BS EN 50516-3-1:2014

BSI Standards Publication

Industrial connector sets and interconnect components to be used in optical fibre control and communication systems — Product specifications

Part 3-1: Type ODVA APC terminated on EN 60793-2-50 category B1.1 and B1.3 singlemode fibre to meet the requirements of category I (industrial environments) as specified in EN 50173-1 and IEC 61753-1-3

National foreword

This British Standard is the UK implementation of EN 50516-3-1:2014.

The UK participation in its preparation was entrusted by Technical Committee GEL/86, Fibre optics, to Subcommittee 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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Industrial connector sets and interconnect components to be used in optical fibre control and communication systems - Product specifications - Part 3-1: Type ODVA APC terminated on EN 60793-2-50 category B1.1 and B1.3 singlemode fibre to meet the requirements of category I (industrial environments) as specified in EN 50173-1 and IEC 61753-1-3

Industrie-Steckverbindersätze und Verbindungsbauelemente für Lichtwellenleiter-Steuerungs- und Datenübertragungssysteme - Produktnormen - Teil 3-1: Industriesteckverbinder der Bauart ODVA-APC zum Anschluss an Einmodenfasern der Typen B1.1 und B1.3 nach EN 60793-2-50 für die Kategorie I (Industrieumgebung) nach den Festlegungen in EN 50173-1 und IEC 61753-1-3

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Foreword

This document (EN 50516-3-1:2014) 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)	2014-12-23
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2016-12-23

EN 50516, *Industrial connector sets and interconnect components to be used in optical fibre control and communication systems — Product specifications*, is currently divided in the following parts:

– *Part 1-1: Type SC-RJ PC industrial terminated on EN 60793-2-10 category A1a and A1b multimode fibre to meet the requirements of category I (industrial environments) as specified in IEC/PAS 61753-1-3*;

– *Part 2-1: Type ODVA PC industrial terminated on EN 60793-2-10 category A1a and A1b multimode fibre to meet the requirements of category I (industrial environments) as specified in EN 50173-1 and IEC 61753-1-3*;

– *Part 3-1: Type ODVA APC terminated on EN 60793-2-50 category B1.1 and B1.3 singlemode fibre to meet the requirements of category I (industrial environments) as specified in EN 50173-1 and IEC 61753-1-3* [the present document].

CENELEC draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning ODVA industrial connectors (see declaration in Annex E).

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

_____

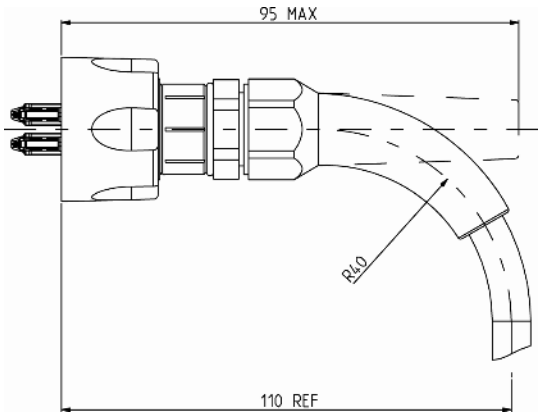
Industrial connector sets and interconnect components to be used in optical fibre control and communication systems — Product specifications	
Part 3-1: Type ODVA APC terminated on EN 60793-2-50 category B1.1 and B1.3 singlemode fibre to meet the requirements of category I (industrial environments) as specified in EN 50173-1 and IEC 61753-1-3	
Description	**Performance**
Coupling mechanism: Twist and lock with sealing	Application: For the use in category I (industrial environment)
Configuration: Plug / adaptor / with one side of the configuration having a seal and a protective shell	Attenuation (random mate) factory terminated: B: ≤ 0,12 dB mean ≤ 0,25 dB for > 97 % of measurements C: ≤ 0,25 dB mean ≤ 0,50 dB for > 97 % of measurements
Fibre category: EN 60793-2-50 Type B1.1 and B1.3	Attenuation (random mate) FSOC: C: ≤ 0,25 dB mean ≤ 0,50 dB for > 97 % of measurements
Cable type: See Table 3	Return loss: 1: ≥ 60 dB (mated) ≥ 55 dB (unmated)

Related documents:

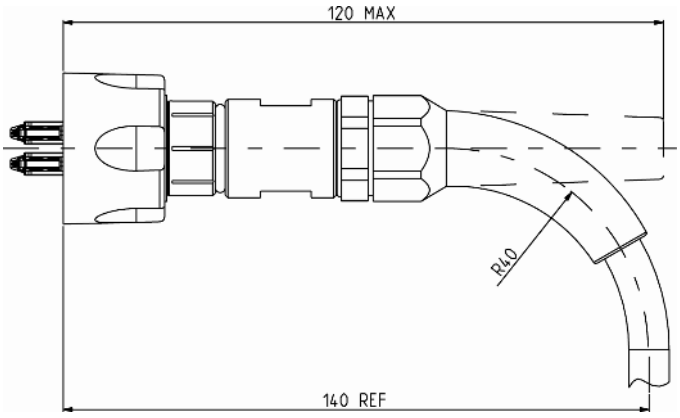
EN 50173-1	Information technology — Generic cabling systems — Part 1: General requirements
EN 50173-3	Information technology — Generic cabling systems — Part 3: Industrial premises
EN 60529	Degrees of protection provided by enclosures (IP Code) (IEC 60529)
EN 60794-3	Optical fibre cables — Part 3: Sectional 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)
FprEN 61753-1-3 [1)]	Fibre optic interconnecting devices and passive components — Performance standard — Part 1-3: General and guidance for single-mode fibre optic connector and cable assembly for harsh industrial environment, Category I (IEC 61753-1-3:201X (86B/3496/CDV))
EN 61754-28	Fibre optic interconnecting devices and passive components — Fibre optic connector interfaces — Part 28: Type LF3 connector family (IEC 61754-28)

1) At draft stage.

Outline and maximum dimensions: ODVA connector plug with protective shell in sealed adaptor.



factory terminated



FSOC

1 Scope

1.1 Product definition

This European Standard contains the initial, start of life dimensional, optical, mechanical and environmental performance requirements which an ODVA (factory terminated) (Open DeviceNet Vendors Association) or ODVA fusion splice on connector (FSOC) terminated with cylindrical composite titanium APC ferrules with one side protected by an industrial housing, an adaptor fitted with resilient alignment sleeve and patchcord shall meet in order for it to be categorised as an EN standard product. The product is rated IP67.

Since different variants are permitted, product marking details are given in 3.6.

1.2 Intermateability

Products conforming to the requirements of this specification will inter mate and give the specified level of random attenuation and random return loss performance provided the same fibre type is used. The intention is that this will be true irrespective of the manufacturing source(s) of the product.

When intermating plug variants with different attenuation grades, the resulting level of attenuation cannot be assured to be any better than the worst attenuation grade.

The intermating of a grade C plug with a grade B plug will result in an uncertain level of random attenuation performance.

Table 1 — Ensured level of random attenuation

Plug variant/Attenuation grade	C	B
C	C	C
B	C	B

1.3 Operating environment

The tests selected combined with the severities and durations, specified as Category I, are intended to reflect, although they do not necessarily satisfy all the requirements of, the boundary conditions of $M_3I_3C_3E_3$.

1.4 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.

1.5 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.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 60068-2-60 Environmental testing — Part 2: Tests — Test Ke: Flowing mixed gas corrosion test (IEC 60068-2-60)

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

EN 60874-1 Fibre optic interconnecting devices and passive components — Connectors for optical fibres and cables — Part 1: Generic specification (IEC 60874-1)

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 61300-2-2 Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-2: Tests — Mating durability (IEC 61300-2-2)

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

EN 61300-2-6 Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-6: Tests — Tensile strength of coupling mechanism (IEC 61300-2-6)

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 61300-2-10 Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-10: Tests — Crush resistance (IEC 61300-2-10)

EN 61300-2-12:2005 Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-12: Tests — Impact (IEC 61300-2-12:2005)

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 61300-2-27 Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-27: Tests — Dust — Laminar flow (IEC 61300-2-27)

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 61300-2-35 Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-35: Tests — Cable nutation (IEC 61300-2-35)

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)
IEC 61300-2-53[2)]	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 2-53: Test — Degrees of protection provided by fibre optic enclosures (IP Codes 65 and 67)
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 61300-3-6	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-6: Examinations and measurements — Return loss (IEC 61300-3-6)
EN 61300-3-15	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-15: Examinations and measurements — Dome eccentricity of a convex polished ferrule endface (IEC 61300-3-15)
EN 61300-3-16	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-16: Examinations and measurements — Endface radius of spherically polished ferrules (IEC 61300-3-16)
EN 61300-3-23	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-23: Examination and measurements — Fibre position relative to ferrule endface (IEC 61300-3-23)
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 61300-3-34	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-34: Examinations and measurements — Attenuation of random mated connectors (IEC 61300-3-34)
EN 61300-3-35	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-35: Examinations and measurements — Fibre optic connector endface visual and automated inspection (IEC 61300-3-35)
EN 61300-3-47[2)]	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-47: Examinations and measurements — Endface geometry of PC/APC spherically polished ferrules using interferometry (IEC 61300-3-47)
EN 61754-28	Fibre optic interconnecting devices and passive components — Fibre optic connector interfaces — Part 28: Type LF3 connector family (IEC 61754-28)

2) At draft stage.

3 Description

3.1 General

The ODVA industrial connector is a duplex plug connector set of plug / adaptor / plug configuration with one side having a protective shell characterised by two cylindrical, spring loaded butting ferrules of 1,25 mm nominal diameter and a twist and lock coupling mechanism. The optical alignment mechanism of the connectors is of a resilient sleeve style.

3.2 Plug

The plug consists of an ODVA connector interface and a housing part. These two parts have to be in the defined position to each other (see Figures 1a), 1b) and 5) to guarantee correct mating. Sealing is made between an o-ring (placed on the housing) and the adaptor frame. A cover (dust cap) to protect the ferrule endface when the plug is in the unmated condition shall be provided. Sealing shall also be guaranteed between the connector and the dust cap.

