

# SLOVENSKI STANDARD

## SIST EN 50411-2-4:2022

01-februar-2022

Nadomešča:  
SIST EN 50411-2-4:2012

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### Sistemi za upravljanje z optičnimi vlakni in zaščitna ohišja za optične komunikacijske sisteme - Specifikacije proizvoda - 2-4. del: Okrovi optičnih spojníc 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

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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

[SIST EN 50411-2-4:2022](https://standards.iteh.ai/catalog/standards/sist/36aac4de-5d06-4610-8cfe-73cb6ca88807/sist-en-50411-2-4-2022)

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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: EN 50411-2-4:2021**

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#### **ICS:**

33.180.20	Povezovalne naprave za optična vlakna	Fibre optic interconnecting devices
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EUROPEAN STANDARD

**EN 50411-2-4**

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2021

ICS 33.180.20

Supersedes EN 50411-2-4:2012 and all of its  
amendments and corrigenda (if any)

English Version

## 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 European Standard was approved by CENELEC on 2021-08-09. 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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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**

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**EN 50411-2-4:2021 (E)****European foreword**

This document (EN 50411-2-4:2021) has been prepared by CLC/TC 86BXA, "Fibre optic interconnect, passive and connectorised components".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-05-26
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2024-11-26

This document supersedes EN 50411-2-4:2012 and all of its amendments and corrigenda (if any).

EN 50411-2-4:2021 includes the following significant technical changes with respect to EN 50411-2-4:2012:

- reference EN IEC 61756-1 is added;
- terms and definitions are added;
- harmonized general requirements with the EN IEC 61753-111 series;
- the IEC 61753-1:2007 categories A and S tests and test severities are replaced by the IEC 61753-1:2018 categories A and S tests and test severities;
- maximum single circuit splice capacity of size E closure reduced from 84 splices to 72 splices;
- variant XX<sub>7</sub> (FMS designed for fibre type) added;
- test pressure for category A changed to 20 kPa overpressure;
- reduced loads in cable retention test for small diameter cables and tubes;
- axial compression test of cables is added;
- number of assembly and disassembly cycles reduced to 5 cycles;
- resistance to solvents and contaminating fluids for category S has changed. The duration of the immersion in diesel became 1 h and the drying time 24 h. Immersion in kerosene is removed;
- duration of the change of temperature reduced to 12 cycles;
- the test "resistance to shot gun blasts" test is removed;
- fibre type B-567 added for test sample.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

### 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	— for underground (EN IEC 61753-1 category S); — for aerial (EN IEC 61753-1 category A).

#### Related documents:

EN IEC 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: Outdoor cables – Sectional specification (IEC 60794-3)*

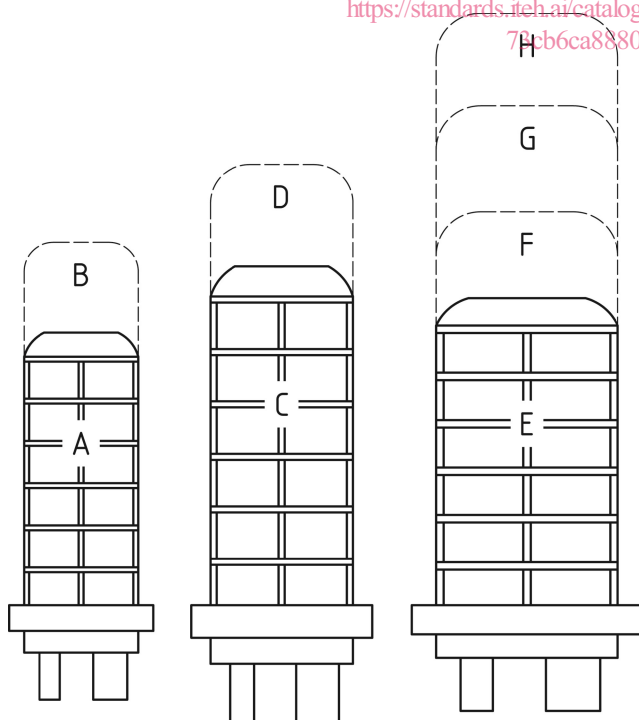
EN IEC 61753-1, *Fibre optic interconnecting devices and passive components - Performance standard – Part 1: General and guidance (IEC 61753-1)*

EN IEC 61756-1, *Fibre optic interconnecting devices and passive components - Interface standard for fibre management systems - Part 1: General and guidance (IEC 61756-1)*

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

ETSI EN 300 019, *Environmental Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment*

#### Construction and sizes:



#### 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





- EN 61300-2-5, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-5: Tests – Torsion (IEC 61300-2-5)*
- EN 61300-2-9, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-9: Tests – Shock (IEC 61300-2-9)*
- EN 61300-2-10, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-10: Tests - Crush resistance (IEC 61300-2-10)*
- EN 61300-2-11, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-11: Tests - Axial compression (IEC 61300-2-11)*
- 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 (IEC 61300-2-22)*
- 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 (IEC 61300-2-23)*
- EN 61300-2-26, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-26: Tests - Salt mist (IEC 61300-2-26)*
- 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 (IEC 61300-2-33)*
- 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 (IEC 61300-2-34)*
- 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 (IEC 61300-2-37)*
- 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 (IEC 61300-2-38)*
- EN 61300-3-1, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-1: Examinations and measurements - Visual examination (IEC 61300-3-1)*
- 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 (IEC 61300-3-3)*
- EN 61300-3-28, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-28: Examinations and measurements - Transient loss (IEC 61300-3-28)*
- EN ISO 4892-3, *Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps (ISO 4892-3)*

**EN 50411-2-4:2021 (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 <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

**3.1****excursion loss**

change in optical attenuation during the slow variations of environmental parameters

Note 1 to entry: Excursion loss is the  $\pm$  deviation from the original value of the transmitted power at the start of the test.

