



BSI Standards Publication

Connector sets and interconnect components to be used in optical fibre communication systems — Product specifications

Part 7-4: LC-PC simplex terminated on IEC 60793-2-50 category B1.1 and B1.3 singlemode fibre with full zirconia ferrule for category C

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National foreword

This British Standard is the UK implementation of EN 50377-7-4:2011. It supersedes BS EN 50377-7-4:2004, which is withdrawn.

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**Connector sets and interconnect components to be used in optical fibre communication systems -
Product specifications -
Part 7-4: LC-PC simplex terminated on IEC 60793-2-50 category B1.1 and B1.3 singlemode fibre with full zirconia ferrule for category C**

Jeux de connecteurs et composants d'interconnexion à utiliser dans les systèmes de communication par fibres optiques – Spécifications de produits -
Partie 7-4: Type simplex LC-PC câblé sur une fibre unimodale des catégories B1.1 et B1.3 de la CEI 60793-2-50, avec férule en zircone, catégorie C

Steckverbindersätze und Verbindungselemente für Lichtwellenleiter-Datenübertragungssysteme - Produktnormen -
Teil 7-4: Bauart LC-PC-Simplex zum Anschluss an Einmodenfasern der Kategorien B1.1 und B1.3 nach IEC 60793-2-50 mit Zirkoniumdioxid-Ferrule für die Kategorie C

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 86BXA, Fibre optic interconnect, passive and connectorised components.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50377-7-4 on 2011-01-02.

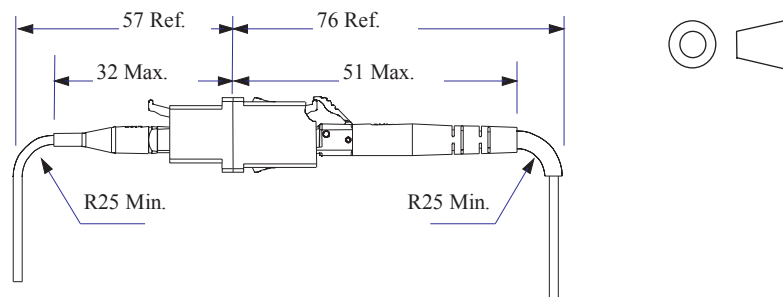
This document supersedes EN 50377-7-4:2004.

This document is updated to include the performance of the adaptor, and patch cord next to the pigtailed connector as defined in the previous version. It also includes latest attenuation and return loss grades as specified in IEC.

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

The following dates were fixed:

- | | | |
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| – latest date by which the EN has to be implemented
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Connector sets and interconnect components to be used in optical fibre communication systems – Product specifications			
Part 7-4: LC-PC simplex terminated on IEC 60793-2-50 singlemode category B1.1 and B1.3 singlemode fibre with full zirconia ferrule for category C			
Description		Performance	
Coupling mechanism:	Latch push-pull	Application:	EN 61753-1:2007, category C (controlled environment)
Configuration:	Plug / adaptor / plug	Attenuation grade:	B: ≤ 0,12 dB mean ≤ 0,25 dB for ≥ 97 % of measurements
Fibre category:	EN 60793-2-50 Types B1.1 and B1.3		C: ≤ 0,25 dB mean ≤ 0,50 dB for ≥ 97 % of measurements
Cable type:	See Table 3	Return loss grade:	2: ≥ 45 dB (random mate)
Related documents:			
EN 60794-2	Optical fibre cables – Part 2: Indoor cables – Sectional specification (IEC 60794-2)		
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)		
EN 61754-20	Fibre optic connector interfaces – Part 20: Type LC connector family (IEC 61754-20)		
ETSI TS 100 671	Transmission and Multiplexing (TM); Passive optical components; Optical fibre connectors for single-mode optical fibre communication systems; Common requirements and conformance testing		
ETSI EN 300 019 series	Environmental Engineering (EE) – Environmental conditions and environmental tests for telecommunications equipment		
Outline and maximum dimensions:			
			

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1 Scope

1.1 Product definition

This European Standard contains the initial, start of life dimensional, optical, mechanical and environmental performance requirements which a connector terminated with cylindrical zirconia PC ferrule and assembled singlemode resilient alignment sleeve LC-PC simplex connector set (plug / adaptor / plug) adaptor and patchcord must meet in order for it to be categorised as an EN standard product.

Since different variants and grades of performance are permitted, product marking details are given in 3.6.

1.2 Intermateability

Although all products conforming to the requirements of this standard will intermate, the resulting level of random attenuation performance will only be ensured in accordance with Table 1. The intention is that this will be true irrespective of the manufacturing source(s) of the product.

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

Therefore, 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

Attenuation grade	C	B
C	C	C
B	C	B

A simplex plug can be connected in a duplex adaptor without degrading the level of performance.

1.3 Operating environment

The tests selected combined with the severities and durations are representative of an internal weather protected environment defined by EN 61753-1:2007, Category C.

