



SLOVENSKI STANDARD SIST EN 50411-2-8:2009

01-julij-2009

8 Y]b]]'nUcdh] bUj`U_bU]b`_UVYg_Y'gdc'b]W'nUi dcfUVc'j`cdh] b]`
_ca i b]_UVYg_]`g]ghYa]`!'GdYWZ]_UVYU]nXY_U!'&,"XY.'?cbY`rcf]`a]_fc_UbUcj
n'nfU b]a `j d]`cj UbYa `cdh] b]`j`U_Ybžhd`%

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

LWL-Spleißkassetten und -Muffen für die Anwendung in LWL-Kommunikationssystemen
- Produktnormen - Teil 2-8: ABF-Mikrorohrverbinder, Bauart 1

Organiseurs et boîtiers de fibres à utiliser dans les systèmes de communication par
fibres optiques - Spécifications de produits - Partie 2-8: Connecteurs en microconduits
de Type 1, destinés aux fibres optiques soufflées à l'air comprimé

Ta slovenski standard je istoveten z: EN 50411-2-8:2009

ICS:

33.180.20 Ú[ç^: [çæ) ^Á a] !æ^Á æ Fibre optic interconnecting
[] cã } ææ|æ } æ devices

SIST EN 50411-2-8:2009 en,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50411-2-8:2009

<https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 50411-2-8

May 2009

ICS 33.180.20

English version

**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**

Organiseurs et boîtiers de fibres à utiliser
dans les systèmes de communication
par fibres optiques -
Spécifications de produits -
Partie 2-8: Connecteurs en microconduits
de Type 1, destinés aux fibres optiques
soufflées à l'air comprimé

LWL-Spleißkassetten und -Muffen
für die Anwendung in LWL-
Kommunikationssystemen -
Produktnormen -
Teil 2-8: ABF-Mikrorohrverbinder,
Bauart 1

(standards.iteh.ai)

[SIST EN 50411-2-8:2009](https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009)

<https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009>

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.

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, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

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 50411-2-8 on 2008-12-01.

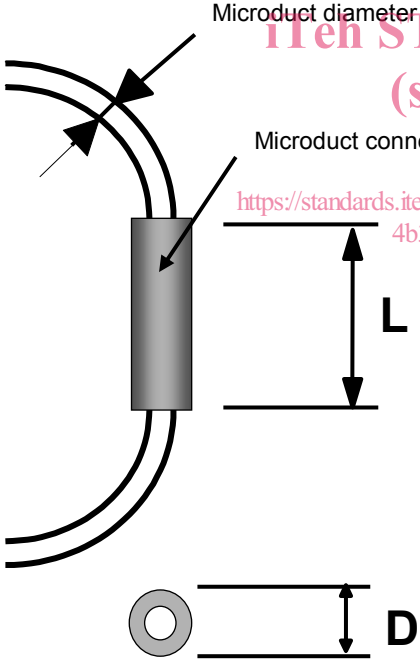
The following dates were fixed:

- 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

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 50411-2-8:2009](https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009)

<https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009>

Fibre organisers and closures to be used in optical fibre communication systems - Product specifications			
Microduct connectors, for air blown optical fibres, Type 1			
Construction:	Sealed microduct connector	Applications:	Optical fibre cable networks EN 61753-1
Tube seals:	Cold applied		
Connector types:	Straight, Straight bulkhead, Reducer, Close down, Liquid block, Liquid block with barb end, End stop and Stem.		
Related documents:			
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)		
ETSI EN 300 019 series	Environmental Engineering (EE) – Environmental conditions and environmental tests for telecommunications equipment		
Construction:	Examples 'Straight through'		
 <p>Microduct diameter</p> <p>Microduct connector</p> <p>L</p> <p>D</p>	Connector dimensions for non-bulkhead mounting		
	Nominal microduct outside diameter	Diameter or across corners	Length
		D	L
		max. mm	max. mm
	3 mm	9	23
	4 mm	14	32
	5 mm	15	40
	6 mm	15	38
	7 mm	18	42
	8 mm	20	46
	10 mm	24	50
	12 mm	25	54
	14 mm	29	62
15 mm	33	70	
16 mm			

