SLOVENSKI STANDARD
SIST EN 50411-3-4:2019

01-september-2019

Sistemi za upravljanje z optičnimi vlakni in zaščitna ohišja za optične komunikacijske sisteme - Specifikacije izdelka - 3-4. del: Stenska omarica za povezavo s priključki "patch cord" za kategoriji C in A

Fibre management systems and protective housings to be used in optical fibre communication systems - Product specifications - Part 3-4: Wall box for splice to patchcord connections, for category C and A

LWL-Spleißkassetten und -Muffen für die Anwendung in LWL-Kommunikationssystemen – Produktnorm – Teil 3-4: Fasermanagementsysteme, Wandkasten für Spleiß-Patchkabel-Verbindungen, für die Kategorie C und A

Organiseurs et boîtiers de fibres à utiliser dans les systèmes de communication par fibres optiques - Spécifications de produits - Partie 3-4:Système de gestion de fibres, boîte murale pour connexion entre épissures et cordons de brassage, pour les catégories C et A

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31.240	Mehanske konstrukcije za elektronsko opremo	Mechanical structures for electronic equipment
33.180.20	Povezovalne naprave za optična vlakna	Fibre optic interconnecting devices

SIST EN 50411-3-4:2019 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50411-3-4

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ICS 33.180.20

English Version

Fibre management systems and protective housings to be used in optical fibre communication systems - Product specifications - Part 3-4: Wall box for splice to patchcord connections, for category C and A

Organiseurs et boîtiers de fibres à utiliser dans les systèmes de communication par fibres optiques - Spécifications de produits - Partie 3-4:Système de gestion de fibres, boîte murale pour connexion entre épissures et cordons de brassage, pour les catégories C et A

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

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Contents

European foreword

This document (EN 50411-3-4:2019) 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)	2020-05-20
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2022-05-20

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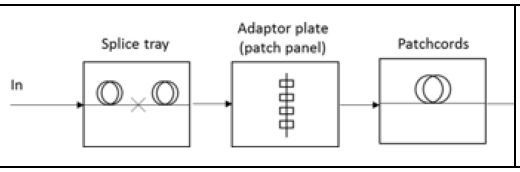
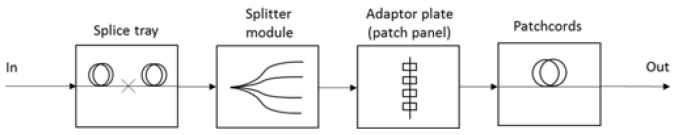
Fibre management systems and protective housings to be used in optical fibre communication systems – Product specifications -

Part 3–4: Wall or pole mounted box for splice to patchcord connections, for categories C and A

Description	Typical installation configuration	Typical mounting options
Wall or pole mounted box	Fibre distribution box	Vertical wall (external or internal) Pole or wall mounted (above ground) Inside street furniture (cabinet or pedestals)

Typical fibre management configurations





Operating service environments

Applications:	
Optical fibre cable networks. For indoor and for external above ground applications	EN IEC 61753-1 category C EN IEC 61753-1 category A

Modular adapter plates for the following connectors

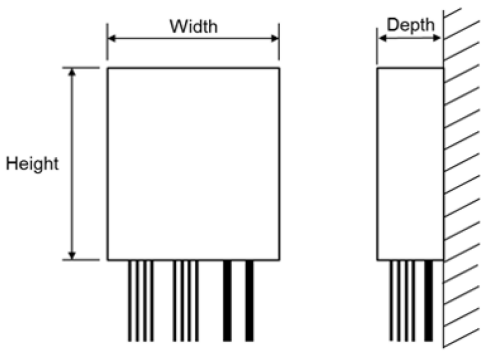
Connector type	Adapter size	Standard
SC	Simplex or duplex	EN 61754-4
LC	Simplex or duplex	EN 61754-20
LF3	Simplex or duplex	EN 61754-13
LSH	Simplex or duplex	EN 61754-15
MPO	Simplex	EN 61754-7

Fibre separation levels in Fibre Management System

Single circuit (1, 2 or 4 fibre splices per tray), Single element (6, 8 or 12 fibre splices per tray), Multiple element (up to 144 fibre splices per tray)	Single ribbon (1 ribbon splice per tray), Multiple ribbon (up to 12 ribbon splices per tray)

Box sizes and dimensions

Box sizes: 4, 8, 12, 24, 48, 72, 120 and 144 patchcord connections



Box sizes	Patchcord connections	Width (mm)	Height (mm)	Depth (mm)
A	4	170	300	50
B	8	280	450	100
C	12	280	450	100
D	24	465	450	225
E	48	465	500	225
F	72	465	550	225
G	120	465	600	225
H	144	465	650	225

NOTE Cables and patchcords enter the box from underneath.

1 Scope

1.1 Product definition

This document contains the dimensional, optical, mechanical and environmental performance requirements of a fully installed optical fibre wall or pole mounted box, in order for it to be categorized as a European Standard product.

The typical configuration is splicing of incoming fibres to optional splitters and/or to pigtails, connecting pigtail plugs on one side to patchcord plugs on the other side, using adapters.

A box is a protective housing containing a fibre management system with splice trays of various fibre separation levels and connector mounting plates. The box may contain one or more of the following:

— storage and routing for fibre and cable;

— uncut fibre cable storage;

— splice trays;

— adapters and connectors;

— passive optical devices (optical splitters or WDM).

A box can be installed on a vertical indoor or outdoor surface above ground level. If the box is required to be relocatable with cables attached, the following additional tests are performed:

— cable bending;

— cable torsion.