1.4 Reliability

Whilst the anticipated service life expectancy of the product in this environment is 20 years, compliance with this European Standard 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 European Standard does not guarantee the manufacturing consistency of the product. This should be maintained using a recognised quality assurance programme.

2 Normative references

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

EN 60793-2-50	Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres (IEC 60793-2-50)
EN 60874-1:2007	Connectors for optical fibres and cables - Part 1: Generic specification (IEC 60874-1:2006)
EN 61300 series	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures (IEC 61300 series)
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	Part 2-2: Tests – Mating durability (IEC 61300-2-2)
EN 61300-2-4	Part 2-4: Tests – Fibre/cable retention (IEC 61300-2-4)
EN 61300-2-6	Part 2-6: Tests – Tensile strength of coupling mechanism (IEC 61300-2-6)
EN 61300-2-12:2009	Part 2-12: Tests – Impact (IEC 61300-2-12:2009)
EN 61300-2-17	Part 2-17: Tests – Cold (IEC 61300-2-17)
EN 61300-2-18	Part 2-18: Tests – Dry heat – High temperature endurance (IEC 61300-2-18)
EN 61300-2-19	Part 2-19: Tests – Damp heat (steady state) (IEC 61300-2-19)
EN 61300-2-22	Part 2-22: Tests – Change of temperature (IEC 61300-2-22)
EN 61300-2-42	Part 2-42: Tests – Static side load for connectors (IEC 61300-2-42)
EN 61300-2-44	Part 2-44: Tests – Flexing of the strain relief of fibre optic devices (IEC 61300-2-44)
EN 61300-3-4	Part 3-4: Examinations and measurements – Attenuation (IEC 61300-3-4)
EN 61300-3-6:2009	Part 3-6: Examinations and measurements – Return loss (IEC 61300-3-6:2008)
EN 61300-3-10	Part 3-10: Examinations and measurements – Gauge retention force (IEC 61300-3-10)
EN 61300-3-15	Part 3-15: Examinations and measurements - Dome eccentricity of a convex polished ferrule endface (IEC 61300-3-15)
EN 61300-3-16	Part 3-16: Examinations and measurements - Endface radius of spherically polished ferrules (IEC 61300-3-16)
EN 61300-3-23	Part 3-23: Examination and measurements – Fibre position relative to ferrule end-face (IEC 61300-3-23)
EN 61300-3-28	Part 3-23: Examinations and measurements – Transient loss (IEC 61300-3-28)
EN 61300-3-34	Part 3-34: Examinations and measurements – Attenuation of random mated connectors (IEC 61300-3-34)
EN 61300-3-42	Part 3-42: Examinations and measurements – Attenuation of single mode alignment sleeves and or adaptors with resilient alignment sleeves (IEC 61300-3-42)
EN 61753-1:2007	Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards (IEC 61753-1:2007)

3 Description

3.1 General

The LC-PC simplex connector is a single position plug connector set of plug adaptor plug configuration characterised by cylindrical, spring loaded butting ferrules of 1,25 mm nominal diameter and a latched push-pull coupling mechanism. The optical alignment mechanism of the connectors is of a resilient sleeve style.

3.2 Plug

The plug features a cylindrical zirconia ceramic ferrule and a latched push-pull mechanism. It has a single male key, which is used to limit and may be used to orientate the relative rotation between mated connectors.

A cover (dust cap) to protect the ferrule endface when the connector is in the unmated condition shall be provided.

Alternative materials may be used for the ferrule that have directly compatible material properties to zirconia but the endface and performance requirements must be met under all conditions

3.3 Adaptor

The adaptor has a zirconia ceramic resilient alignment sleeve. The mounting styles are simplex rectangular flange equipped with snap-latches, duplex square flange equipped with snap-latches, and a duplex rectangular flange with snap-latches with a panel cut out same as SC connector.

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

Alternative materials may be used for the sleeve that has directly compatible material properties to zirconia but the performance requirements must be met under all conditions

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 IEC interface standard this is clearly stated.

3.6 Colour and marking

Marking of the product shall be in accordance with EN 60874-1:2007, 4.7, in the following order of precedence:

- identification of manufacturer;
- manufacturing date code: year/week;
- manufacturers part number;
- variant identification number.

The following colour scheme is preferred.