Contents

1	Scope	7
1.1	Product identification	7
1.2	Operating environment.....	7
1.3	Reliability	7
1.4	Quality assurance.....	7
1.5	Safety labelling – Warning: need for an ‘over pressure device’ in sealed closures.....	7
2	Normative references	8
3	Definitions and abbreviations	9
3.1	Definitions.....	9
3.2	Abbreviations.....	11
4	Description	11
4.1	Microduct connector housing	11
4.2	Burst pressure.....	15
4.3	Microduct seals	15
4.4	Materials.....	15
4.5	Marking.....	15
5	Variants	16
6	Dimensional requirements	17
6.1	Dimensions diagram	17
6.2	‘Straight’ connectors – Equal microduct.....	17
6.3	‘Straight bulkhead’ connectors – Equal microduct.....	18
6.4	‘ID reducer/enlarger stem’ connectors.....	18
6.5	‘ID reducer/enlarger’ connectors.....	19
6.6	‘OD reducer/enlarger stem’ connectors	19
6.7	‘OD reducer/enlarger’ connectors	20
6.8	‘ID and OD reducer/enlarger stem’ connectors.....	20
6.9	‘ID and OD reducer/enlarger’ connectors.....	21
6.10	‘Close Down’ connectors.....	21
6.11	‘Liquid Block’ connector.....	22
6.12	‘Liquid Block with barb end’ connectors	22
6.13	‘End Stop’ connectors	22
7	Tests	23
7.1	Sample size.....	23
7.2	Test sample preparation	23
7.3	Test and measurement methods	24
7.4	Test sequence.....	24
7.5	Pass/fail criteria.....	24
8	Test report	24
9	Performance requirements	24
9.1	Bend radius	24
9.2	Dimensional and marking requirements.....	24
9.3	Sealing, optical and appearance performance criteria.....	24
9.4	Mechanical sealing performance requirements	26
9.5	Environmental sealing performance requirements.....	28

Annex A (informative) Sample size and product sourcing requirements	30
Annex B (informative) Air blown fibre microduct – Mean outside diameter range	31
Annex C (normative) Test method – High pressure resistance – Safety	32
Annex D (normative) Test method – Installation	33
Annex E (normative) Test method – Insertion force	34
Bibliography	35

Figures

Figure 1 – Fibre flow impedance	11
Figure 2 – Fibre flow impedance – Both direction step.....	11
Figure 3 – Fibre flow impedance – One direction step	12
Figure 4 – Fibre flow impedance – Acute angled step.....	12
Figure 5 – ‘Typical’ connector elements – Cross sectional view.....	13
Figure 6 – ‘Straight’ – Equal microduct outside diameters	13
Figure 7 – ‘Straight bulkhead’ – Equal microduct outside diameters.....	13
Figure 8 – ‘ID reducer/enlarger stem’– Unequal microducts with a different ID ‘OD reducer/enlarger stem’ – Unequal microducts with a different OD ‘ID and OD reducer/enlarger stem’ – Unequal microducts with a different ID and OD	13
Figure 9 – ‘ID reducer/enlarger’ – Unequal microducts with a different ID ‘OD reducer/enlarger’ – Unequal microducts with a different OD ‘ID and OD reducer/enlarger’ – Unequal microducts with a different ID and OD	14
Figure 10 – Close down assembly access for blowing head equipment	14
Figure 11 – Liquid block transition point to stop liquid migration.....	14
Figure 12 – Liquid block with a barb end transition point to stop liquid migration.....	14
Figure 13 – End stop.....	14
Figure 14 – Microduct interconnection geometry.....	15
Figure 15 – Microduct connector overall dimensions	17
Figure 16 – Sealing performance test sample (tank to source).....	23
Figure 17 – Optical test chamber – Liquid block connectors (only).....	24
Figure E.1 – Test apparatus for insertion force method	34

Tables

Table 1 – Micro-duct connector – Variants EN 50411-2-8 – XXX/XXX ₁ - XXX/XXX ₂ – XXX ₃ – X ₄	16
Table 2 – ‘Straight’ connector design – Maximum dimensions	17
Table 3 – ‘Straight bulkhead’ connector – Maximum dimensions	18
Table 4 – ‘ID reducer/enlarger stem’ connector – Maximum dimensions	18
Table 5 – ‘ID reducer/enlarger’ connector – Maximum dimensions	19
Table 6 – ‘OD reducer/enlarger stem’ connector – Maximum dimensions.....	19
Table 7 – ‘OD reducer/enlarger’ connector – Maximum dimensions	20
Table 8 – ‘ID and OD reducer/enlarger stem’ connector – Maximum dimensions	20
Table 9 – ‘ID and OD reducer/enlarger’ connector – Maximum dimensions	21
Table 10 – ‘Close Down’ connector – Maximum dimensions	21
Table 11 – ‘Liquid Block’ connectors – Maximum dimensions	22
Table 12 – ‘Liquid Block with barb end’ connectors - Maximum dimensions	22
Table 13 – ‘End Stop’ connector.....	22
Table 14 – Tightness, optical and appearance performance criteria.....	25
Table 15 – Mechanical requirements.....	26
Table 16 – Environmental sealing performance requirements	28
Table A.1 – Minimum sample size requirements.....	30
Table B.1 – Air blown fibre microduct – Mean outside diameter range	31

iTech STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 50411-2-8:2009](https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009)

