



BSI Standards Publication

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

Part 3-3: Singlemode optical fibre fusion splice protectors

National foreword

This British Standard is the UK implementation of EN 50411-3-3:2019. It supersedes BS EN 50411-3-3:2011, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/86/2, Fibre optic interconnecting devices and passive components.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Amendments/corrigenda issued since publication

Date	Text affected
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English Version

**Fibre management systems and protective housings to be used
in optical fibre communication systems - Product specifications -
Part 3-3: Singlemode optical fibre fusion splice protectors**

Organiseurs et boîtiers de fibres destinés à être utilisés
dans les systèmes de communication par fibres optiques -
Spécifications de produits - Partie 3-3: Protecteurs
d'épissures par fusion de fibres optiques unimodales

LWL-Spleißkassetten und -Muffen für die Anwendung in
LWL-Kommunikationssystemen - Produktnormen - Teil 3-3:
Fusionsspleißschutze für Einmodenfasern

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Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (EN 50411-3-3:2019) 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 (dop) 2020-09-30 implemented at national level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting (dow) 2020-09-30 with this document have to be withdrawn

This document supersedes EN 50411-3-3:2011 and all of its amendments and corrigenda (if any).

EN 50411-3-3:2019 includes the following significant technical changes with respect to EN 50411-3-3:2011:

- terms and definitions are added;
- the EN 61753-1:2007 category U tests and test severities are replaced by the EN IEC 61753-1:2018 category OP test and test severities;
- a 23 mm length variant has been added to the variant XX₃;
- the colour coding variant XX₆ is harmonized with EN 60304;
- tolerance of height and width increased to $\pm 0,1$ mm for variant S1-12 and $\pm 0,15$ mm for S1-16
- requirement added of a transparent heatshrink splice protector to allow the visual centring of the fused fibre area in the splice protector.

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.

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

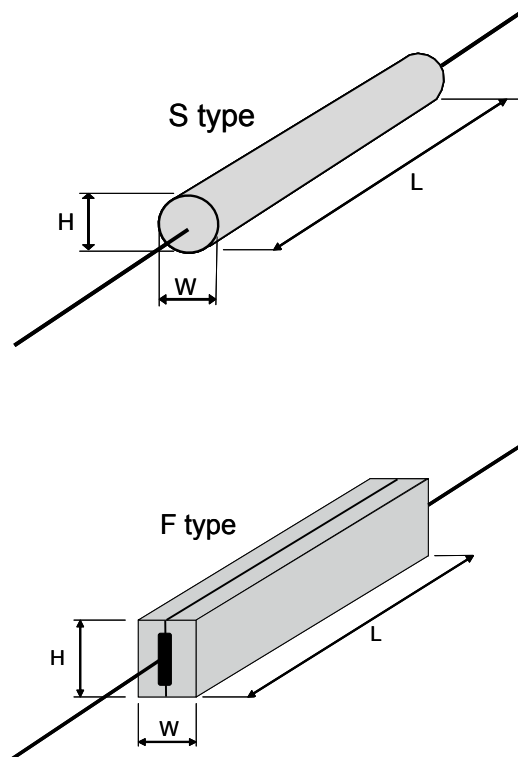
Part 3-3: Singlemode optical fibre fusion splice protectors

Description		Performance	
Type:	Fibre splice protector	Application:	EN 61753-1, Category OP
Style:	Fusion		
Operating wavelength:	1 260 nm to 1 625 nm	Attenuation grades:	Not applicable
Fibre category:	EN 60793-2-50	Return loss grades:	Not applicable

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 61300 series	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures (IEC 61300 series)
EN IEC 61753-1	Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards (IEC 61753-1)

Outline and nominal dimensions:



Product as installed or fully recovered				
Type	Fibre	W mm	H mm	L Available lengths mm
F1	Single fibre	1,2	3,2	30
S1-12	Single fibre	1,25	1,25	15/20/25/30
S1-13	Single fibre	1,3	1,3	15/20/25/30
S1-16	Single fibre	1,6	1,5	15/20/25/30/40
S1-22	Single fibre	2,2	2,2	25/30/35/40/45
S1-24	Single fibre	2,4	2,4	20/23/25/35/40/45/60
S1-26	Single fibre	2,6	2,6	23/35/40/45/60
S1-32	Single fibre	3,2	3,2	45/60
S1-35	Single fibre	3,5	3,5	45/60
S1-37	Single fibre	3,7	3,7	68
S2-37	Ribbon 4	3,7	3,5	40/45
S3-40	Ribbon 8	4,0	3,7	40/45
S4-45	Ribbon 12	4,5	4,0	25/30/40/45

1 Scope

1.1 Product definition

This document contains the initial, start of life dimensional, optical, mechanical and environmental performance requirements, which a single mode fusion splice protector need to meet in order for it to be categorized as an EN standard product.

Although, in this document, the product is qualified for EN IEC 60793-2-50 type B-652.D single mode fibres it is also suitable for fusion splice protection of multimode fibre with 125 µm diameter glass cladding and other single mode fibres with 125 µm diameter glass cladding.

1.2 Interoperability

The installed fusion splice protector needs to fit into optical fibre splice cassettes or splice trays. This document specifies the following physical interface dimensions:

- cross sectional profile with width, height or diameter (in millimetres);
- length (in millimetres).

1.3 Expected performance

In this document, the performance of the fusion splice protector is given with selected fibres as specified in Annex A.

1.4 Operating environment

The tests selected combined with the severities and durations are representative of an outdoor enclosed environment defined as category OP in EN IEC 61753-1. The “assembly and disassembly” and the “dust” tests are not included since they are not relevant once the product is installed. To ensure that the product can be used in outdoor closures, boxes or street cabinets for categories A, G or S (as defined in EN IEC 61753-1) the specified lower temperature is extended to –40 °C and a water immersion requirement for temporary flooding conditions has been added.

