

**SLOVENSKI STANDARD**  
**SIST EN 50377-14-1:2011****01-september-2011**

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**Konektorski sestavi in povezovalne komponente za optične komunikacijske sisteme - Specifikacija izdelka - 14-1. del: Vrvice z enorodnim optičnim vlaknom po EN 60793-2-50 kategorij B1.1 in B1.3 za kategorijo C**

Connector sets and interconnect components to be used in optical fibre communication systems - Product specifications - Part 14-1: Cords with IEC 60793-2-50 singlemode category B1.1 and B1.3 fibre for category C

Steckverbindersätze und Verbindungsbaulemente für Lichtwellenleiter-Datenübertragungssysteme - Produktnormen - Teil 14-1: Verbindungskabel für Einmodenfasern der Kategorien B1.1 und B1.3 nach EN 60793 2 50 für die Kategorie C

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**Ta slovenski standard je istoveten z: EN 50377-14-1:2011**

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**ICS:**

33.180.20	Povezovalne naprave za optična vlakna	Fibre optic interconnecting devices
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EUROPEAN STANDARD  
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**Connector sets and interconnect components to be used in optical fibre communication systems -  
Product specifications -  
Part 14-1: Cords with IEC 60793-2-50 singlemode category B1.1 and B1.3 fibre for category C**

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

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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 Unique Acceptance Procedure and was approved by CENELEC as EN 50377-14-1 on 2011-05-02.

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:

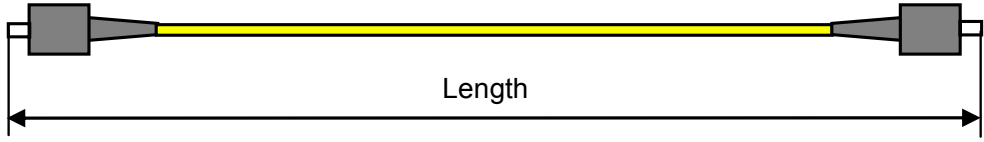
- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 2012-05-02
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2014-05-02

This document includes the performance of the patch cord, as well as latest attenuation and return loss grades as specified in IEC.

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<b>Connector sets and interconnect components to be used in optical fibre communication systems – Product specifications</b>			
<b>Part 14-1: Cords with IEC 60793-2-50 singlemode category B1.1 and B1.3 fibre for category C</b>			
<b>Description</b>		<b>Performance</b>	
Fibre category:	EN 60793-2-50 Types B1.1 and B1.3	Application:	For use in EN category C (controlled environment)
Cable type:	EN 60794-2-50 Type simplex cables	Attenuation grades: (random mate)	B: $\leq 0,12$ dB mean $\leq 0,25$ dB for $\geq 97$ % of measurements  C: $\leq 0,25$ dB mean $\leq 0,50$ dB for $\geq 97$ % of measurements
		Return loss grade: (random mate)	1: $\geq 60$ dB 2: $\geq 45$ dB
<b>Related documents:</b>			
EN 50377 series	Connector sets and interconnect components to be used in optical fibre communication systems – Product specifications		
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 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)		
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		
<b>Outline and maximum dimensions:</b>			
			

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## 1 Scope

### 1.1 Product definition

This standard contains the initial, start of life dimensional, optical, mechanical and environmental performance requirements that an assembled singlemode patch cord with cylindrical ferruled connectors shall 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 3.4 and Clause 4.

### 1.2 Intermateability of the plugs

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 as specified in EN 61755-1, 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 a grade C level of random attenuation performance.

**Table 1 – Ensured level of random attenuation**

Plug variant / Attenuation grade		Plug 2	
		C	B
Plug 1	C	C	C
	B	C	B

### 1.3 Operating environment

The tests selected combined with the severities and durations are representative of an EN 61753-1 category C environment.

### 1.4 Reliability

Whilst the anticipated service life expectancy of the product in this environment is 20 years, compliance with this 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 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 50377 series	Connector sets and interconnect components to be used in optical fibre communication systems – Product specifications
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 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 61300-2-22	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature (IEC 61300-2-22)
EN 61300-2-42	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-42: Tests – Static side load for connectors (IEC 61300-2-42)
EN 61300-2-44	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-44: Tests – Flexing of the strain relief of fibre optic devices (IEC 61300-2-44)
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 61300-3-6	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 61300-3-22	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-22: Examinations and measurements – Ferrule compression force (IEC 61300-3-22)
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 61753-1	Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards (IEC 61753-1)
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)

## 3 Description

This document applies to both patch cords and work area cords.

A patch cord is defined as a short length of cable with connector plugs assembled at both cable ends. Typical length (but not limited to) is 1 m to 10 m, measured from tip to tip at the extremes. Patch cords are installed in mechanically protected locations (inside cabinets, distribution frames and enclosures).



