

8 Y]b]_j'nUcdh] bUj`U_bU]b`_UVYg_Y'gdc'b]W'nUcdh] bY`_ca i b]_UW'g_Y'g]ghYa Y
!`GdYWZ_UW'U]nXY_U!`&' "XY.`NUYgb`YbY'j fghbY'cdh] bY'gdc'b]W'h]dU`%
_UW[cf]`Y'G/`5

Fibre organisers and closures to be used in optical fibre communication systems -
Product specifications - Part 2-3: Sealed inline fibre splice closures Type 1, for category
S & A

LWL-Spleißkassetten und -Muffen für die Anwendung in LWL-Kommunikationssystemen
- Produktnormen - Teil 2-3: Abgedichtete LWL-Muffen Bauart 1 für die Kategorien S & A

Organiseurs et boîtiers de fibres à utiliser dans les systèmes de communication par
fibres optiques - Spécifications de produits - Partie 2-3: Boîtiers à épissures de fibres
alignées scellés Type 1, pour catégories S & A

Ta slovenski standard je istoveten z: EN 50411-2-3:2007

ICS:

33.180.20	Ú[ç^: [çæ] ^Á æ] !æ^Á æ	Fibre optic interconnecting
	[] cã } æç æ } æ	devices

SIST EN 50411-2-3:2008

en,fr

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

SIST EN 50411-2-3:2008

<https://standards.iteh.ai/catalog/standards/sist/9264352f-9978-4044-99b6-2282bff346df/sist-en-50411-2-3-2008>

**Fibre organisers and closures to be used
in optical fibre communication systems -
Product specifications -
Part 2-3: Sealed inline fibre splice closures Type 1,
for category S & A**

Organiseurs et boîtiers de fibres à utiliser
dans les systèmes de communication
par fibres optiques -
Spécifications de produits -
Partie 2-3: Boîtiers à épissures
de fibres alignées scellés Type 1,
pour catégories S & A

LWL-Spleißkassetten und -Muffen
für die Anwendung
in LWL-Kommunikationssystemen -
Produktnormen -
Teil 2-3: Abgedichtete LWL-Muffen
Bauart 1 für die Kategorien S & A

[SIST EN 50411-2-3:2008](https://standards.iteh.ai/catalog/standards/sist/9264352f-9978-4044-99b6-2282bfb346df/sist-en-50411-2-3-2008)

[https://standards.iteh.ai/catalog/standards/sist/9264352f-9978-4044-99b6-](https://standards.iteh.ai/catalog/standards/sist/9264352f-9978-4044-99b6-2282bfb346df/sist-en-50411-2-3-2008)

[2282bfb346df/sist-en-50411-2-3-2008](https://standards.iteh.ai/catalog/standards/sist/9264352f-9978-4044-99b6-2282bfb346df/sist-en-50411-2-3-2008)

This European Standard was approved by CENELEC on 2007-10-01. 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: rue de Stassart 35, B - 1050 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 Unique Acceptance Procedure and was approved by CENELEC as EN 50411-2-3 on 2007-10-01.

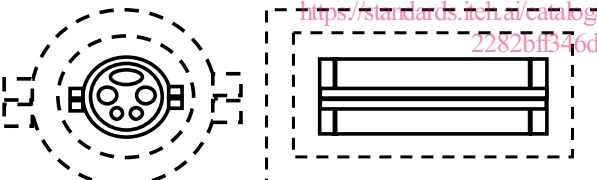
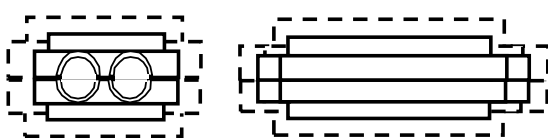
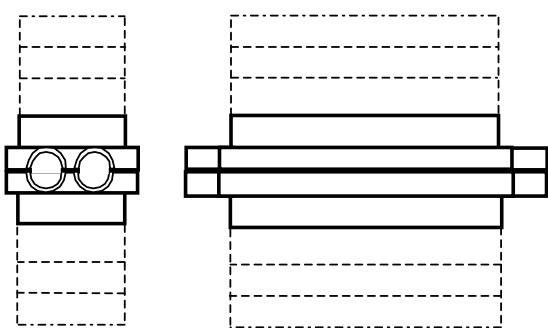
The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-10-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-10-01