Table 2 – Preferred colour scheme

Terminated plug	Adaptor
Blue	Blue

4 Variants

4.1 Terminated plug

The following variants are permitted:

Table 3 – Plug fibre/cable variants with fibre category IEC 60793-2 Type B1.1

E	N	5	0	3	7	7	-	7	-	4	-	*	*
---	---	---	---	---	---	---	---	---	---	---	---	---	---



Variant number	Fibre/Cable Ø mm	Structure
C01	0,7 – 1,4	Buffered fibre
C02	1,6 ± 0,2	Reinforced cable
C03	2,0 ± 0,2	Reinforced cable
C04	2,5 ± 0,2	Reinforced cable
C05	3,0 ± 0,2	Reinforced cable
B01	0,7 – 1,4	Buffered fibre
B02	1,6 ± 0,2	Reinforced cable
B03	2,0 ± 0,2	Reinforced cable
B04	2,5 ± 0,2	Reinforced cable
B05	3,0 ± 0,2	Reinforced cable

4.2 Adaptor

The following variants are permitted:

Table 4 – Adaptor variants

Variant number	Format
A01	Rectangular flange – Simplex
A02	Square flange – Duplex
A03	Rectangular flange – Duplex
A04	Rectangular flange – Quad

4.3 Identification of variants

Table 5 – Identification plug fibre/cable, C grade variants with fibre category IEC 60793-2

Variant number	Performance grade (return loss)	Identification number
C01	2	EN50377-7-4-C01-2
C02	2	EN50377-7-4-C02-2
C03	2	EN50377-7-4-C03-2
C04	2	EN50377-7-4-C04-2
C05	2	EN50377-7-4-C05-2

Table 6 – Identification plug fibre/cable, B grade variants with fibre category IEC 60793-2

Variant number	Performance grade (return loss)	Identification number
B01	2	EN50377-7-4-B01-2
B02	2	EN50377-7-4-B02-2
B03	2	EN50377-7-4-B03-2
B04	2	EN50377-7-4-B04-2
B05	2	EN50377-7-4-B05-2

Table 7 – Adaptor variants

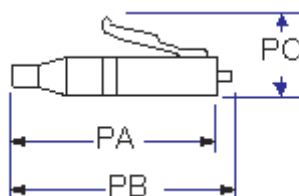
Variant number	Identification number
A01	EN50377-7-4-A01
A02	EN50377-7-4-A02
A03	EN50377-7-4-A03
A04	EN50377-7-4-A04

5 Dimensional requirements

5.1 Outline dimensions

5.1.1 Plug variants

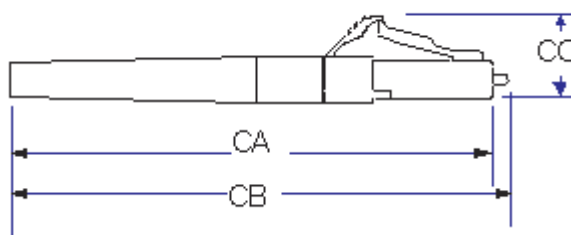
Variant number: B01/C01



Ref.	Dimensions			Note
	min.	mm	max.	
PA	–		30	
PB	–		32	
PC	–		9,4	

a)

Variant number: B02 – B05, C02 – C05



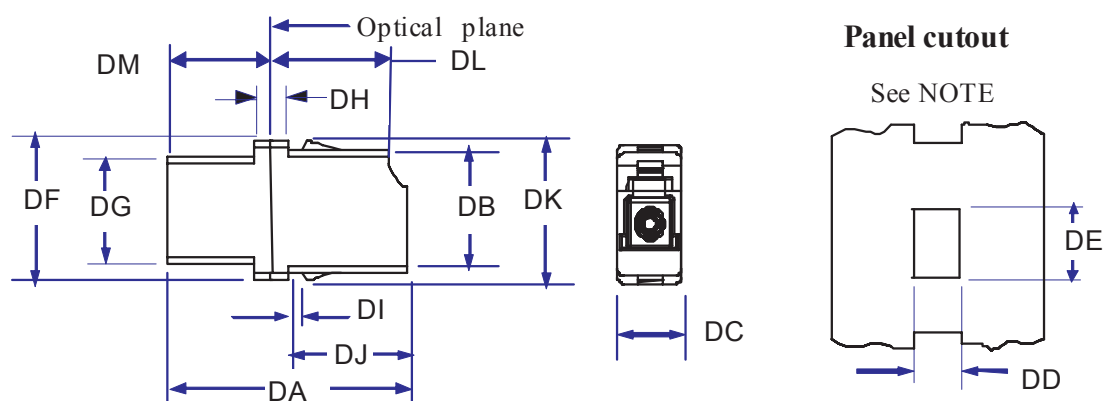
Ref.	Dimensions			Note
	min.	mm	max.	
CA	–		49	Not including heat-shrink tube
CB	–		51	
CC	–		10,5	

b)

Figure 1 – Outline dimensions – Plug variants

5.1.2 Adaptor variants

Variant number: A01



Ref.	Dimensions		Note
	min.	max.	
DA	25,0	30,0	See NOTE
DB	11,5	11,6	
DC	6,9	7,0	
DD	7,1	7,2	
DE	11,7	11,8	
DF	-	13,3	
DG	-	10,3	
DH	-	3,8	
DI	Approximate 1,5		
DJ	12,6	12,9	
DK	13,1	13,2	
DL	11,0	12,8	
DM	11,0	12,8	
NOTE Panel cutout: panel thickness should be between 1,0 mm and 1,5 mm.			

Figure 2 a) Variant A01 outline dimensions – Simplex adaptor