The plug features two cylindrical composite titanium ferrules and a push-pull coupling mechanism. Alternative materials may be used for the ferrule that have directly compatible material properties, but the endface and performance requirements shall be met under all conditions.

The plug has three male keys to provide the orientation to the duplex connector in relation with the adaptor.

The plug can be either a complete factory terminated version or a fusion splice on connector (FSOC) version. The fusion splice is located within the sealed housing.

3.3 Adaptor

The adaptor consists of an ODVA adaptor as it is described in this specification and a duplex LF3 adaptor in a mounting frame. Sealing is made between the connector housing and the adaptor mounting frame. The mounting frame shall be mounted in a protected area with a gasket to ensure sealing between the adaptor and the protected area. Preferred cut out dimensions to maintain sealing are given in Figure 3 and Figure 4.

At the rear of the adaptor there are two LF3 simplex connectors.

The adaptor consists of two zirconia ceramic resilient alignment sleeves and two push-pull coupling mechanisms, one for each sleeve. Alternative materials may be used for the sleeve that have directly compatible material properties as zirconia but the performance requirements shall be met under all conditions.

The adaptor housing has three female keys.

Covers (dust caps) shall be provided to protect each duplex port of the adaptor.

3.4 Materials

Materials which are not specified or which are not specifically described are left to the discretion of the manufacturer.

3.5 Dimensions

Outline dimensions and other dimensions necessary to ensure intermateability or which affect performance are specified. All other dimensions are left to the discretion of the manufacturer. Where the mating face limit dimensions are not in agreement with an EN interface standard this is clearly stated.

3.6 Colour and marking

Marking of the product shall be in accordance with EN 60874-1, in the following order of precedence:

a) identification of manufacturer;

b) manufacturing date code: year / week;

c) manufacturers part number;

d) variant identification number.

The preferred colour scheme is given in Table 1.

Table 2 — Preferred colour scheme

ODVA housing	
black	
LF3 Plug	**LF3 Adaptor**
green	green
NOTE The preferred black is 9005 and green is RAL 6018. Other not listed parts could also be of the preferred colour to show the colour scheme.	

4 Variants

4.1 Terminated plug

The following cable variants are permitted:

Table 3 — Terminated plug — Plug variants

Variant number	Cable diameter	Structure	Remarks
B1	5,0 mm – 8,5 mm	Reinforced duplex cable	The roundness shall be < 0,2 mm. ⌀ 0,2 mm
C1	5,0 mm – 8,5 mm	Reinforced duplex cable	The roundness shall be < 0,2 mm. ⌀ 0,2 mm
C1 FSOC	5,0 mm – 8,5 mm	Reinforced duplex cable	The roundness shall be < 0,2 mm. ⌀ 0,2 mm

4.2 Adaptor

The following variants are permitted:

Table 4 — Terminated plug — Adaptor variants

Variant number	Format
01	Fixed adaptor (mounting frame e.g. fixed on a sealed box / sealed connector outside)
02	Fixed D hole adaptor

4.3 Identification of variants

The identification numbers for the cable variants and adaptor variants are given in Tables 4 and 5.

Table 5 — Identification of plug variants

Variant number	Identification number
B1	EN 50516-3-1-B1
C1	EN 50516-3-1-C1
C1 FSOC	EN 50516-3-1-C1-FSOC

Table 6 — Identification of adaptor variants

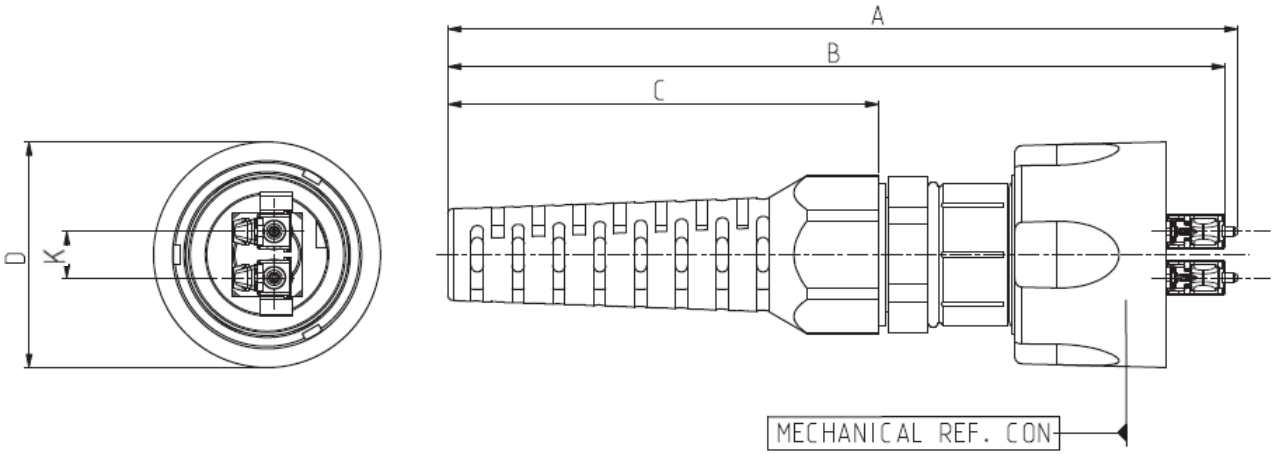
Variant number	Identification number
01	EN 50516-3-1-01
02	EN 50516-3-1-02

5 Dimensional requirements

5.1 Outline dimensions

5.1.1 Plug

Variant No. B1 / C1:

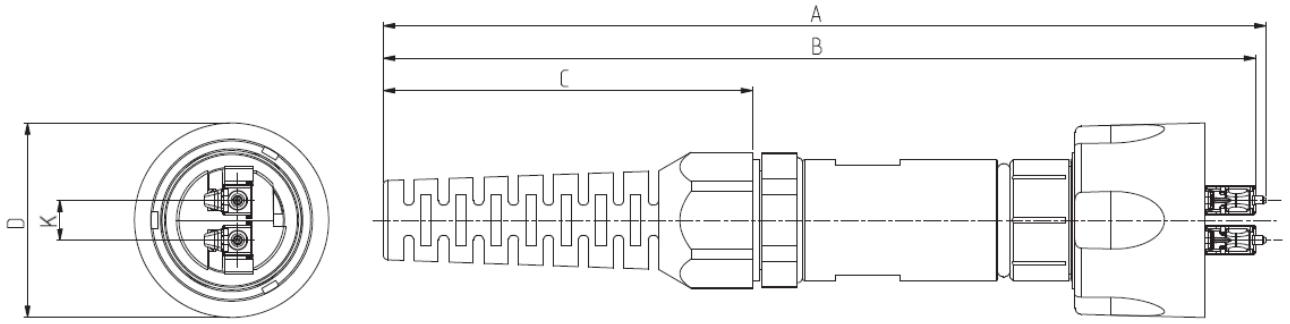


Ref.	Dimensions			Remarks
	min.	mm	max.	
A			110	
B			108	
C			60	Nominal 52,3
D	30		30,3	
K		6,25		Basic dimension
NOTE Drawing shows connectors with protection cap open.				

a) Outline dimensions — Plug

Figure 1 — Outline dimensions — Plug *(continued)*

Variant No. C1 FSOC:



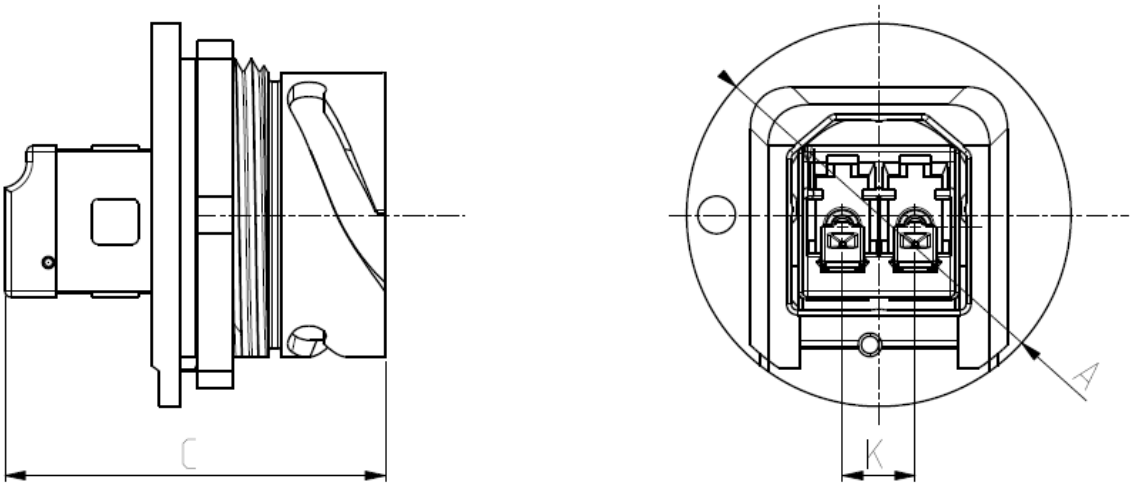
Ref.	Dimensions			Remarks
	min.	mm	max.	
A			137	
B			135	
C			60	Nominal 52,3
D	30		30,3	
K		6,25		Basic dimension
NOTE Drawing shows connectors with protection cap open.				

b) Outline dimensions — Plug

Figure 1 — Outline dimensions — Plug *(end)*

5.1.2 Adaptor

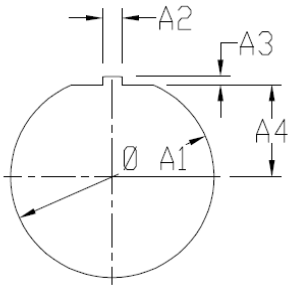
Variant Fixed adaptor:



Ref.	Dimensions			Remarks
	min.	mm	max.	
A	32		35	
C	34		35	
K		6,25		Basic dimension

