

SLOVENSKI STANDARD
oSIST prEN 50411-2-4:2018
01-december-2018

Sistemi za upravljanje z optičnimi vlakni in zaščitna ohišja za optične komunikacijske sisteme - Specifikacije proizvoda - 2-4. del: Okrovi optičnih spojnic z zatesnjenimi pokrovi za kategorijo S & A

Fibre management systems and protective housings to be used in optical fibre communication systems - Product specifications - Part 2-4: Sealed dome fibre splice closures for category S & A

LWL-Spleißkassetten und -Muffen für die Anwendung in LWL-Kommunikationssystemen - Produktnormen - Teil 2-4: LWL-Muffen Bauart 1 mit abgedichteter Haube 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 2-4: Boîtiers à épissure de fibres sous dôme scellés Type 1, pour catégories S & A

Ta slovenski standard je istoveten z: prEN 50411-2-4:2018

ICS:

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| 33.180.20 | Povezovalne naprave za optična vlakna | Fibre optic interconnecting devices |
|-----------|---------------------------------------|-------------------------------------|

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Fibre management systems and protective housings to be used in optical fibre communication systems - Product specifications - Part 2-4: Sealed dome fibre splice closures for category S & A

Organiseurs et boîtiers de fibres à utiliser dans les
systèmes de communication par fibres optiques -
Spécifications de produits - Partie 2-4: Boîtiers à épissure
de fibres sous dôme scellés Type 1, pour catégories S & A

LWL-Spleißkassetten und -Muffen für die Anwendung in
LWL-Kommunikationssystemen - Produktnormen - Teil 2-4:
LWL-Muffen Bauart 1 mit abgedichteter Haube für die
Kategorien S und A

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2019-01-04.

It has been drawn up by CLC/TC 86BXA.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

prEN 50411-2-4:2018 (E)

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prEN 50411-2-4:2018 (E)**European foreword**

This document (prEN 50411-2-4:2018) has been prepared by CLC/TC 86BXA, "Fibre optic interconnect, passive and connectorised components".

This document is currently submitted to the Enquiry.

The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 12 months (to be confirmed or modified when voting)

This document will supersede EN 50411-2-4:2012.

prEN 50411-2-4:2018 includes the following significant technical changes with respect to EN 50411-2-4:2012:

- terms and definitions are added;
- the IEC 61753-1:2007 categories A and S tests and test severities are replaced by the IEC 61753-1:201X¹⁾ categories A and S tests and test severities;
- maximum single circuit splice capacity of size E closure reduced from 84 splices to 72 splices;
- addition of new test severity of cable retention load for (microduct) tubes and cables without strength members: Load (N) = 10 * Øcable (mm);
- the test "resistance to shot gun blasts" test is removed.

¹⁾ To be published.

Fibre management systems and protective housings to be used in optical fibre communication systems – Product specifications

Part 2–4: Sealed dome fibre splice closures for category S and A

| Description | | Performance |
|-------------------|--|---|
| Construction: | Sealed dome ended | 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 | <ul style="list-style-type: none"> - for underground (IEC 61753-1:201X category S); - for aerial (IEC 61753-1:201X 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)

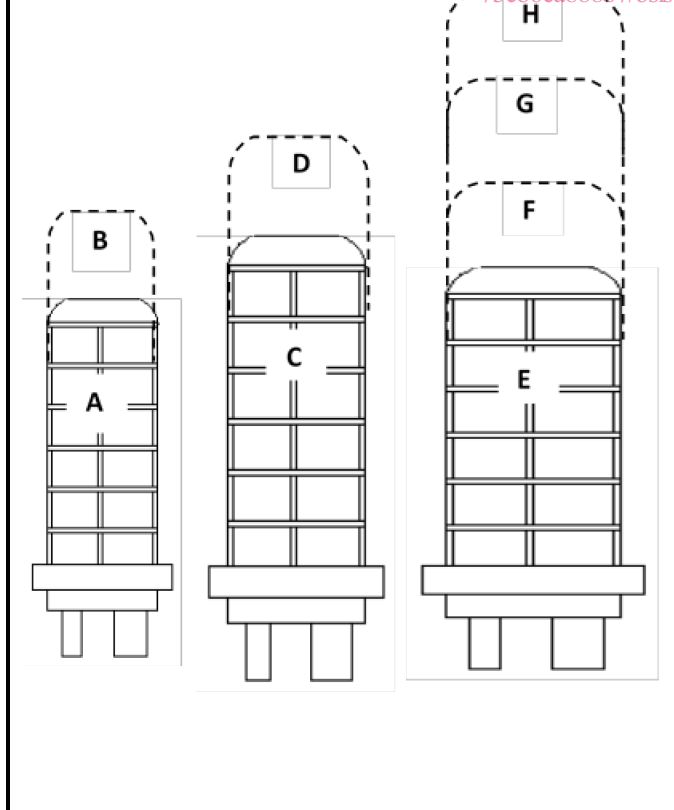
EN 60794-3 Optical fibre cables – Part 3: Sectional specification – Outdoor cables (IEC 60794-3)