1.5 Reliability

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

1.6 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.

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 60304, *Standard colours for insulation for low-frequency cables and wires* (IEC 60304)

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 61300-1, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 1: General and guidance* (IEC 61300-1)

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 IEC 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 61300-2-5, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-5: Tests – Torsion* (IEC 61300-2-5)

EN 61300-2-7, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-7: Tests - Bending moment* (IEC 61300-2-7)

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 61300-2-17, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-17: Tests – Cold* (IEC 61300-2-17)

EN 61300-2-18, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-18: Tests - Dry heat - High temperature endurance* (IEC 61300-2-18)

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 61300-2-45, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-45: Tests - Durability test by water immersion* (IEC 61300-2-45)

EN 61300-2-46, *Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-46: Tests — Damp heat cyclic* (IEC 61300-2-46)

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)

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

fibre optical circuit that is carrying an optical signal

[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]

4 Description

4.1 Fusion splice protector

4.1.1 General

A single mode fibre fusion splice protector is a passive component, which provides mechanical and environmental protection to a single fibre or ribbon fibre fusion splice. The fused fibres are protected against ingress of dust or temporary flooding by a sealing material, generally a polymer material such as hot melt adhesive or mastic.

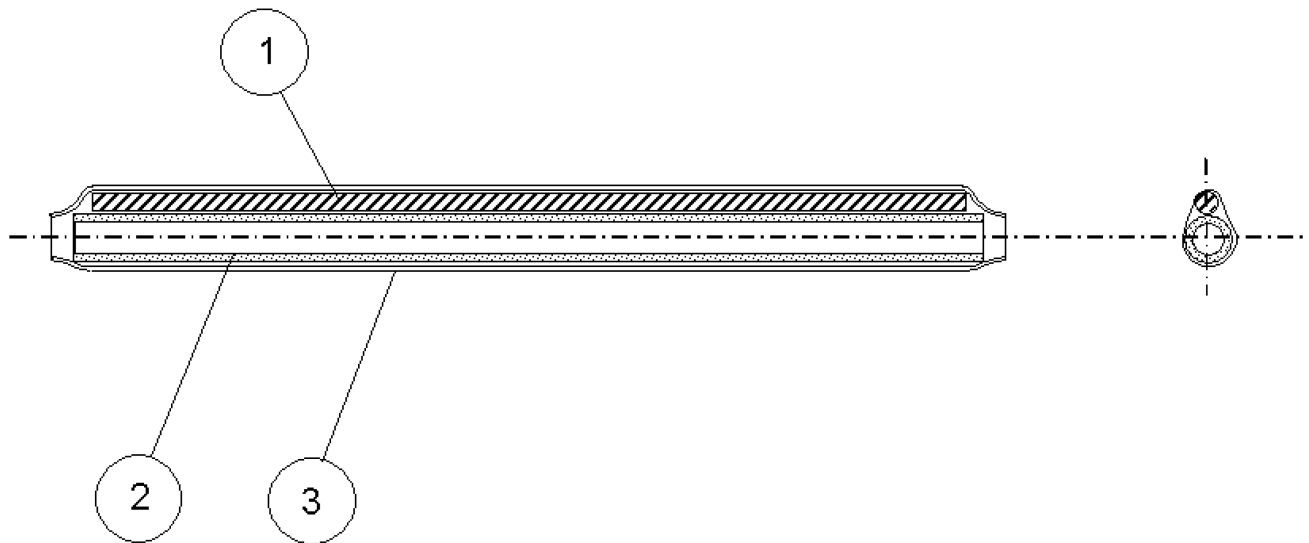
The products described in this standard are based on various protection types:

- heat shrinkable splice protector;
- crimp or fold-over splice protector (also called clam shell splice protector).

4.1.2 Heat shrinkable splice protector type

Prior to splicing, the splice protector is put over one of the fibre or ribbon ends. After the fusion of the fibres, the splice protector is placed over the spliced area. After visual centring over the fused area the splice protector is shrunk using heating equipment.

A typical fusion splice protector is composed of three elements (see Figure 1).

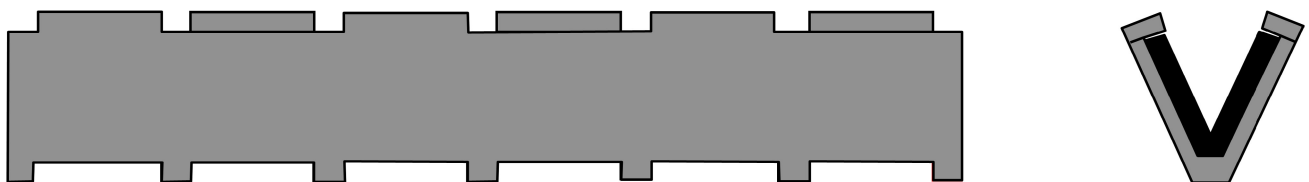
**Key:**

- 1 a reinforcement member to give rigidity after the protector is installed in the heater;
- 2 an adhesive tube that will encapsulate the spliced region and bonds directly to the bare glass and primary or secondary coating of the fibres;
- 3 a cross-linked polyethylene heat-shrinkable tube, which encloses the adhesive insert tube and the reinforcement member.

Figure 1 — Heat shrinkable splice protector**4.1.3 Crimp, fold-over or clam shell splice protector type**

The fused area of the optical fibre is centred and kept in place by adhesive strips and then the splice protector is folded over and closed by the use of a crimping tool. In general the following elements are present:

- a rigid flat strip hinged in the centre;
- a compressible material adhered to the flat strip.

**Figure 2 — Crimp, fold-over or clam shell splice protector**