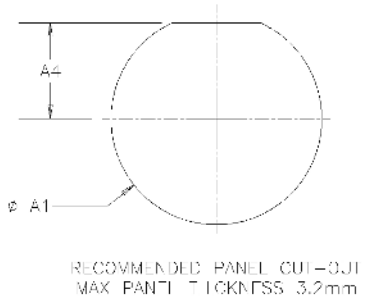
Figure 2 — Outline dimensions — Fixed adaptor

Variant 01 Fixed adaptor:



Ref.	Dimensions		Remarks
	min.	mm max.	
A1	26,6	27,7	
A2	2,0	3,1	
A3	0,5	1,6	
A4	11,9	13,0	

Figure 3 — Cut out for fixed adaptor mounting Variant 01



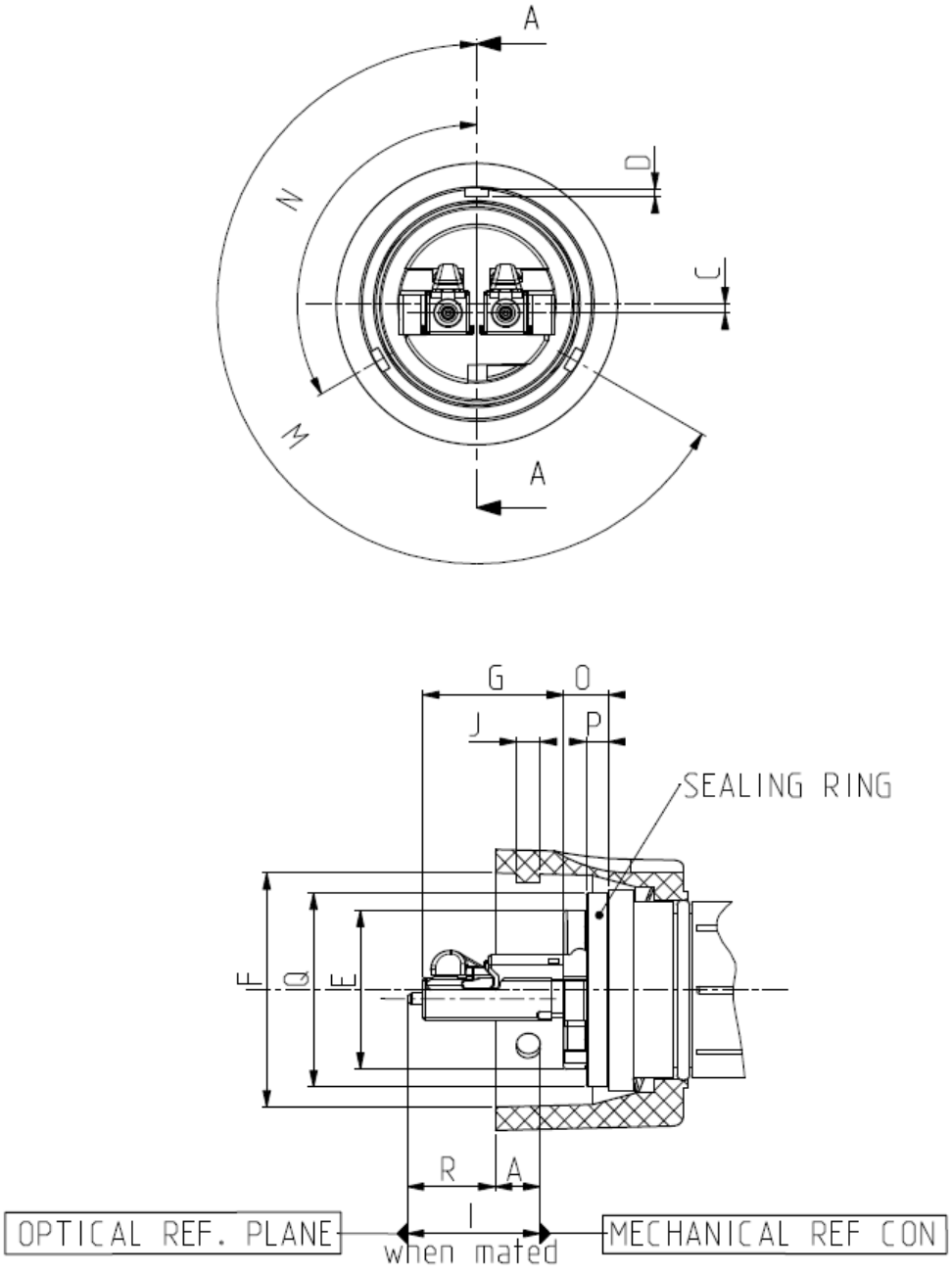
Ref.	Dimensions		Remarks
	min.	mm max.	
A1	28,4	28,6	
A4	12,83	13,03	
NOTE Panel cut out dimensions are for recommendation only.			

Figure 4 — Cut out for fixed adaptor mounting Variant 02

5.2 Mating face and other limit dimensions

5.2.1 Plug

The mating face dimensions given in this European Standard are in accordance with EN 61754-28. They are listed to illustrate the intermateability between an LF3 plug and an ODVA industrial plug within the ODVA adaptor.



Section A – A

Figure 5 — Plug mating face and other limit dimensions *(continued)*

Ref.	Dimensions			Remarks
	min.	mm	max.	
A	-		5,08	
C		0,94		Nominal [a]
D	1,04		1,30	
E	16,8		18,1	Diameter
F	24,74		25,00	Diameter
G		14,88		Nominal
I	14,37		14,51	Nominal
J	2,49		2,59	Diameter
M	239°		241°	Degrees
N	119°		121°	Degrees
O		4,65		Nominal
P	2,1		2,5	Gasket
Q	19,8		20,8	Gasket, diameter [e]
R	10,1		10,7	[b c d]

[a] Dimension C is the offset of the optical centre line of the LF3 ferrules with respect to the mechanical centre line of the ODVA.

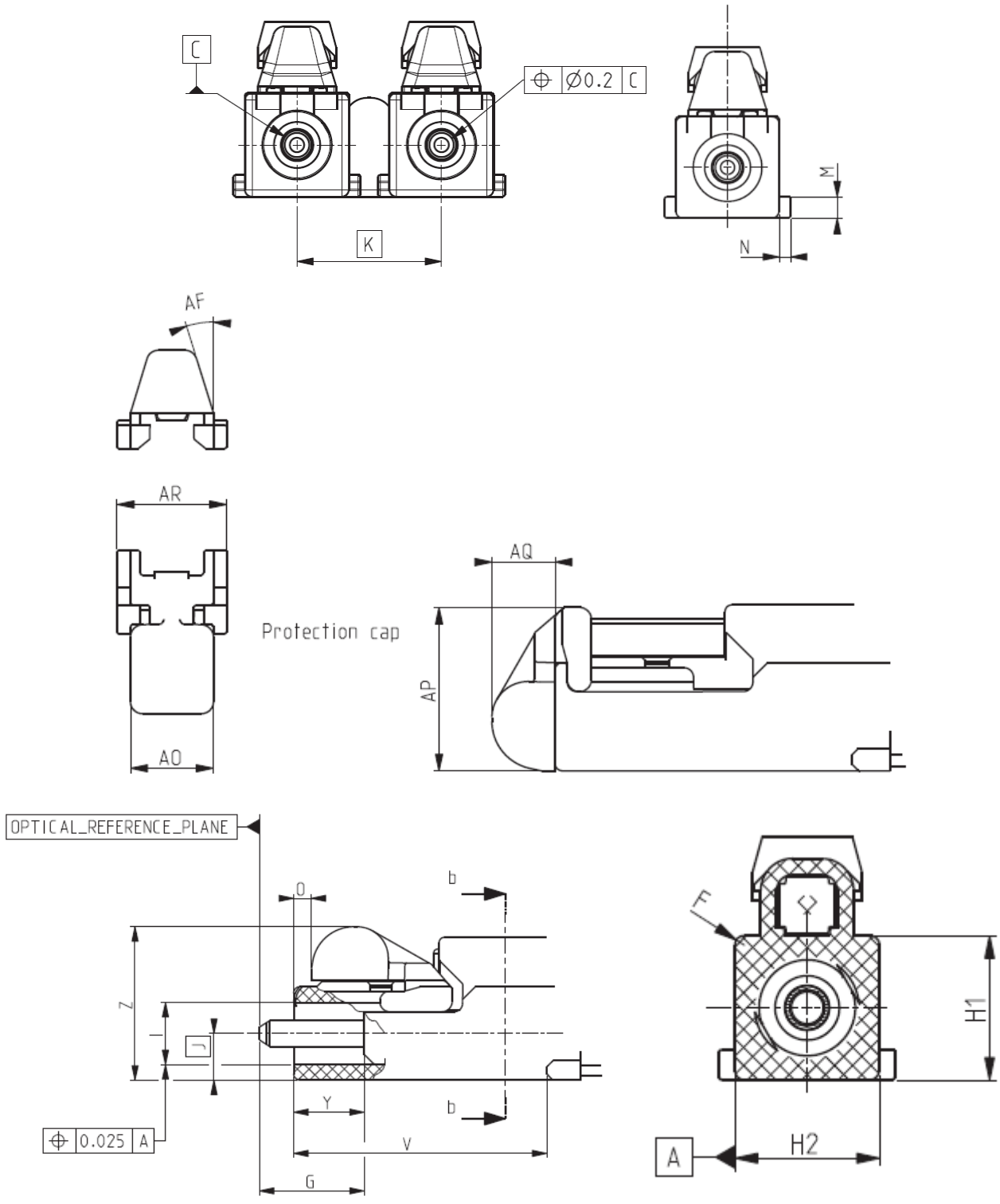
[b] Ferrule compression force shall be from 5,0 N to 6,0 N when the ferrule is compressed to a point where R is 9,4 mm to 10,0 mm. Forces are for buffered fibre only. For different cord construction allow higher forces of 5,0 N to 7,0 N.

[c] This value shows the dimension after the ferrule is polished and in the unmated condition.

[d] Mechanical reference plane.

[e] The sealing can be reached by different types of gaskets.