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50411-2-3:2008

<https://standards.iteh.ai/catalog/standards/sist/9264352f-9978-4044-99b6-2282bf346df/sist-en-50411-2-3-2008>

Fibre organisers and closures to be used in optical fibre communication systems - Product specifications						
Part 2-3: Sealed inline fibre splice closures Type 1, for category S & A						
Description		Performance				
Construction:	Sealed Inline	Applications:				
Cable seals:	Heat activated and/or cold applied	Optical fibre cable networks				
Fibre management:	Single circuit, Single element, Multiple element and/or Single/Multiple Ribbon	for underground:		IEC 61753-1 category S		
		for aerial:		IEC 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 60794-2	Optical fibre cables - Part 2: Indoor cables - Sectional specification (IEC 60794-2)					
EN 60794-3	Optical fibre cables - Part 3: Sectional specification - Outdoor cables (IEC 60794-3)					
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 300 019-1-4	Environmental Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment - Part 1-4: Classification of environmental conditions - Stationary use at non-weather protected locations					
Construction and splice capacity:		Variant: Number Fibre Splices - Maximum capacity & fibre management system – SC, SE, SR, ME and MR				
Closure Type 1 (A-E):		S organiser			M organiser	
		Single Circuit (SC)	Single Element (SE)	Single Ribbon (SR)	Multiple Element (ME)	Multiple Ribbon (MR)
		A	A	A	A	A
		8 Splice	48 Splice	48 Splice	144 Splice	288 Splice
		B	B	B	B	B
		16 Splice	96 Splice	96 Splice	288 Splice	1152 Splice
		C	C	C	C	C
		24 Splice	144 Splice	120 Splice	360 Splice	1728 Splice
		D	D	D	D	D
		48 Splice	288 Splice	288 Splice	864 Splice	3456 Splice
		E	E	-	E	E
		144 Splice	432 Splice	-	864 Splice	5184 splice
Closure Type 2A (F-G):						
						
		F	F	-	F	-
		6 Splice	36 Splice	-	216 Splice	-
		G	G	G	G	G
		12 Splice	72 Splice	72 Splice	144 Splice	24 Splice
		H	H	H	H	H
		16 Splice	96 Splice	96 Splice	384 Splice	1152 Splice
		J	J	J	J	J
		22 Splice	132 Splice	132 Splice	528 Splice	1584 splice
		K	K	-	K	
		40 Splice	240 Splice	-	480 Splice	
		L	L	-	L	L
		96 Splice	288 Splice	-	648 Splice	1152 Splice
Closure Type 2B (H-L):						
						

