1998-1	Petroleum industry – Terminology – Part 1: Raw materials and products
EN 590	Automotive fuels – Diesel – Requirements and test methods

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
ducts
semi-rigid underground pipe, typically manufactured from a polymeric material, and typically greater than 65 mm outside diameter

3.1.2
sub-ducts
underground semi-flexible pipes, which may fit inside a duct, typically manufactured from a polymeric material, and typically less than 50 mm outside diameter

3.1.3
microducts (MD)
small, flexible, lightweight tube with an outer diameter typically less than or equal to 16 mm

3.1.4
protected microducts
one or more microducts surrounded by a protective sheath and/or protected by a duct/sub-duct

3.1.5
microduct optical fibre cables
optical fibre cables suitable for installation by blowing into a microduct

3.1.6
microduct fibre units
fibre unit that is suitable for installation by blowing into a microduct. It differs from microduct optical fibre cables in that it provides less protection to the fibres that it contains

3.1.7
air blown fibre (ABF) microduct closure
ABF microduct closures provide a physical housing for microduct management; connection, fixing, sealing, anchoring, liquid and/or gas blocking, storage and routing up to the input and output protected microduct of the air blown fibre cable closure system

3.1.8
blowing point closure
closure used as a position for blowing fibre at multiple points in series (cascade blowing). Typically the closure contains ‘close down’ microduct connectors, for fibre access to the blowing head equipment

3.1.9
straight microduct connectors
microduct connectors are used to connect two microducts together. This connector has a means of microduct attachment and sealing on both sides and is typically unsupported (floating inside the closure)

3.1.10
straight bulkhead microduct connectors
microduct connectors are used to connect two microducts together. This connector has a means of microduct attachment and sealing on both sides and is typically supported on a bulkhead attached by a suitable fixing system (i.e. nut or clip)

3.1.11
different ID reducers/enlarger stem microduct connectors
stem connector which connects two microducts with the same OD but different ID, with a smooth internal transition to prevent fibre hang ups. Typically they have microduct attachment and sealing at one end of the connector, and a stem on the other end to facilitate attachment to a straight connector

3.1.12
different ID reducers/enlarger microduct connectors
connectors which connects two microducts with the same OD but different ID, including a smooth internal transition to prevent fibre hang ups. Typically they are used to connect a heavy walled to a thinner wall MD

3.1.13
different OD reducers/enlarger stem microduct connectors
stem which connects two microducts with the same ID but different OD. Typically they have microduct attachment and sealing at one end of the connector, and a stem on the other end to facilitate attachment to a straight connector

3.1.14
different OD reducers/enlarger microduct connectors
connector which connects two microducts with the same ID, but different OD

3.1.15
different ID and OD reducers/enlarger stem microduct connectors
stem which connects two microducts with a different OD and different ID; including a smooth internal transition to prevent fibre hang ups. Typically they have microduct attachment and sealing at one end of the connector, and a stem on the other end to facilitate attachment to a straight connector

3.1.16
different ID and OD reducers/enlarger microduct connectors
connector which connects two microducts with different OD's and different ID's, including a smooth internal transition to prevent fibre hang ups

3.1.17
close down microduct connectors
microduct connectors that are used for fibre access for blowing head equipment for cascade blowing, allowing a microduct to be opened and resealed after blowing, without detriment to the fibre in situ

3.1.18
liquid block microduct connectors
microduct connectors that are used at a transition point to stop liquids from flowing between the connected microducts to avoid liquid and contaminant ingress and liquid damage to other equipment

3.1.19
liquid block with a barb end
similar to a liquid block connector, at the barb end. The barb end is designed to interface with the non-microduct (transport tubing), which protects the fibre at a "fibre management system" closure

3.1.20
end stop microduct connectors
microduct connectors that are used for sealing open ended microduct, avoiding air leakage, water or foreign material ingress

3.1.21
connector insertion force
force required to insert the microduct into the connector without damage

3.1.22
fibre management system (FMS)
system to control fibre routing from the incoming to the outgoing fibres, containing one or more splice cassettes and additional functional elements

3.1.23
microduct management system
system to control microduct routing inside a closure or housing, from the incoming to the outgoing microduct, all jointed together with microduct connectors of various functional types

3.1.24
burst pressure
point at which the closure fails to contain pressure

3.1.25
cut backs
process to remove a short length of microduct in order to prepare the ends, prior to fitting a new connector, ensuring better sealing and attachment faces

3.2 Abbreviations

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

PS Product Specification

MD Microduct

ABF Air Blown Fibre

ID Inside Diameter (microducts)

OD Outside Diameter (microducts)

AC Across Corners

MMS Microduct Management System

4 Description

4.1 Microduct closure

An ABF microduct closure comprises a closure housing that is attached to the ends of

- an underground installed duct or sub duct or
- an air blown fibre protected microduct.

Microduct closures comprises an access housing that allows the interconnection and storage of microducts or protected microducts. Figure 1, shows the minimum space profile required to house microduct connectors.

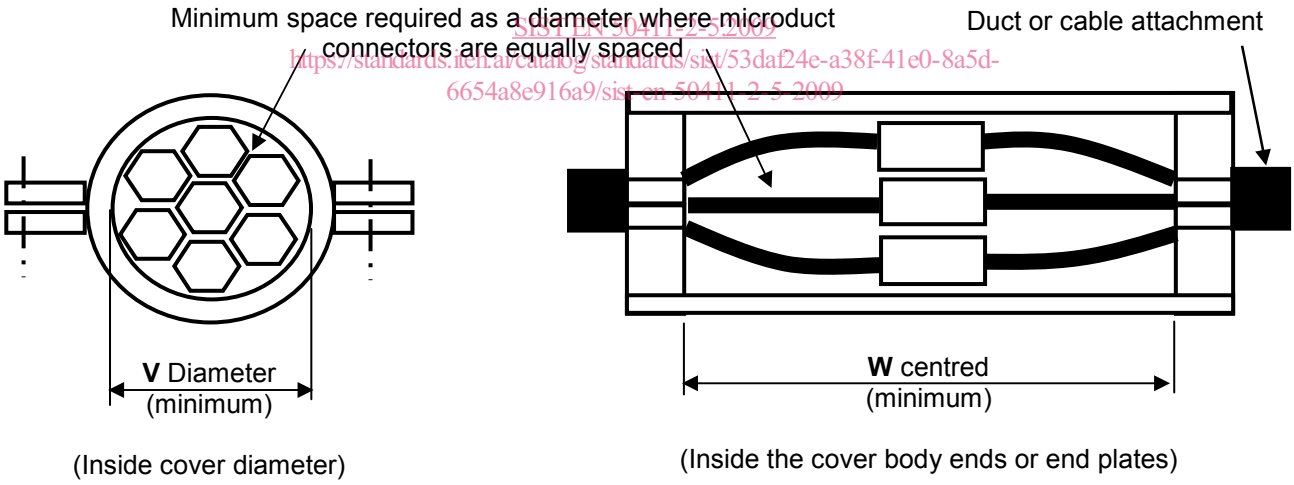

Figure 1 – Schematic – Minimum microduct and connector space profile (see Annex C)

4.2 Closure housing functions

Microduct closures for protected microducts have three basic functions they are to provide:

- a branch off for secondary microduct installation to a customer;
- an intercept to an existing pre-installed protected microduct;
- an access point for blowing fibre onward using conventional blowing equipment.

4.3 Burst pressure

The microduct system may fail therefore the closure must be able to be fitted with an over pressure safety system. This system should be able to exhaust air fast enough to ensure that a safe working pressure of equal to, or less than 0,4 bars is maintained when the correct installation pressure is applied.