Figure 5 — Plug mating face and other limit dimensions *(end)*



a) Section a – a **b) Section b – b**

Figure 6 — Variant B1 / C1 / C1-FSOC LF3 connector interface *(continued)*

Ref.	Dimensions			Remarks
	min.	mm	max.	
F	0,3		0,5	Radius
G	4,88		5,10	Ferrule extension
H1	4,42		4,52	
H2	4,42		4,52	
I	3,0		3,2	Diameter
J	H/2		H/2	
K		6,25		Basic dimension
M	-		1,0	
N	-		0,5	
O	1,1		-	
V	12,1		-	
Y	3,3		-	
Z	-		7,5	
AF		17		Degrees
AO	3,35		3,4	
AP	6,7		6,9	
AQ	2,5		2,63	
AR	4,45		4,48	

Figure 6 — Variant B1 / C1 / C1-FSOC LF3 connector interface *(end)*

5.2.2 Ferrule endface geometry and fibre core position after termination

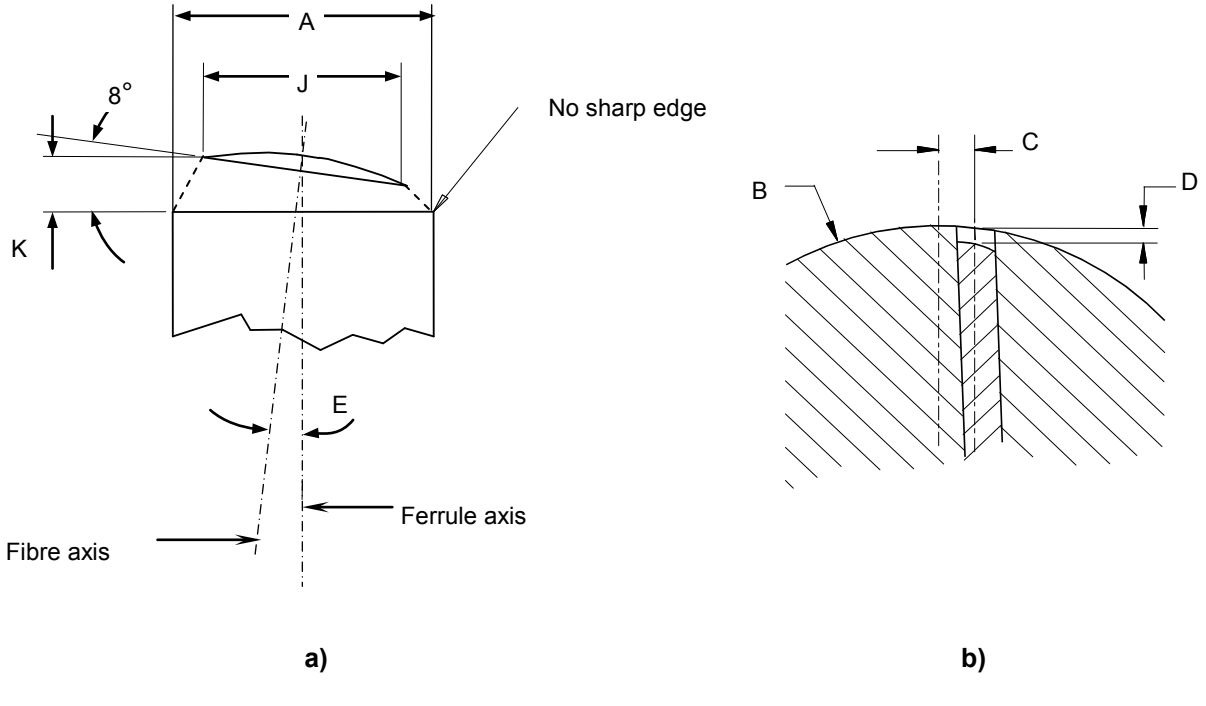


Figure 7 — Ferrule endface geometry — After termination

To obtain the performances indicated by grade B or C each individual fibre core of the LF3 ferrule in the ODVA plug and in the ODVA adaptor shall be positioned within the circular area shown in Figure 8.

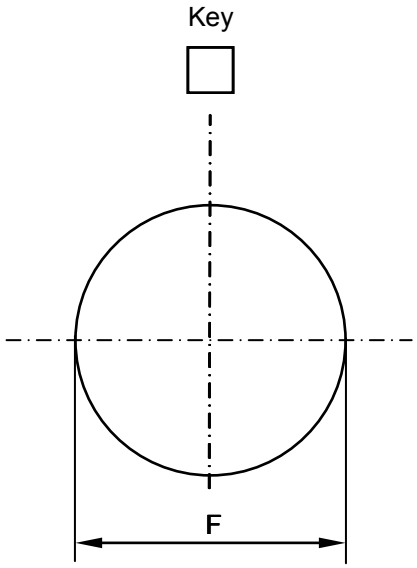


Figure 8 — Positioning of fibre core

The two fibres, positioned in the circular area shown in Figure 8, have to be oriented within ODVA industrial de-latch housing relative to each other at a pitch of 6,25 mm to ensure the performance grade B or C either with the use of ODVA industrial, ODVA or LF3 simplex plugs in an ODVA adaptor.

Table 7 — Geometrical parameters

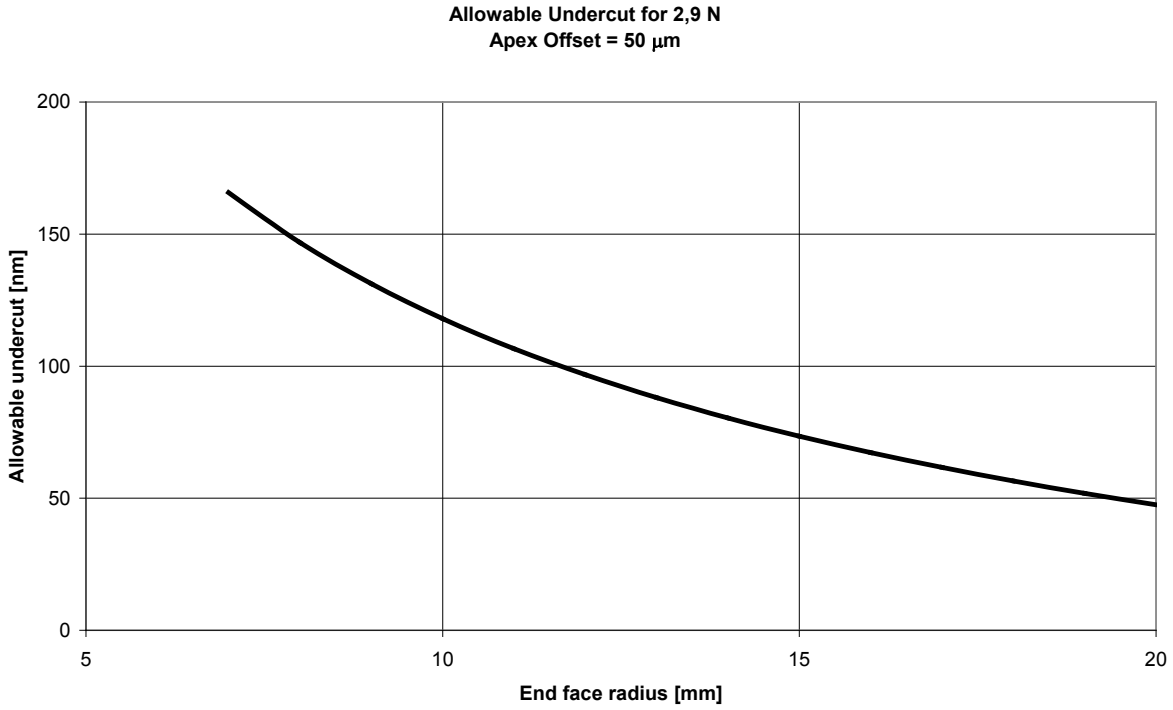
Ref.	Parameter values				Remarks
	Grade B		Grade C		
	min.	max.	min.	max.	
A	1,248 5	1,249 5	1,248 5	1,249 5	Diameter, mm
B	7	20	7	20	Radius [d], mm
C	0	50	0	50	µm [c]
D	- 200	see Figure 9	- 200	see Figure 9	nm [b d]
E	0	0,6	0	0,8	Degrees
F	0	0,000 15	0	0,000 3	Radius, mm
J	0,6	0,85	0,6	0,85	Diameter, mm
K	-	1,0	-	1,0	mm

[a] Contact force 2,9 N nominal. The given endface conditions are for titanium. Nominal material physical constant values: Young's Modulus, E = 105 GPa, Poisson's Ratio, v = 0,34.

[b] A negative value indicates fibre protrusion.

[c] The dimension C shall be measured in both extreme positions of the ferrule when the ferrule is rotated in the connector.

[d] The radius and fibre undercut shall be measured in accordance with EN 61300-3-47.