Contents

1	Scope	6
1.1	Product definition	6
1.2	Operating environment.....	6
1.3	Reliability	6
1.4	Quality assurance.....	6
1.5	Allowed fibre and cable types.....	6
2	Normative references	6
3	Description.....	7
3.1	Closure housing	7
3.2	Closure overpressure safety	8
3.3	Cable seals	8
3.4	Organiser system	8
3.5	Materials	9
3.6	Colour and marking.....	9
4	Variants	10
5	Dimensional requirements	15
5.1	Dimensions of Type 1 closures.....	15
5.2	Dimensions of Type 2A closures	16
5.3	Dimensions of Type 2B closures	16
6	Tests.....	17
6.1	Sample size	17
6.2	Test sample preparation.....	17
6.3	Test and measurement methods.....	18
6.4	Test sequence	18
6.5	Pass/fail criteria.....	18
7	Test report.....	18
8	Product qualification requirements.....	19
8.1	Dimensional and marking requirements.....	19
8.2	Sealing, optical and appearance performance criteria	19
8.3	Mechanical sealing performance requirements.....	21
8.4	Environmental sealing performance requirements.....	25
8.5	Mechanical optical performance requirements.....	27
8.6	Environmental optical performance requirements.....	28
Annex A	(informative) Fibre references	29
Annex B	(informative) Minimum sample size requirements	30
Annex C	(informative) Families of organiser systems covered in this standard.....	31
Annex D	(informative) Dimensions of organisers for multiple elements and multiple ribbon .	32
Annex E	(informative) Dimensions of S organisers for Single Circuit, Single Element and Single Ribbon	33
	Figure 1 - Outline dimensions of Type 1 closures.....	15
	Figure 2 - Outline dimensions of Type 2A closures.....	16
	Figure 3 - Outline dimensions of Type 2B closures.....	16
	Figure 4 - Track joint configuration sample.....	17
	Figure 5 - Distribution joint configuration sample.....	18
	Figure C.1a) - 'Tree' style organiser	31
	Figure C.1b) - 'Book' style organiser.....	31
	Figure C.1c) - 'Juke box' style organiser.....	31
	Figure C.1d) - 'Shelf' style organiser	31
	Figure C.1 - Families of organiser systems	31
	Figure D.1 - Outline dimensions of the M organiser.....	32
	Figure E.1a).....	33

Figure E.1b).....	33
Figure E.1c).....	33
Figure E.1d).....	33
Figure E.1 - Outline dimensions of the S organiser.....	33
Table 1 - Sealed inline fibre splice closure Type 1, for category S - Variants.....	10
Table 1a) - SC tray and closure selection.....	11
Table 1b) - SE tray and closure selection.....	11
Table 1c) - SR tray and closure selection.....	12
Table 1d) - ME 18 fibre trays with closure selection.....	12
Table 1e) - ME 24 fibre trays with closure selection.....	12
Table 1f) - ME 36 fibre trays with closure selection.....	13
Table 1g) - ME 48 fibre trays with closure selection.....	13
Table 1h) - ME 72 fibre trays with closure selection.....	13
Table 1i) - MR 24 fibre trays with closure selection.....	13
Table 1j) - MR 144 fibre trays with closure selection.....	14
Table 1k) - MR 288 fibre trays with closure selection.....	14
Table 2 - Dimensions of Type 1 closures.....	15
Table 3 - Dimensions of Type 2A closures.....	16
Table 4 - Dimensions of Type 2B closures.....	16
Table 5 - Tightness, optical and appearance performance criteria.....	19
Table 6 - Mechanical optical performance requirements.....	21
Table 7 - Environmental sealing performance requirements.....	25
Table 8 - Mechanical optical performance requirements.....	27
Table 9 - Environmental optical performance requirements.....	28
Table D.1 - M organiser - Guide to fibres or splices per closure.....	32
Table D.2 - M organiser - Guide to the dimensions of trays.....	32
Table E.1 - S organiser - SC, SE and SR.....	33

1 Scope

1.1 Product definition

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

1.2 Operating environment

The tests selected combined with the severity and duration is representative of outside plant for subterranean and/or aerial environments defined by:

ETSI EN 300 019-1-4 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 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

Although the performance tests are carried out on test samples with dispersion un-shifted singlemode fibre (see Annex A), the closure, once tested according to this product specification, will be also suited for other fibre types like dispersion shifted, non-zero dispersion shifted and multimode fibres.

This closure standard allows both singlemode and multimode fibre to be used and covers all EN standard optical fibre cables with their various fibre capacities, types and designs. This includes, but is not limited to, optical fibre cable standards EN 60794-2 (indoor), EN 60794-3 (outdoor).