<https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009>

1 Scope

1.1 Product identification

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

This product specification covers the following 'microduct connectors' to suit a wide range of blown fibre applications, for floating or fixed:

- joining the same size microduct, or different sizes of microduct;
- joining same size protected microduct, to same or different size of microduct or protected microduct;
- disconnection of the connector to gain access, for example, to insert blowing equipment;
- a means to seal the fibre inside the connector to prevent the flow of liquids;
- close off open-ended microducts.

This product specification covers blown fibre microduct connectors for use in 'sub-ducts or protected micro-duct cable closures' as specified in EN 50411-2-5 for use in outside environments, and for both sealed and non-sealed closures. The outside environment includes both subterranean (underground) and/or aerial applications.

This document includes reducer/enlarger products. It may not be possible to blow through these devices. Manual feeding may be required because of the pressure gradient step.

This product specification does not apply to microduct connectors for use in direct sunlight.

1.2 Operating environment

The tests selected, combined with the severity and duration, are representative of an outside plant environment for both subterranean and aerial environments defined by

- ETSI EN 300 019 series: class 8.1: underground locations,
- EN 61753-1: all categories.

1.3 Reliability

Whilst the anticipated service life expectancy of the product in these environments is 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 Safety labelling – Warning: need for an 'over pressure device' in sealed closures

All air blown fibre connectors, supplied to this standard, must have a warning on the product or packaging to read as follows:

Where the air blown fibre connector is installed inside a sealed airtight closure or housing, the closure must be able to be fitted with an over pressure safety system that is able to exhaust air to atmospheric pressure.

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 50411-2-5	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
EN 60793-1-40:2003	Optical fibres – Part 1-40: Measurement methods and test procedures – Attenuation (IEC 60793-1-40:2001, mod.)
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 series	Optical fibre cables – Part 5: Sectional specification – Microduct cabling for installation by blowing (IEC 60794-5 series)
EN 61300 series	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures (IEC 61300 series)
EN 61300-2-1	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 61300-2-22	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 fibre optic 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	Part 3-3: Examinations and measurements – Active monitoring of changes in attenuation and return loss (IEC 61300-3-3)
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	Equipment 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

ABF microduct closure

physical housing containing microduct management, such as connection, fixing, sealing, anchoring, liquid and/or gas blocking, storage and routing between the input and output protected microduct of the air blown fibre cable system

3.1.2

microducts (MD)

small, flexible, lightweight tube with an outer diameter typically less than or equal to 16 mm

3.1.3

protected microducts

one or more microducts surrounded by a protective sheath or pre-installed in a protective duct

3.1.4

microduct optical fibre cables

optical fibre cables suitable for installation by blowing into a microduct

3.1.5

microduct optical fibre unit

fibre unit that is suitable for installation by blowing into a microduct. They differ from microduct optical fibre cables in that they provide less protection to the fibres that they contain

<https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009>

3.1.6

straight microduct connectors

microduct connectors that 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)

3.1.7

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 by a suitable fixing system (i.e. nut or clip)

3.1.8

different ID reducers/enlarger stem microduct connectors

stem connectors which connect two microducts with the same OD but 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

3.1.9

different ID reducers/enlarger microduct connectors

connectors which connect two microducts with the same OD, but different ID, including a smooth internal transition to prevent fibre hang ups. Typically they connect a heavy walled to a thinner wall MD

3.1.10

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

3.1.11**different OD reducers/enlarger microduct connectors**

connectors which connect two microducts with the same ID but different OD

3.1.12**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

3.1.13**different ID and OD reducers /enlarger microduct connectors**

connectors which connect two microducts with different OD and different ID, including a smooth internal transition to prevent fibre hang ups

3.1.14**close down microduct connectors**

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

3.1.15**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

3.1.16**liquid block with a barb end connectors**

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

<https://standards.iteh.ai/catalog/standards/sist/6c8e5f94-8bfe-4afb-86bb-4b379c7abc8a/sist-en-50411-2-8-2009>

3.1.17**end stop microduct connectors**

microduct connectors that are used for sealing open ended micro-duct to avoid air leakage, water or foreign material ingress and for safety reasons

3.1.18**connector insertion force**

force required to insert the microduct into the connector without damage

3.1.19**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

3.1.20**microduct management system (MMS)**

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

3.1.21**burst pressures**

point at which the closure fails to contain pressure

3.1.22**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