EN IEC 61753-1:201X¹⁾ Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standard (IEC 61753-1:201X)

EN 61300 series Fibre optic interconnecting devices and passive components – Basic test and measurement procedures (IEC 61300 series)

ETS 300 019 Environmental Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment

Construction and sizes: <https://standards.iteh.ai/catalog/standards/siv/50411-2-4-2018/75c0fca58807/osist-pr-en-50411-2-4-2018> **Maximum splice capacity depending closure size and fibre circuit separation level**



| Size | S type FMS | | | M type FMS | |
|----------|---------------------|---------------------|--------------------|-----------------------|----------------------|
| | Single Circuit (SC) | Single Element (SE) | Single Ribbon (SR) | Multiple Element (ME) | Multiple Ribbon (MR) |
| A | - | - | - | 72 splices | - |
| B | 12 splices | 72 splices | 48 splices | 96 splices | - |
| C | 24 splices | 144 splices | 72 splices | 144 splices | - |
| D | 48 splices | 288 splices | 144 splices | 576 splices | - |
| E | 72 splices | 216 splices | 144 splices | - | - |
| F | 144 splices | 432 splices | 288 splices | - | - |
| G | 192 splices | 624 splices | 384 splices | - | 288 splices |
| H | 240 splices | 864 splices | 432 splices | - | 1 152 splices |

prEN 50411-2-4:2018 (E)**1 Scope****1.1 Product definition**

This document 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 categorized as a European Standard product.

1.2 Operating environment

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

EN IEC 61753-1:201X¹⁾ 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 recognized 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 recognized quality assurance programme.

1.5 Allowed fibre and cable types

Although the optical performance tests are carried out on test samples with EN 60793-2-50, B1.3 dispersion unshifted single mode fibre (see Annex A), the closure, once tested according to this European Standard, will also be suitable for other fibre types, e.g. dispersion shifted, non-zero dispersion shifted and multi-mode fibres.

This closure standard allows both single mode and multimode fibre to be used and covers all IEC 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) and EN 60794-3 (outdoor).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60794-2, *Optical fibre cables - Part 2: Indoor cables - Sectional specification (IEC 60794-2)*

EN 60794-3, *Optical fibre cables - Part 3: Sectional specification - Outdoor cables*

EN 61300-2-1, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-1: Tests - Vibration (sinusoidal)*

EN 61300-2-4, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-4: Tests - Fibre/cable retention*

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- EN 61300-2-5, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-5: Tests - Torsion*
- EN 61300-2-9, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-9: Tests - Shock*
- EN 61300-2-10, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-10: Tests - Crush resistance*
- EN 61300-2-11, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-11: Tests - Axial compression*
- EN 61300-2-12, *Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-12: Tests — Impact (IEC 61300-2-12)*
- EN 61300-2-22, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-22: Tests - Change of temperature*
- EN 61300-2-23, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-23: Tests - Sealing for non-pressurized closures of fibre optic devices*
- EN 61300-2-26, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-26: Tests - Salt mist*
- EN 61300-2-33, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-33: Tests - Assembly and disassembly of fibre optic mechanical splices, fibre management systems and closures*
- EN 61300-2-34, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-34: Tests - Resistance to solvents and contaminating fluids of interconnecting components and closures*
- EN 61300-2-37, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-37: Tests - Cable bending for fibre optic closures*
- EN 61300-2-38, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-38: Tests - Sealing for pressurized fibre optic closures*
- EN 61300-3-1, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-1: Examinations and measurements - Visual examination*
- EN 61300-3-3, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-3: Examinations and measurements - Active monitoring of changes in attenuation and return loss*
- EN 61300-3-28, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-28: Examinations and measurements - Transient loss*
- EN IEC 61753-1:201X,¹⁾ *Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards (IEC 61753-1:201X)*

prEN 50411-2-4:2018 (E)**3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1**fibre management system****FMS**

system to control, protect and store splices, connectors, passive optical components and fibres from incoming to outgoing cables