**3.2****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]

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**3.3****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]

**3.4****intervention**

gain access to modify, add, remove or repair fibre circuits, splices, connectors or other components between the incoming and outgoing cables of an existing closure

**3.5****installation**

all activities and handling operations to establish and install a protective housing including the cables or by adding new circuits, splices, connectors and other components

**3.6****installation conditions**

circumstances that must be fulfilled for an installation, which includes; environmental conditions, size interface between the closure or enclosure and the fibre management system, optical performance, additional/special conditions and safety requirements

**3.7****live fibre**

fibre optical circuit that is carrying an optical signal

[SOURCE: EN IEC 61756-1]

**3.8****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]

**3.9****multiple ribbon****MR**

multiple element consisting of multiple optical fibres (circuits) arranged in ribbons (fibres in parallel) which are also arranged (for example, in stacks)

[SOURCE: EN IEC 61756-1]

**3.10****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 61756-1]

**3.11****protective housings**

all indoor and outdoor housings utilised for the storage, distribution or protection of one or more cable joints or any passive or active telecom equipment

Note 1 to entry: Examples of protective housings: wall boxes, cabinets, cases, optical distribution frame sub racks, closures or pedestals. A closure can be either a "sealed closure" or a "free breathing closure".

Note 2 to entry: The protective housing contains a fibre management system.

[SOURCE: EN IEC 61753-1]

**3.12****sealed closure**

watertight and dust-tight housing that can hold a varying overpressure or underpressure caused by temperature changes or atmospheric pressure changes

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.

Note 3 to entry: Completely inner filled housings are also considered to be sealed closures.

[SOURCE: EN IEC 61753-1]

**EN 50411-2-4:2021 (E)****3.13****single circuit****SC**

physical fibre separation level where the optical circuit consists of one fibre (single fibre), or more than one fibre, providing all services for one subscriber

Note 1 to entry: This fibre separation level has the fibre(s) of only one customer on one splice tray. It is the highest (best) degree of physical circuit separation.

[SOURCE: EN IEC 61756-1]

**3.14****single element****SE**

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 fibre separation level has all fibres from a cable element (e.g. loose tube) on one splice tray. It is an intermediate degree of physical circuit separation (between single circuit and multiple element).

[SOURCE: EN IEC 61756-1]

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**3.15****single ribbon****SR**

single element designed to carry all fibres of one ribbon

Note 1 to entry: Depending on the fibres deployment, a single ribbon can contain all the fibres of one circuit (single circuit) or the fibres of more than one circuit (single element).

[SOURCE: EN IEC 61756-1]

**3.16****splice tray**

structure that organises and controls storage of fibre splices in an orderly manner, together with the associated excess uncabled fibre length

Note 1 to entry: It can be a part of a fibre management system.

[SOURCE: EN IEC 61756-1]

**3.17****transient loss**

short term (ms) reversible change of optical transmission characteristics arising from optical discontinuity, physical defects and modifications of the attenuation (e.g. bending loss) normally caused by mechanical stress

[SOURCE: EN 61300-3-28]

**3.18****uncut fibre**

fibres from a continuous cable with the cable sheath removed over a defined length without cutting the fibres or tubes

Note 1 to entry: The uncut tubes or fibres are stored e.g. in a space saving loop. When required, the fibres are cut and spliced or connected.

[SOURCE: EN IEC 61756-1]

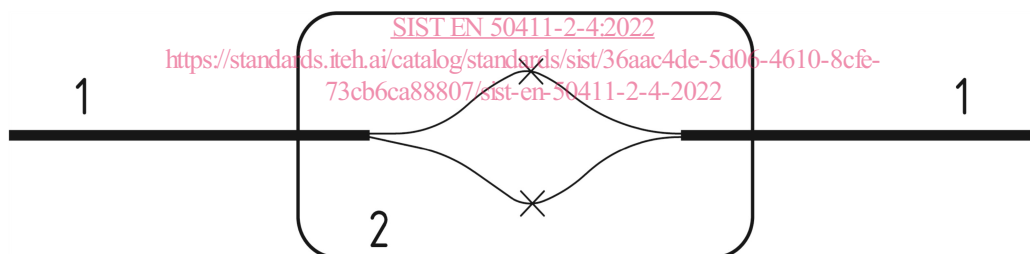
**4 Description****4.1 Closure housing**

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:

- **Track joint** configuration (see Figure 1) used to interconnect at least two cables (example: drop cable repair closure);

**Key**

- 1 cable
- 2 closure

**Figure 1 — Track joint configuration**

- **Spur joint** configuration (see Figure 2) used to split one cable into at least 2 smaller cables;