NOTE The allowed maximum undercut can be calculated by means of the formula below:

$$D_{Maximum} = 1880 \cdot B^{(-0,765)} - B \cdot 10^6 + \left(\sqrt{B^2 \cdot 10^6 - C^2}\right) \cdot 10^3 - 80$$

where

D = allowable fibre undercut relative to ferrule endface [nm] (dimension D in Table 7);

B = radius of ferrule [mm] (dimension B in Table 7);

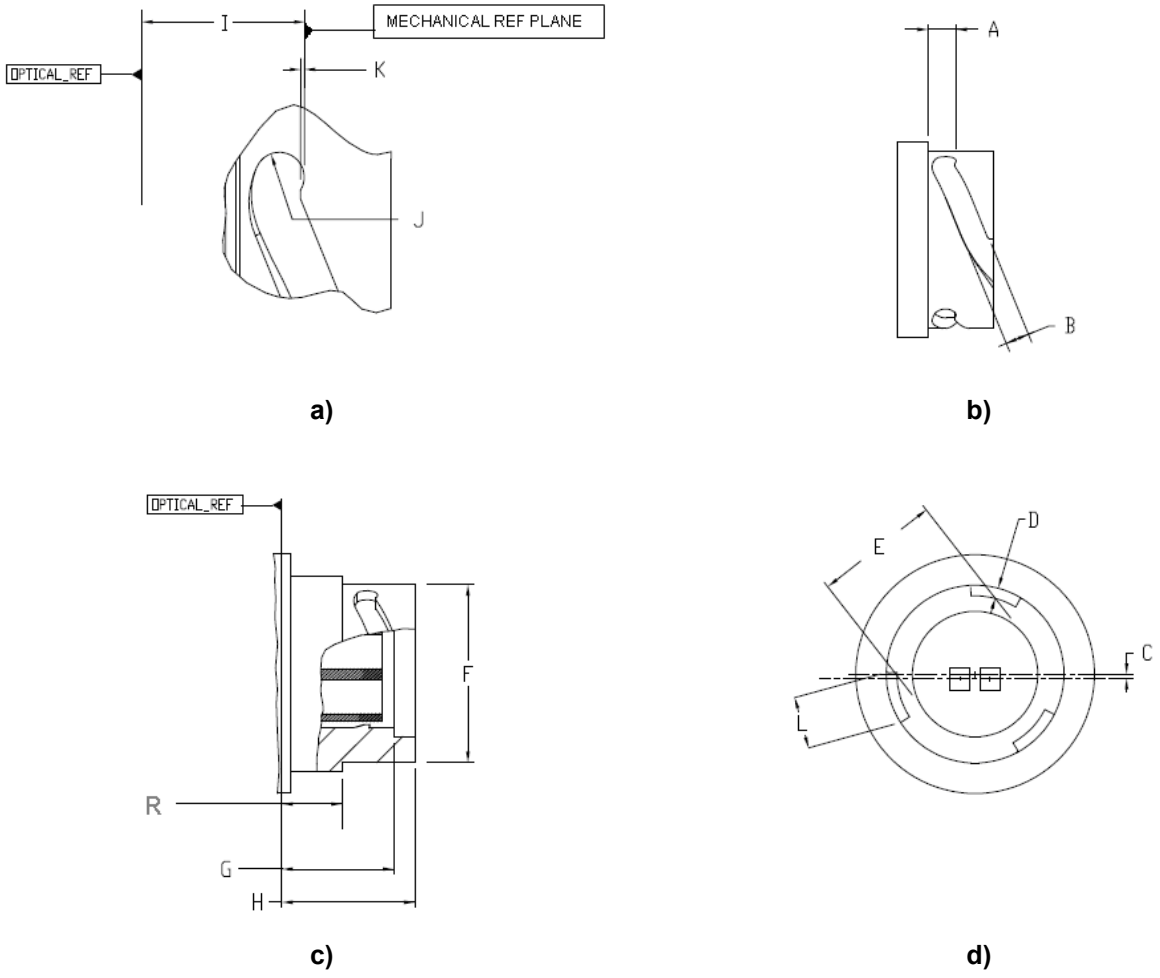
C = dome offset [µm] (dimension C in Table 7).

The figure shows, as example, the maximum undercut in case of a maximum dome offset of 50 µm with a permitted radius range of 7 mm to 20 mm.

Figure 9 — Ferrule endface geometry — Allowable undercut

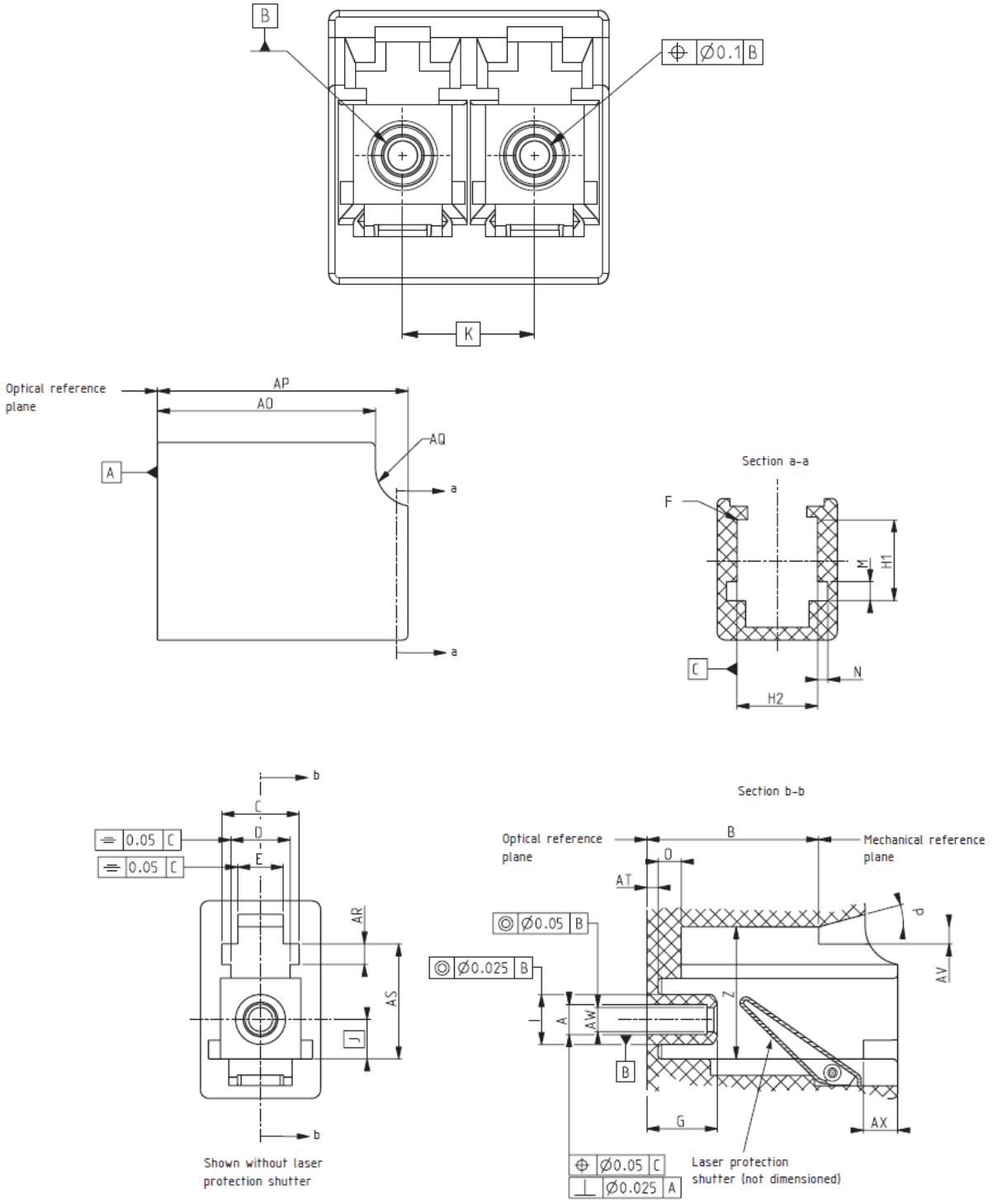
The figures and the values above define the parameters that shall be met by each individual plug in order to ensure that the specified random attenuation performance grade will be met in any connection.

5.2.3 Adaptor



Ref.	Dimensions			Remarks
	min.	mm	max.	
A	5,46		-	
B	2,74		3,56	Pitch = 31,75
C		0,94		Nominal
D	1,35		1,57	
E	17,3		17,6	Diameter
F	24,46		24,64	Diameter
G	-		16,21	
H		19,13		Nominal
I	13,91		14,07	
J	2,75		3,15	Diameter
K	0,15		0,30	Tangent to groove flat
L	7,62		-	
R		9,95		Reference

Figure 10 — Variant 01, fixed adaptor



a) Section a – a **b) Section b – b**

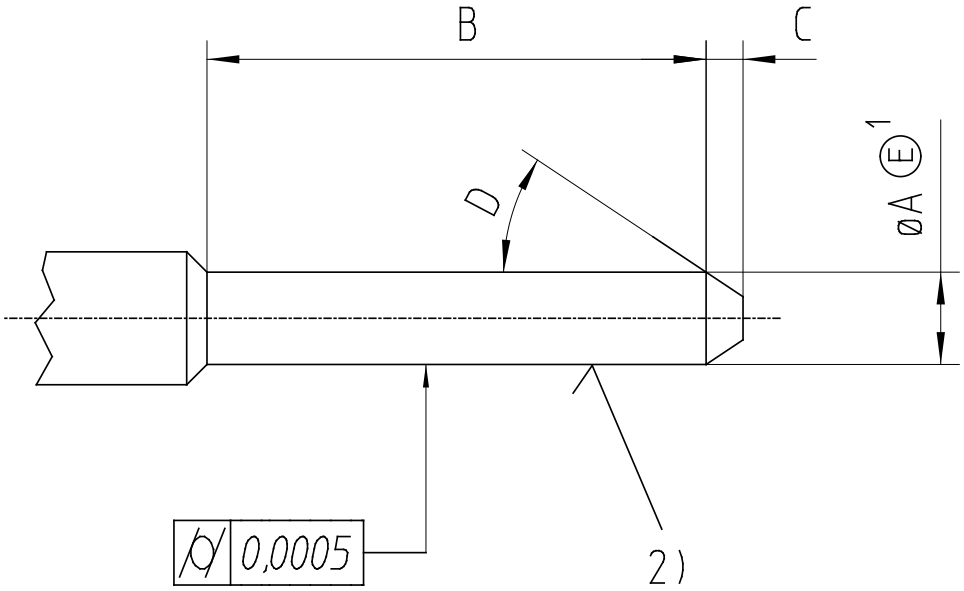
Figure 11 — LF3 adaptor interface *(continued)*

Ref.	Dimensions			Remarks
	min.	mm	max.	
A	–		–	Diameter (a)
B	9,9		10	Diameter
C	4,5		-	
D	3,4		3,5	
E	2,6		2,7	
F	0,2		0,3	Radius
G	4,0		4,1	
H1	4,65		4,75	
H2	4,65		4,75	
I	2,87		2,97	Diameter
J		2,29		
K		6,25		
M	1,0		1,1	
N	0,5		0,6	
O	-		1,3	
P		15		Degrees, typical
Z	7,6		7,9	
AO	11,0		12,8	
AP	14,5		14,7	
AQ	2,2		2,4	Radius
AR	1,1		1,2	
AS	6,6		6,8	
AT	0,6		0,7	
AV	1,0		1,1	
AW	1,4		1,5	Diameter
AX	1,9		-	

The connector alignment feature is a resilient (split) alignment sleeve. The feature shall accept a pin gauge to the centre of the adaptor with a force of 1,0 N to 2,5 N under the condition that another pin gauge is inserted into the feature from the other side until both pin gauges butt against each other. The pin gauge shall be according to Figure 6. The centre of the adaptor is defined by the left side position of dimension B.