Note 1 to entry: A fibre management system is intended for installation within a protective housing.

Note 2 to entry: A fibre management system is often called an “organiser”.

[SOURCE: EN IEC 61756-1]

3.2**fibre splice**

permanent or separable joint whose purpose is to couple optical power between two optical fibres, achieved by either a fusion or a mechanical technique

[SOURCE: IEC 731-05-05 modified]

3.3**live fibre**

fibre optical circuit that is carrying an optical signal

[SOURCE: EN IEC 61756-1]

3.4**multiple element****ME**

physical separation level consisting of more than one single element

Note 1 to entry: This separation level implies fibres from multiple cable elements on one splice tray (also called mass storage) and constitutes the lowest degree of circuit physical separation.

[SOURCE: EN IEC 61756-1]

3.5**multiple ribbon****MR**

as opposed to single ribbon, a multiple element consisting of multiple optical fibres (circuits) arranged in ribbons (fibres in parallel) in turn arranged e.g. in stacks

[SOURCE: EN IEC 61756-1]

3.6**optical time domain reflectometer****OTDR**

device for characterizing an optical fibre whereby an optical pulse is transmitted through the optical fibre and the optical power of the resulting light scattered and reflected back to the input is measured as a function of time

Note 1 to entry: Useful in estimating attenuation coefficient for uniform fibres, and identifying and localizing defects and localized losses.

[SOURCE: IEC 60825-1:2014]

3.7**sealed closure**

watertight and dust-tight housing that can hold a varying overpressure or underpressure caused by temperature changes or atmospheric pressure changes. Complete inner filled housings are also considered to be sealed closures

Note 1 to entry: There is no exchange of air with the outside environment when exposed to temperatures over the specified operating temperature range

Note 2 to entry: Although often referred to as hermetic sealed closures, humidity can enter the inner closure by diffusion

[SOURCE: EN IEC 61753-1]

3.8**single circuit****SC**

circuit (fibre) physical separation level where the optical circuit consists of one fibre (single fibre), or more than one fibre, providing one termination

Note 1 to entry: This separation level foresees only the fibre(s) of one customer per splice tray and constitutes the highest degree of circuit physical separation.

[SOURCE: EN IEC 61756-1]

3.9**single element****SE**

circuit (fibre) physical separation level with a cable subassembly comprising one or more optical fibres inside a common covering e.g. a tube or inside one groove of a grooved cable (slotted core cable)

Note 1 to entry: A single element provides more than one termination or circuit.

Note 2 to entry: A fibre ribbon is a single element.

Note 3 to entry: This separation level foresees all fibres from a cable element (e.g. a loose tube) per splice tray and constitutes an intermediate degree of circuit physical separation between single circuit (SC) and multiple element (ME).

[SOURCE: EN IEC 61756-1]

3.10**single ribbon****SR**

single circuit or single element, depending on the fibres' deployment, designed to carry respectively one circuit (single circuit) or more circuits (single element)

[SOURCE: EN IEC 61756-1]

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4 Description

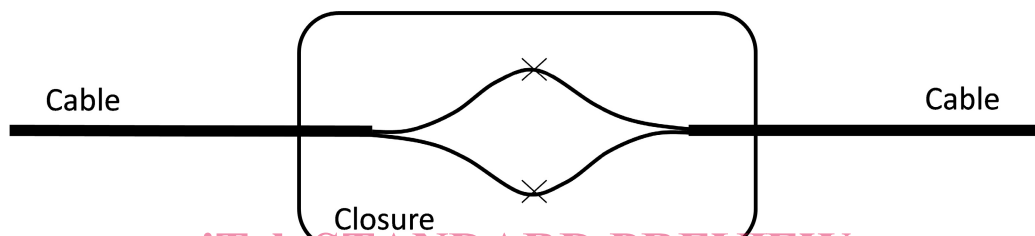
4.1 Closure housing

An optical fibre closure comprises a sealed closure housing that is attached to the ends of the joined cable sheaths and a fibre management system for containing and protecting the fibres, splices and other passive optical devices.