This document specifies the number of splice trays and splice/connector capacity for each fibre separation level. The maximum capacity is 144 connectors and splices. For housings with a higher number of splices and connectors, EN 50411-4-1 (street cabinets) can be used.

Boxes for fibre splices only are covered in EN 50411-3-1.

1.2 Operating environment

The tests selected, combined with the severity and duration, are representative of indoor and outside plants for above ground environments defined by EN IEC 61753-1:

— category C: Controlled (indoor) environment;

— category A: Aerial (above ground) environment.

1.3 Reliability

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

1.4 Quality assurance

Compliance with this document does not guarantee the manufacturing consistency of the product. This can be maintained using a recognized quality assurance programme.

1.5 Allowed fibre and cable types

This box standard accommodates EN IEC 60793-2-50 singlemode fibres and EN 60793-2-10 A1-OM2 to A1-OM5 and A1-OM1 multimode fibres and all EN 60794 series optical fibre cables with various fibre capacities, types and designs.

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 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 60695-11-10, *Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods (IEC 60695-11-10)*

EN 60754-1, *Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content (IEC 60754-1)*

EN 60793-2-10, *Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres (IEC 60793-2-10) (IEC 60793-2-10)*

EN IEC 60793-2-50, *Optical fibres - Part 2-50: Product specifications - Sectional specification for class B singlemode fibres (IEC 60793-2-50)*

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

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 61300-2-12, *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 61300-2-26, *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 61300-3-1, *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 IEC 61753-1, *Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards (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)*

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
live fibre or active fibre
fibre in an optical circuit or node that is carrying an optical signal

3.2
adapter
component in which two or more ferrules are aligned

Note 1 to entry: A ferrule is the fibre holding component part of the optical fibre connector plug

3.3
box
free breathing protective housing that is permanently attached to a vertical wall or pole

Note 1 to entry: A box is not specifically designed to allow cable movement (e.g. torsion, bending) at the cable ports during operation.

3.4
cable element
grouping of fibres in the cable sheath

3.5
fan-out
passive optical component providing a transition between a single ribbon or single element into individual fibres

3.6
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 systems is often called an “organiser”.

3.7
free breathing housing
protective housing that allows a free exchange of air with the environment

Note 1 to entry: Limited water ingress and/or limited dust ingress is possible. Free breathing housings are not intended for use in areas that are subject to flooding or water immersion. Free breathing closures are used in aerial environments for the interconnection of cables.

Note 2 to entry: A free breathing closure may look like a sealed closure, but it is not designed to hold a varying overpressure or underpressure caused by temperature changes or atmospheric pressure changes.

3.8
microduct
small, flexible lightweight tube with an outer diameter between 3 mm and 16 mm

3.9
multiple element
ME
physical fibre separation level consisting of more than one single element

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

3.10
multiple ribbon
MR
multiple element consisting of multiple optical fibres (circuits) arranged in ribbons (fibres in parallel) which are arranged e.g. in stacks

3.11
optical fibre connector
component normally attached to a cable or piece of apparatus for the purpose of providing interconnection and disconnection of fibre optic cables

Note 1 to entry: The interconnection usually consists of two plugs mated together in an adapter or 1 plug mated in a socket.

3.12
passive optical component
optical component or assembly which does not require any source of energy for its operation other than optical input signals, or controls the dynamic or static characteristics of optical signals using a source of energy

Note 1 to entry: A passive optical component never generates an optical gain of signal power.

Note 2 to entry: Examples include optical attenuators and passive branching devices.

3.13
patchcord
length of optical fibre or cable, permanently terminated at both ends with a plug

3.14
pigtail
length of optical fibre or cable, permanently terminated at one end with a plug

3.15
protective housings
indoor and outdoor housings utilised for the storage, distribution or protection of one or more cable joints or 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: a protective housing contains a fibre management system

3.16
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. Single circuit minimizes the disturbance of operating circuits when accessing any adjacent circuit.

3.17
single element
SE

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

Note 1 to entry: A single element provides services to more than one subscriber.

Note 2 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).

3.18
single ribbon
SR
physical fibre separation level with all fibres grouped in 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).

3.19
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: A splice tray is a part of a fibre management system.

3.20
transient loss
short term (milliseconds) reversible change of optical transmission characteristics arising from optical discontinuity, physical defects and modifications of the attenuation (e.g. from bend loss) normally caused by mechanical stress

3.21
uncut fibre
fibres from a continuous cable with the cable sheath removed over a defined length

Note 1 to entry: Uncut fibres typically comprise a section of cable where the cable sheath has been removed and the cable tubes or uncut fibres are cleaned as for installation. These uncut tubes or fibres are then stored, usually inside a protective housing, in a loop. When required the fibres or tubes are then cut and the fibres connected or spliced.

4 Abbreviations

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

FMS	Fibre Management System
FTTH	Fibre to the Home
ME	Multiple Element
MR	Multiple Ribbon
NA	Not applicable
OD	Outside Diameter
SC	Single Circuit
SE	Single Element
SR	Single Ribbon
WDM	Wavelength Division Multiplexer

5 Description

5.1 Functions and configurations

An optical fibre box is a housing that is attached to a wall or pole and contains the ends of the terminated cable or microduct. The design of the box shall allow the interconnection of cable ends or fibre units.

A box has a means of containing and protecting the fibres, splices, connectors, and other passive optical devices.

A box used for blown cabling contains an area where the ends of the microducts or the protected microducts, which may be terminated with water and gas blocking, are placed.

The design of the box may 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 or balloon splice box.

A box shall be able to be re-opened without interruption or disturbance of the traffic of the live circuits within the box.

The main fibre management configurations of the optical fibre distribution boxes in this specification are given in Figure 1.