Figure 11 — LF3 adaptor interface *(end)*

5.2.4 Pin gauge for adaptor



Ref.	Dimensions		Remarks
	min. mm	max.	
A	1,248 8	1,249 2	diameter[a]
B	4,2	15	
C	0,4	0,5	
D	28	32	Angle in degrees

[a] Envelope condition in accordance with EN ISO 8015.

[b] Surface roughness R_a ≤ 0,1 µm.

Figure 12 – Pin gauge for adaptor

6 Tests

6.1 Sample size

For the purposes of this European Standard a sample is a mated connector set defined as a ODVA plug / ODVA adaptor / duplex LF3 plug configuration.

All samples shall be randomly selected.

The sample size and product sourcing requirements are given in Annex B.

The length of cable on each side of the connector set shall be at least 3 m.

The length of the patch cord samples which shall be included in the test chamber together with the two attached connectors is 5 m.

6.2 Test and measurement methods

All tests and measurements have been selected from EN 61300 series.

Unless otherwise stated in the individual test details all attenuation measurements shall be performed at both (1 310 ± 30) nm and (1 550 ± 30) nm, all return loss measurements shall be performed at (1 550 ± 30) nm.

Attenuation change is defined as the difference between the min. and max. values of attenuation measured during the test.

No deviation from the specified test method is allowed.

Attenuation measurement against reference (EN 61300-3-4) is intended to be repeated if the quality conformance should be required. Random attenuation (EN 61300-3-34) is to be used during qualification only to ensure the requirements of the appropriate grade are met.

Reference connector requirements are specified in Annex A.

6.3 Test sequence

All products shall be subjected to Tests 1 and 2 following which there is no defined sequence in which Tests 3 – 19 (see Annex B) shall be run.

6.4 Pass/fail criteria

A product will have met the requirements of this specification provided no failures occur in any test. In the event of a failure occurring, the test shall be rerun using a sample size double that of the original.

7 Test report

A fully documented test report and supporting data shall be prepared and shall be available for inspection as evidence that the tests described in Clause 8 have been carried out in accordance with this specification.

8 Product qualification requirements

8.1 Dimensional and marking requirements

Dimensions and marking, including any associated spring and gauge force, of the product shall be in accordance with the requirements of 3.6 and Clause 5, and shall be measured using the appropriate EN test method.

Endface geometry shall be measured before and after the completion of climatic testing and shall meet the requirements as stated in 5.2.2.

The methods to be used are EN 61300-3-15, EN 61300-3-16 and EN 61300-3-23.

8.2 Optical performance requirements

Table 8 — Optical performance requirements

No.	Test	Requirement	Details	
00	Visual inspection	Product shall be clearly marked and have proper workmanship.	Method:	EN 61300-3-1
0	Visual inspection of polished end face	Product shall meet the requirements of Table 7.	Method:	EN 61300-3-35
1	Attenuation (random mate)	Grade C ≤ 0,25 dB mean ≤ 0,50 dB (for > 97 % of measurements) Grade B ≤ 0,12 dB mean ≤ 0,25 dB (for > 97 % of measurements) 10 randomly mated sets comprising 10 industrial plugs against 10 non industrial plugs and adaptors (100 randomly mated connector sets). Total number of measurements 100 times the number of fibres in each plug.	Method: Source type: Peak wavelength: Source stability: Detector linearity: Launch fibre length: Pre-conditioning procedure:	EN 61300-3-34 LED/LD (1 310 ± 30) nm < ± 0,01 dB over the measuring period or at least 1 h. Within < ± 0,01 dB over the dynamic range to be measured. > 2 m. Only the fundamental mode shall propagate at the connector interface to be tested and at the detector. Clean plug and adaptor according to manufacturer's instructions.
2	Return loss (random mate)	Grade 1 20 randomly mated plugs. For plug / adaptor / plug connector sets, 10 adaptors, randomly selected shall be used (100 randomly mated connector sets). Total number of measurements 100 times the number of fibres in each plug.	Method: Source type: Peak wavelength: Source stability: Detector linearity: Launch fibre length: Directional coupler: Type: Directivity: Pre-conditioning procedure:	EN 61300-3-6, Method 1 LD (1 310 ± 30) nm < ± 0,05 dB over the measuring period or at least 1 h. Within ± 0,05 dB over the dynamic range to be measured. > 2 m. Only the fundamental mode shall propagate at the connector interface to be tested and at the detector. 50/50 fused. > 60 dB Clean plug and adaptor according to manufacturer's instructions.

8.3 Mechanical performance requirements

Table 9 — Mechanical performance requirements

No.	Test	Requirement	Details	
3	Vibration (sinusoidal)	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Frequency range: Vibration amplitude: Vibration acceleration: No. of sweeps No. of axes: Specimen optically functioning: Measurements required: Sampling rate: Pre-conditioning procedure:	EN 61300-2-1 2 Hz – 200 Hz at 1 octave/min 7,5 mm below 9 Hz 50 m/s^2 above 9 Hz 15 (2 – 200 - 2) 3 (orthogonal) Yes Before, during and after test. Max. sampling interval shall be 2 ms (according to EN 61300-3-28). Clean plug and adaptor according to manufacturer's instructions.
4	Mating durability	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Mechanism to be cycled: Number of cycles: Mating speed: Specimen optically functioning: Measurements required: Pre-conditioning procedure: Cleaning during test:	EN 61300-2-2 Plug-Adaptor 500 (only one plug is subjected to successive engagement and separation) Not less than 3 s between engagements. Yes After every mating. Clean plug and adaptor according to manufacturer's instructions In the event that the attenuation increases above or the return loss below the allowable limit the connector may be cleaned as necessary but not more than 25 times during the course of the test. (The measurement at which the cleaning takes place shall be discounted from the test results.)

Table 9 — Mechanical performance requirements *(continued)*

No.	Test	Requirement	Details	
5	Fibre/cable retention	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Magnitude and rate of application of the tensile force: Point of application of the load: Duration of load: Specimen optically functioning: Measurements required: Sampling rate: Pre-conditioning procedure:	EN 61300-2-4 Cable diameter > 5 mm 100 ± 2 N at 5 N/s 0,3 m from plug On strength member 0,3 m from plug. The connector shall be rigidly mounted such that the load is applied to the fibre/cable retention mechanism and not to the coupling mechanism. 120 s Yes Before, during (continuous) and after the test (5 min recovery period). Measurements shall be made after the load has been maintained at its maximum level for at least 30 s. Clean plug and adaptor according to manufacturer's instructions.
6	Strength of coupling mechanism	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Magnitude of load: Duration of the load: Rate of application of the load: Point of application of the load: Specimen optically functioning: Measurements required: Sampling rate: Pre-conditioning procedure:	EN 61300-2-6 60 N 60 s 2 N/s 0,3 m from rear of plug Yes Before, during and after the test (5 min recovery period). Measurements shall be made after the load has been maintained at its maximum level for at least 30 s. Clean plug and adaptor according to manufacturer's instructions.
7	Impact	Attenuation at (1 550 ± 30) nm: Initial and final attenuation shall be ≤ specified for grade. Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Number of drops: Impact tool: Drop height: Impact location: Specimen optically functioning: Measurements required: Pre-conditioning procedure:	EN 61300-2-12:2005, Method B 4 per location 20 Nm 1 m 4 x at 90° rotated locations No (Specimen shall be unmated during impact test.) Fit dust cap. Before and after the test. Clean plug and adaptor according to manufacturer's instructions.

Table 9 — Mechanical performance requirements *(continued)*

No.	Test	Requirement	Details	
8	Torsion	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Magnitude and rate of application of the load: No. of cycles: Point of application of the load: Specimen optically functioning: Measurements required: Sampling rate: Pre-conditioning procedure: Recovery procedure:	EN 61300-2-5 10 N at 1 N/s 25 cycles ± 180° (not to exceed cable specification) 0,2 m from rear of plug body. Yes Before, during (continuous) and after the test. Measurements shall be made after the load has been maintained at its maximum level for at least 3 s. Clean plug and adaptor according to manufacturer's instructions. 5 min recovery period.
9	Cable nutation	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Magnitude of the load: No. of cycles: Point of application of the load: Specimen optically functioning: Measurements required: Sampling rate: Pre-conditioning procedure: Recovery procedure:	EN 61300-2-35 10 N 100 cycles with 360° 0,2 m from rear of plug body. Yes Before, during and after test. Max. sampling interval shall be 2 ms. Clean plug and adaptor according to manufacturer's instructions. 5 min recovery period.
10	Bending moment	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Magnitude of the load: Method of mounting: Point of application of the load: Duration: Specimen optically functioning: Measurements required: Sampling rate: Pre-conditioning procedure:	EN 61300-2-7 10 N smoothly applied. An adaptor shall be mounted rigidly to the mounting fixture. 55 mm from the optical reference plane of the adaptor. The load shall be applied in 2 perpendicular axes of the connector housing orientation. 30 s per axis Yes Before, during (continuous) and after the test. Measurements shall be made after the load has been maintained at its maximum level for at least 3 s. Clean plug and adaptor according to manufacturer's instructions.