Work area cords are typically more ruggedized (larger diameter) and used in mechanically less protected locations.

For the purpose of this document, both patch cords and work area cords are called patch cords.

### 3.1 Plug

The plug features a cylindrical ferrule. It has a single male key that is used to limit and may be used to orientate, the relative rotation between mated connectors.

A cover (dust cap) to protect the ferrule end faces when the connectors are in the unmated condition shall be provided.

The plug shall meet the relevant product specification as listed in Table 2 (most common types are listed).

**Table 2 – Connector references**

Connector	Reference
FC	EN 50377-2 series
SC	EN 50377-4 series
SC-RJ	EN 50377-6 series
LC	EN 50377-7 series
LSH	EN 50377-8 series
MU	EN 50377-10 series
LX.5	EN 50377-13 series

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### 3.2 Cable

The cable shall meet the requirements of EN 60794-2-50.

### 3.3 Materials

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

The plug materials shall meet the relevant requirements of the product specifications listed in Table 2.

The cable materials shall meet the requirements of EN 60794-2-50.

### 3.4 Marking

Marking of the product shall be in the following order of precedence:

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

Provision should be taken to avoid confusion between the original cable marking and the patch cord product information.

## 4 Variants

EN 50377 – 14 – 1 – X<sub>1</sub>X<sub>2</sub>X<sub>3</sub> – X<sub>4</sub>X<sub>5</sub>X<sub>6</sub> – XX<sub>7</sub> – XX<sub>8</sub>

Variant No. X <sub>1</sub> and X <sub>4</sub>	Connector type
S	SC
F	FC
E	LSH
M	MU
R	SC-RJ
X	LX.5
L	LC

Variant No. X <sub>2</sub> and X <sub>5</sub>	Attenuation grade (EN 61755-1)
B	B ( $\leq 0,25$ dB)
C	C ( $\leq 0,5$ dB)

Variant No. X <sub>3</sub> and X <sub>6</sub>	Return loss grade (EN 61755-1)
1	1 ( $\geq 60$ dB mated)
2	2 ( $\geq 45$ dB mated)
3	3 ( $\geq 35$ dB mated)

Variant No. XX <sub>7</sub>	Cable length (in metre)	Remark
01 - 99	Length measured from tip to tip of connectors	Tolerances on length $\pm 50$ mm <sup>a</sup>

<sup>a</sup> For lengths longer than 10 m, the tolerance shall be  $\pm 5\%$ .

Variant No. XX <sub>8</sub>	Cable type (in mm)	Structure	Note
09	$\varnothing 0,9 \pm 0,1$	Buffered fibre	1 fibre
16	$\varnothing 1,6 \pm 0,2$	Reinforced cable	1 fibre
18	$\varnothing 1,8 \pm 0,2$	Reinforced cable	1 fibre
20	$\varnothing 2,0 \pm 0,2$	Reinforced cable	1 fibre
24	$\varnothing 2,4 \pm 0,2$	Reinforced cable	1 fibre
28	$\varnothing 2,8 \pm 0,2$	Reinforced cable	1 fibre
30	$\varnothing 3,0 \pm 0,2$	Reinforced cable	1 fibre

## 5 Dimensional requirements

### 5.1 Outline dimensions

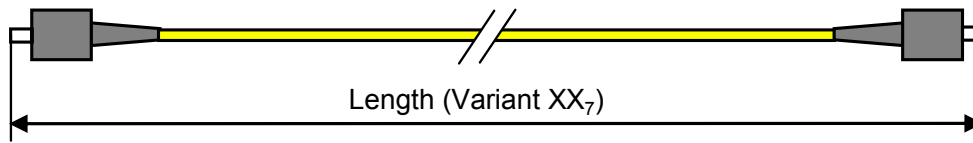


Figure 1 – Length of patch cord

Length shall be measured from tip to tip of connectors (see Figure 1).

## 6 Tests

### 6.1 Sample size

For the purpose of this specification, a sample is defined as a patch cord.

All samples shall be randomly selected.

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

The length of the patch cord samples is 5 m.

### 6.2 Test and measurement methods

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

As stated in the individual test details, all measurements shall be performed at  $(1\ 310 \pm 30)$  nm,  $(1\ 550 \pm 30)$  nm and  $(1\ 625 \pm 20)$  nm.

No deviation from the specified test method is allowed.

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

### 6.3 Test sequence

All products shall be subjected to Tests 1 – 2 as specified in Annex B. There is no defined sequence in which Tests 3 – 8 must be run.

### 6.4 Pass/fail criteria

A product will have met the requirements of this standard provided no failures occur in the sample group for any test.

In the event of a failure occurring, the failing test shall be repeated 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 standard.