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 60793-2-50	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres (IEC 60793-2-50)
EN 60794-1-2	Optical fibre cables - Part 1-2: Generic specification - Basic optical cable test procedures (IEC 60794-1-2)
EN 60794-2	Optical fibre cables - Part 2: Indoor cables - Sectional specification (IEC 60794-2)
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 61300-2-12	Part 2-12: Tests - Impact (IEC 61300-2-12)
EN 61300-2-22	Part 2-22: Tests - Change of temperature (IEC 61300-2-22)

EN 61300-2-23	Part 2-23: Tests - Sealing for non-pressurized closures of fibre optic devices (IEC 61300-2-23)
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 closures (IEC 61300-2-37)
EN 61300-2-38	Part 2-38: Tests - Sealing for pressurized closures of fibre optic devices (IEC 61300-2-38)
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 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 300 019-1-4	Environmental Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment - Part 1-4: Classification of environmental conditions - Stationary use at non-weather protected locations

3 Description

3.1 Closure housing

An inline optical closure comprises a closure housing that is attached to the ends of the joined cable sheaths and a means for containing and protecting the fibres, fibre splices and other passive optical devices. The closures covered in the specification are those that are split at the cable entry ports. This allows for assembly over pre-installed cables or where there is no access to the cable end (i.e. uncut looped fibre).

This is not to be confused with an optical closure for blowing cable or fibre. This comprises an access housing that allows the interconnection of cable ducts or tubes and is attached to the ends of the ducts or cables containing empty tubes. However, this document shall be used when air blown fibres are spliced inside this type of closure.

The fibre management closure provides facilities for the environmental protection, housing for fibre management systems and sealing of input and output optical cables. In order to comply with the standard, the optical functionality, physical, geometrical and mechanical requirements are defined.

The design of the closure housing shall allow the jointing of two or more cable ends in the following configurations or applications:

Common base covering:

(T) Track Joint configuration used on trunk cable, with minimum of 2 cable entries

(S) Spur joint configuration used on local feeder cable with minimum of 3 cable entries

(D) Distribution joint configuration used on customer feed cable with minimum of 8 cable entries

NOTE Cable entries can be more than one cable per cable entry port.

The design of the distribution and spur joint closure housing shall allow the joining together of at least one pair of cables which are not at the end of a cable section, without cutting all fibres between both cable openings. This application is generally known as distribution joint or external node, but also called a mid-span closure or balloon splice.

It is desirable that the closure can be re-opened when necessary without interruption or disturbance of the traffic of the live circuits.

3.2 Closure overpressure safety

Overpressure can build up in sealed closures due to temperature differentials, or due to atmospheric pressure changes over a period of time, to flash testing of the seals after installation, to incorrect installation techniques. Care should be taken when opening the closure.

Provision shall be made to relieve any internal pressure differential prior to completely opening the closure.

For air blown fibre applications an overpressure release system is required for all sealed closures.

3.3 Cable seals

Cable entry seal systems can be either, but not limited to:

(H) Dedicated heat activated heat source, for example, electrical, infrared, hot air or flame

- Thermo-shrinkable materials
- Hot melt adhesives
- Polyethylene injection welding

(R) Dedicated cold applied

- Mastic, tapes, pastes, potting compounds, gels and cold adhesives
- O-rings, grommets, rubber shapes, pre-expanded tubing are cold processes

(U) Combined heat activated and cold applied

The fibre management closure allows for a physical housing structure that provides for optical cable fixing, sealing, anchoring, water and gas blocking, storage and routing up to the input and output fibres of the fibre management system.

3.4 Organiser system

SIST EN 50411-2-3:2008

The organiser system provides means for routing, storing and protecting of fibres and fibre splices or other passive optical devices in a predetermined order, from one cable sheath opening to another.

Fibre circuits may be separated to an appropriate separation level. This will limit the risk of interruption of traffic to those fibres that belong to the same group of circuits.