Table 9 — Mechanical performance requirements *(end)*

No.	Test	Requirement	Details	
11	Shock	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Acceleration: Duration: Shape: Number of axes: Directions: Number of shocks: Specimen optically functioning: Measurements required: Sampling rate: Pre-conditioning procedure:	EN 61300-2-9 250 m/s^2 6 ms Half sine pulse 3 3 x 2 5 per direction Yes Before, during (continuous) and after the test. Measurements shall be made after the load has been maintained at its maximum level for at least 3 s. Clean plug and adaptor according to manufacturer's instructions.
12	Crush resistance	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Load: Application area: Location of the load: Duration of the load: Specimen optically functioning: Measurements required: Sampling rate: Pre-conditioning procedure:	EN 61300-2-10 750 ± 50 N (50 x 50) mm Centre of housing at 0° and 90° along the longitudinal axis 60 s per location Yes Before, during (continuous) and after the test. Measurements shall be made after the load has been maintained at its maximum level for at least 3 s. Clean plug and adaptor according to manufacturer's instructions.

8.4 Environmental performance requirements

Table 10 — Environmental performance requirements

No.	Test	Requirement	Details	
13	Change of temperature for connectors and patchcords	Initial and final attenuation shall be ≤ specified for grade. Requirements during the test: Change in attenuation during the test: ≤ 0,2 dB for connectors and ≤ 0,5 dB when patchcords with both industrial connectors and the cable are in the climatic chamber. Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Low temperature: High temperature: Duration at temperature extreme: Rate of change of temperature: Number of cycles: Specimen optically functioning: Measurements required: Pre-conditioning procedure: Recovery procedure:	EN 61300-2-22 -40 °C +70 °C 3 h 1 °C/min 4 Yes Before, during (max. interval 10 min) and after the test. Clean plug and adaptor according to manufacturer's instructions. 2 h at normal ambient conditions.
14	Dust	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage after the test according to test 0.	Method: Dust type: Dust particle size: Dust concentration: Duration of exposure: Specimen optically functioning: Measurements required: Preconditioning procedure: Recovery procedure:	EN 61300-2-27 Talc d < 150 µm (10,6 ± 7,1) g/m^3 10 min Yes Before and after the test. Clean plug and adaptor according to manufacturer's instructions. 2 h at normal ambient conditions.
15	Damp heat, cyclic	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage.	Method: Low temperature: High temperature: Humidity: Duration of the cycle: Number of cycles: Specimen optically functioning: Measurements required: Pre-conditioning procedure: Recovery procedure:	EN 61300-2-46 +25 ± 2 °C +55 ± 2 °C 95 % ± 3 % RH at the maximum temperature 24 h 6 Yes Before, during (max. interval 10 min) and after the test. Clean plug and adaptor according to manufacturer's instructions. 2 h at normal ambient conditions.

Table 10 — Environmental performance requirements *(continued)*

No.	Test	Requirement	Details	
16	Industrial atmosphere	Attenuation at (1 550 ± 30) nm: Initial and final attenuation shall be ≤ specified for grade. Return loss: > 60 dB mated The specimen has no mechanical damage.	Method: Duration of exposure: Concentration: Stability of concentration (volume changes per hour): Specimen optically functioning: Measurements required: Preconditioning procedure: Recovery procedure:	EN 60068-2-60, Method 1 96 h SO_2: (500 ± 100) ppb H_2S: (100 ± 20) ppb (at 25 ± 2 °C and 75 % RH) (3-10) ppb No Before and after the test. Clean plug and adaptor according to manufacturer's instructions. 2 h at normal ambient conditions.
17	Salt mist	Attenuation at (1 550 ± 30) nm: Initial and final attenuation shall be ≤ specified for grade. Return loss: > 60 dB mated The specimen has no mechanical damage.	Method: Atmosphere: Temperature: Duration of exposure: Specimen optically functioning: Measurements required: Preconditioning procedure: Recovery procedure:	EN 61300-2-26 Salt solution 5 % NaCl, pH 6,5 – 7,2 +35 °C 96 h No Before and after the test. Clean plug and adaptor according to manufacturer's instructions. 2 h at normal ambient conditions.
18	Resistance to solvents and contaminating fluids	Attenuation at (1 550 ± 30) nm: Initial and final attenuation shall be ≤ specified for grade. Return loss: > 60 dB mated The specimen has no mechanical damage.	Method: Solvent: Duration of exposure: Specimen optically functioning: Measurements required: Preconditioning procedure: Recovery procedure	EN 61300-2-34 NaCl 0,3 ppm at 30 °C Mineral oil 0,5 ppm at 70 °C Soap $5 \cdot 10^4$ ppm at 30 °C 24 h No Before and after the test. Clean plug and adaptor according to manufacturer's instructions. 2 h at normal ambient conditions.

Table 10 — Environmental performance requirements *(end)*

No.	Test	Requirement	Details	
19	Durability by water immersion	Attenuation at (1 550 ± 30) nm: ≤ 0,20 dB change (initial and final attenuation shall be ≤ specified for grade) Return loss: > 60 dB mated The specimen has no mechanical damage. No water inside the connector.	Method: Depth: Temperature of the water: Duration of exposure: Number of cycles: Specimen optically functioning: Measurements required: Preconditioning procedure: Recovery procedure	EN 60529 / IEC 61300-2-53 Sample shall be 1 m below the surface of the water (IP67). (+25 ± 2) °C 30 min 1 Yes Before, during and after the test. Clean plug and adaptor according to manufacturer's instructions. 2 h at normal ambient conditions.

Annex A
(informative)

Attenuation against reference

A.1 Test details

Attenuation measurement tests against reference connectors (EN 61300-3-4) may be performed if quality conformance is required. When these measurements are required the following test details are valid.

Table A.1 — Attenuation measurement: Test details

Test	Requirement	Details	
Attenuation (against reference connector)	Grade B: ≤ 0,25 dB Grade C: ≤ 0,5 dB	Method:	EN 61300-3-4, Method B
		Source type:	LED/LD
		Peak wavelength:	(1 310 ± 30) nm and (1 550 ± 30) nm
		Source stability:	< ± 0,01 dB over the measuring period or at least 1 h.
		Detector linearity:	Within ± 0,05 dB over the dynamic range to be measured.
		Launch fibre length:	> 2 m. Only the fundamental mode shall propagate at the connector interface to be tested and at the detector.
		Pre-conditioning procedure:	Clean plug and adaptor according to manufacturer's instructions.

A.2 Reference LF3 connector details

Ferrule outer diameter	1,249 0 mm – 1,249 2 mm
Eccentricity of fibre core centre to ferrule centre	< 0,000 3 mm
Deviation of axis of fibre to axis of ferrule	< 0,2 degree
Eccentricity of spherically polished ferrule end face	< 50 µm
Visual examination of fibre endface with ×200 magnification	No defects in core zone
Attenuation between two reference plugs at 1 310 nm	< 0,10 dB
Visual examination	every 50 matings

Annex B
(normative)

Sample size and product sourcing requirements

Table B.1 — Sample size and product sourcing requirements

No.	Test	Sample size		Source
		Plug	Adaptor	
n/a	Dimensional	5	5	New
n/a	Visual inspection of polished end face	20		
1	Attenuation (random mate)	20	10	New
2	Return loss (random mate)	20	10	Test 1
3	Vibration (sinusoidal)	4	2	Test 2
4	Mating durability	4	2	Test 2
5	Fibre/cable retention	4	2	Test 2
6	Strength of coupling mechanism	4	2	Test 2
7	Impact	4	2	Test 2
8	Torsion	4	2	Test 2
9	Cable nutation	4	2	Test 2
10	Bending moment	4	2	Test 2
11	Shock	4	2	Test 2
12	Crush	4	4	Test 2
13	Change of temperature connector patchcord	8 4	4 8	Test 2
14	Dust	4	4	Test 2
15	Damp heat, cyclic	4	4	Test 2
16	Industrial atmosphere	4	4	Test 2
17	Salt mist	4	4	Test 2
18	Resistance to solvents and contaminating fluids	4	4	Test 2
19	Durability by water immersion	4	4	Test 2

The above tests are intended to be performed individually in any order on produced sources as defined. Products from previous tests may used.

Annex C
(informative)

Details of environmental classification out of EN 50173-1 (MICE)

Table C.1 — Details of environmental classification out of EN 50173-1 (MICE)