This is not to be confused with an optical fibre closure for blowing cable or fibre. This comprises a protective 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 design of the closure housing shall allow the jointing of two or more cable ends in the following configurations or applications:

(T) **Track joint** configuration used to interconnect at least two cables (example: drop cable repair closure)



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Figure 1 – Track joint configuration

(S) **Spur joint** configuration used to split one cable into at least 2 smaller cables.

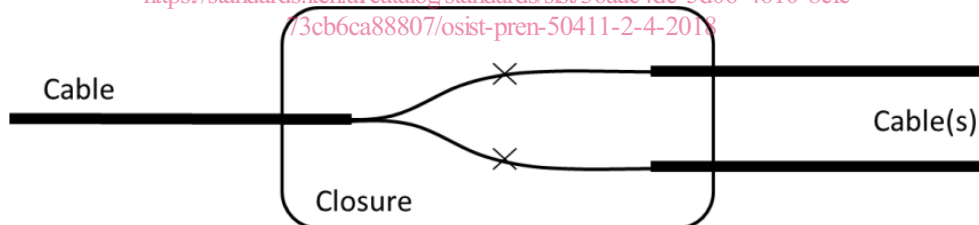


Figure 2 – Spur joint configuration

(D) **Distribution joint** configuration used on customer feed cable with minimum of 6 cable entries (D1), 10 cable entries (D2), 18 cable entries (D3), 34 cable entries (D4) or 66 cable entries (D5).

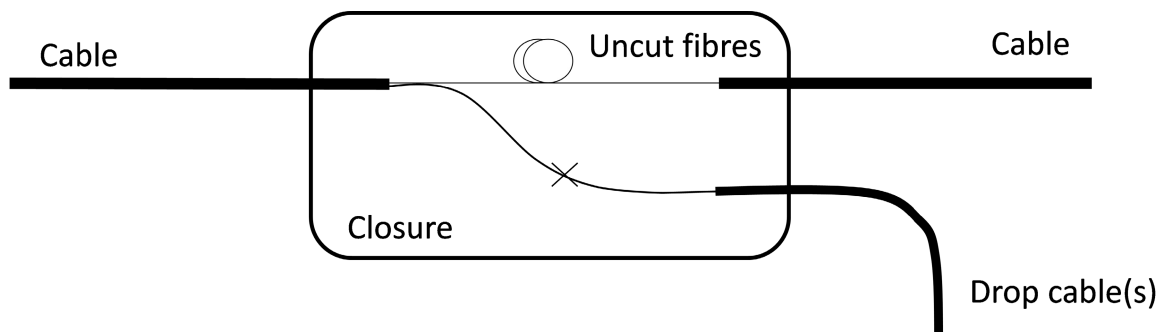


Figure 3 – Distribution joint configuration

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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.

4.2 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, or due to flash testing of the seals after installation, or due to incorrect installation techniques. Care should be taken when opening a sealed closure. Provisions shall be made that overpressure is exhausted when opening the closure prior to complete removal of the cover.

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

4.3 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.

4.4 Fibre management system

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

Fibres may be separated to an appropriate separation level. This will limit the risk of interruption to traffic in those fibres belonging to other groups of circuits.

- **Single Circuit (SC)** is a group of fibres providing one termination or service with 1, 2 or 4 fibres to one subscriber. In this document a single circuit is considered to be a circuit of 2 fibres;
- **Single Element (SE)** provides more than one termination or service with typically 12 fibres. In this document a single element is considered to be a group of 12 fibres;
- **Single Ribbon (SR)** is a group of fibres providing one termination or service with 4, 8 or 12 fibres. In this document a single ribbon is considered to have 12 fibres;
- **Multiple Element (ME)** is a group of fibres providing more than one termination or service per splice tray. Typically splice tray capacities are between 24 and 144 fibres;