- **Single Circuit (SC)** is a fibre management system that is a group of fibres providing one termination or service of 1 or 2 fibre(s). In this document a Single Circuit is considered to be a circuit of 2 fibres.
- **Single Element (SE)** is a fibre management system that is a cable subassembly comprising one or more optical fibres inside a common covering e.g. tube or inside one groove of a grooved cable (slotted core cable). Single Elements provide more than one termination or circuit of typically 12 fibres. In this document a Single Element is considered to be a group of 12 fibres.
- **Single Ribbon (SR)** is a fibre management system that is a cable subassembly comprising one optical ribbon. Single Ribbon is a group of fibres providing one termination or service of typically 4, 8 or 12 fibres.
- **Multiple Element (ME)** is a fibre management system that provides all necessary equipment to connect a defined number of incoming and outgoing fibres/cables. It comprises storage and protection of fibres and interconnections in one splice tray for more than one Single Element. Typically splice tray capacities between 24 and 144 fibres.
- **Multiple Ribbon (MR)** fibre management provides all necessary equipment to connect a defined number of incoming and outgoing fibre ribbons that are generally housed within a single tube within the cable. This tube is typically fixed to the entry and exit ports of a splice tray. It comprises storage and protection of more than one single ribbon, but typically six or more fibre ribbons and their interconnections in a single splice tray for ribbons between 4 and 36 fibres, but typically 12 fibre ribbons. There are also many different names for this structure, e.g. mass storage or mass ribbons. Typically splice tray capacities are between 36 and 144 fibres.

NOTE The families of organiser systems covered in this document are listed in Annex C.

3.5 Materials

All materials that are likely to come in contact with personnel shall meet appropriate health and safety regulations.

Closure and sealing materials shall be compatible with each other and with the materials of the cables.

All components of the closure shall be resistant to solvents and degreasing agents that are typically used to clean and degrease fibres and cables.

The effects of UV light on all exposed polymeric materials shall not affect product performance. The effects UV light shall be determined by measuring a suitable property (e.g. tensile strength) both before and after exposure.

Metallic parts shall be resistant to the corrosive influences they may encounter during the lifetime of the product.

3.6 Colour and marking

Marking/Identification of the 'variant number' (see Clause 4) to be on the product or packaging label along with the following:

- identification of manufacturer;
- manufacturing date code: year / month.

The preferred colour for the outer closure material is black for polymeric materials.

iteh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50411-2-3:2008

<https://standards.iteh.ai/catalog/standards/sist/9264352f-9978-4044-99b6-2282bf346df/sist-en-50411-2-3-2008>

4 Variants

Table 1 - Sealed inline fibre splice closure Type 1, for category S - Variants

EN 50411 - 2- 3 – X₁ - X₂ - X₃ - XX₄ - XXX₅ - X₆

Variant No. X₁	Operating environment	
S	Subterranean environment	
A	Aerial environment	
B	Both subterranean and aerial environments	
Variant No. X₂	Closure Application - base number of cables	
T	Track closure (2 cables min.)	
S	Spur closure (3 cables min.)	
D	Distribution (8 cables min.)	
Variant No. X₃	Cable sealing technology – heat, non-heat or both	
R	Cold applied	
H	Heat activated (heat source required)	
U	Universal, both methods in a single cable entry base	
Variant No. XX₄	Type of organiser system	
SC	Single Circuit (1 or 2 fibres)	S organisers NOTE In some cases an M organiser tray can be used as SC or SE organiser tray (by reducing number of stored splices per tray).
SE	Single Element (4 or more fibres)	
SR	Single Ribbon (4 or more fibres per ribbon)	
ME	Multiple Element (two or more units)	M organisers
MR	Multiple Ribbon (six or more ribbons 4 fibres per ribbons)	

Depending on the selection of **XX₄**, refer to one of the following Tables 1a) to 1k) to find **XXX₅** and **X₆**.