Mechanical	**M_1**	**M_2**	**M_3**
Shock/bump [a]			
Peak acceleration	40 m/s^2	100 m/s^2	250 m/s^2
Vibration			
Displacement amplitude (2 Hz to 9 Hz)	1,5 mm	7,0 mm	15,0 mm
Acceleration amplitude (9 Hz to 500 Hz)	5 m/s^2	20 m/s^2	50 m/s^2
Tensile force	See Note 1	See Note 1	See Note 1
Crush	45 N over 25 mm (linear) min.	1 100 N over 150 mm (linear) min.	2 200 N over 150 mm (linear) min.
Impact	1 J	10 J	30 J
Bending, flexing and torsion	See Note 1	See Note 1	See Note 1
Ingress	**I_1**	**I_2**	**I_3**
Particulate ingress (max. diameter)	12,5 mm	0,05 mm	0,05 mm
Immersion	None	Intermittent liquid jet ≤ 12,5 l/min ≥ 6,3 mm jet > 2,5 m distance	Intermittent liquid jet ≤ 12,5 l/min ≥ 6,3 mm jet > 2,5 m distance and immersion (≤1 m for ≤ 30 min)
Climatic and chemical	**C_1**	**C_2**	**C_3**
Ambient temperature	-10 °C to +60 °C	-25 °C to +70 °C	-40 °C to +70 °C
Rate of change of temperature	0,1 °C/min	1,0 °C/min	3,0 °C/min
Humidity	5 % to 85 % (non-condensing)	5 % to 95 % (condensing)	5 % to 95 % (condensing)
Solar radiation	700 W/m^2	1 120 W/m^2	1 120 W/m^2
Liquid pollution Contaminants	Concentration x 10^{-6}	Concentration x 10^{-6}	Concentration x 10^{-6}
Sodium chloride (salt/sea water)	0	< 0,3	< 0,3
Oil (dry-air concentration)	0	< 0,005	< 0,5
Sodium stearate (soap)	None	>5 x 10^4 aqueous non-gelling	> 5 x 10^4 aqueous gelling
Detergent	None	ffs	ffs
Conductive materials in solution	None	Temporary	Present
Gaseous pollution Contaminants	Mean/Peak (Concentration x 10^{-6})	Mean/Peak (Concentration x 10^{-6})	Mean/Peak (Concentration x 10^{-6})
Hydrogen sulphide	< 0,003 / < 0,01	< 0,05 / < 0,5	< 10 / < 50
Sulphur dioxide	< 0,01 / < 0,03	< 0,1 / < 0,3	< 5 / < 15
Sulphur trioxide (ffs)	< 0,01 / < 0,03	< 0,1 / < 0,3	< 5 / < 15
Chlorine wet (>50% humidity)	< 0,000 5 / < 0,001	< 0,005 / < 0,03	< 0,05 / < 0,3
Chlorine dry (<50% humidity)	< 0,002 / < 0,01	< 0,02 / < 0,1	< 0,2 / < 1,0
Hydrogen chloride	-/ < 0,06	< 0,06 / < 0,3	< 0,6 / 3,0
Hydrogen fluoride	< 0,001 / < 0,005	< 0,01 / < 0,05	< 0,1 / < 1,0
Ammonia	< 1 / < 5	< 10 / < 50	< 50 / < 250
Oxides of Nitrogen	< 0,05 / < 0,1	< 0,5 / < 1	< 5 / < 10
Ozone	< 0,002 / < 0,005	< 0,025 / < 0,05	< 0,1 / < 1
Electromagnetic	**E_1**	**E_2**	**E_3**
Electrostatic discharge – Contact (0,667 µC)	4 kV	4 kV	4 kV
Electrostatic discharge – Air (0,132 µC)	8 kV	8 kV	8 kV
Radiated radio frequency, amplitude modulated (RF – AM)	3 V/m at (80 to 1 000) MHz 3 V/m at (1 400 to 2 000) MHz 1 V/m at (2 000 to 2 700) MHz	3 V/m at (80 to 1 000) MHz 3 V/m at (1 400 to 2 000) MHz 1 V/m at (2 000 to 2 700) MHz	10 V/m at (80 to 1 000) MHz 3 V/m at (1 400 to 2 000) MHz 1 V/m at (2 000 to 2 700) MHz
Conducted radio frequency (RF)	3 V at 150 kHz to 80 MHz	3 V at 150 kHz to 80 MHz	10 V at 150 kHz to 80 MHz
Electrical fast transient/Burst (EFT/B)	AC 500 V	AC 1 000 V	AC 2 000 V
Surge (transient ground potential difference) - signal, line to earth	500 V	1 000 V	2 000 V
Magnetic Field (50/60 Hz)	1 A/m	3 A/m	30 A/m
Magnetic Field (60 Hz to 20 000 Hz)	ffs	ffs	ffs

[a] The repetitive nature of the shock experienced by the channel shall be taken into account.

NOTE 1 This aspect of environmental classification is installation-specific and should be considered in association with EN 50174-2 and the appropriate component specification.

Annex D
(informative)

Details of sample construction

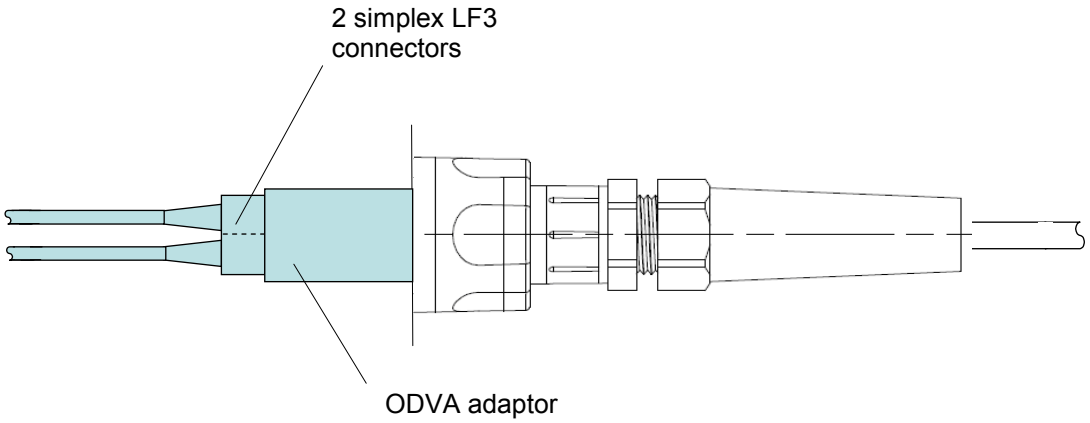
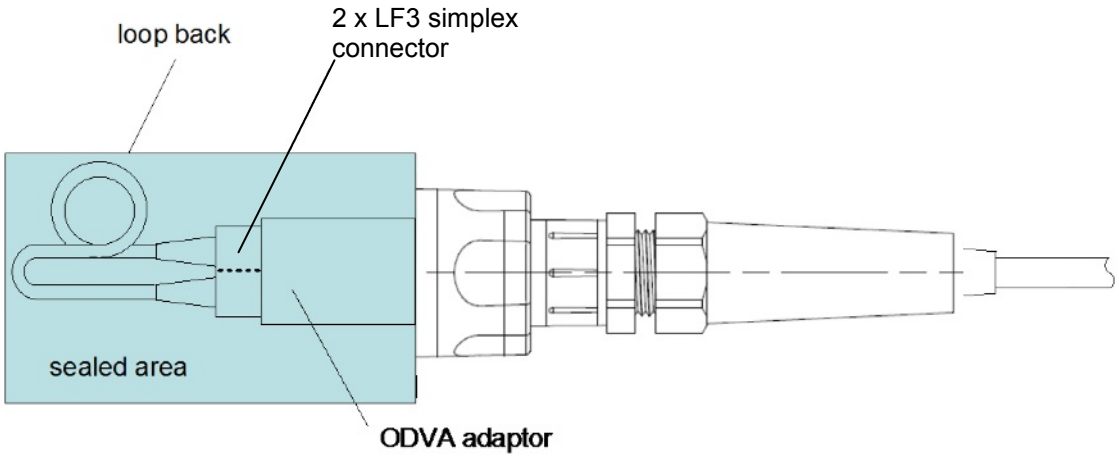


Figure D.1 — Example of test specimen for Tests 1 – 13



The cable loop within the sealed area shall be at least of 2 m length. Loop bending radius should not be less than that required by the cable specification.

Figure D.2 — Example of test specimen for Tests 14 – 19

Annex E
(informative)

Patent statement concerning ODVA industrial connectors

Patent Statement and Licensing Declaration Form for ITU-T/ITU-R Recommendation | ISO/IEC Deliverable

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(*)Number	prEN-50516-x-y ODVA Industrial
(*)Title	Industrial connector sets and interconnect components to be used in optical fibre control and communication systems - Product Specifications

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FORM: 1 March 2007

Patent Information (desired but not required for options 1 and 2; required in ITU for option 3 (NOTE))

No.	Status [granted/ pending]	Country	Granted Patent Number or Application Number (if pending)	Title
1	Granted	US	6,475,009 B2	Industrial Telecommunications Connector
2	Granted	US	6,595,791 B2	Industrial Telecommunications Connector
3				

NOTE For option 3, the additional minimum information that shall also be provided is listed in the option 3 box above.

Bibliography

EN 50173-1	Information technology — Generic cabling systems — Part 1: General requirements
EN 50173-3	Information technology — Generic cabling systems — Part 3: Industrial premises
EN 50174-2	Information technology — Cabling installation — Part 2: Installation planning and practices inside buildings
EN 60793-2-10	Optical fibres — Part 2-10: Product specifications — Sectional specification for category A1 multimode fibres (IEC 60793-2-10)
EN 60793-2-50	Optical fibres — Part 2-50: Product specifications — Sectional specification for class B single-mode fibres (IEC 60793-2-50)
EN 60794-2-50	Optical fibre cables — Part 2-50: Indoor cables — Family specification for simplex and duplex cables for use in terminated cable assemblies (IEC 60794-2-50)
EN 60794-3	Optical fibre cables — Part 3: Sectional specification — Outdoor cables (IEC 60794-3)
EN 61280-1-4	Fibre optic communication subsystem test procedures — Part 1-4: General communication subsystems — Light source encircled flux measurement method (IEC 61280-1-4)
EN 61300 (series)	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures (IEC 61300 series)
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 61300-3-4	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-4: Examinations and measurements — Attenuation (IEC 61300-3-4)
EN 61300-3-10	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-10: Examinations and measurements — Gauge retention force (IEC 61300-3-10)
EN 61300-3-42	Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-42: Examinations and measurements — Attenuation of single mode alignment sleeves and or adaptors with resilient alignment sleeves (IEC 61300-3-42)
EN 61753-1	Fibre optic interconnecting devices and passive components performance standard — Part 1: General and guidance for performance standards (IEC 61753-1)
IEC 61753-1-3[3)]	Fibre optic interconnecting devices and passive components performance standard — Part 1-3: General and guidance for performance standards — Single-mode fibre optic connector performance for harsh industrial operating conditions
EN 61755-1	Fibre optic connector optical interfaces — Part 1: Optical interfaces for single mode non-dispersion shifted fibres — General and guidance (IEC 61755-1)
EN 61755-2-2	Fibre optic connector optical interfaces — Part 2-2: Optical interface standard single mode angled physically contacting fibres (IEC 61755-2-2)

[3)] At draft stage

EN 61755-3-8	Fibre optic interconnecting devices and passive components — Fibre optic connector optical interfaces — Part 3-8: Optical interface, 2,5 mm and 1,25 mm diameter cylindrical 8 degrees angled-APC composite ferrule using titanium as fibre surrounding material, single mode fibre (IEC 61755-3-8)
EN ISO 8015	Geometrical product specifications (GPS) — Fundamentals — Concepts, principles and rules (ISO 8015)

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