



**SLOVENSKI STANDARD**  
**oSIST prEN 50411-3-6:2011**

**01-februar-2011**

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**Delilniki za optična vlakna in kabelske spojnice za optične komunikacijske sisteme  
- Specifikacija izdelka - 3-6. del: Večrodna mehanska optična spojnica**

Fibre organisers and closures to be used in optical fibre communication systems -  
Product specifications - Part 3-6: Multimode mechanical fibre splice

**iTeh STANDARD PREVIEW**  
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[SIST EN 50411-3-6:2013](https://standards.iteh.ai/catalog/standards/sist/807e6b68-d561-4278-9e9c-a8979c3940a5/sist-en-50411-3-6-2011)

**Ta slovenski standard je istoveten z: prEN 50411-3-6:2010**

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**ICS:**

33.180.20	Povezovalne naprave za optična vlakna	Fibre optic interconnecting devices
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**DRAFT**  
**prEN 50411-3-6**

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ICS

English version

**Fibre organisers and closures to be used  
in optical fibre communication systems -  
Product specifications -  
Part 3-6: Multimode mechanical fibre splice**

To be completed

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This draft European Standard is submitted to CENELEC members for CENELEC enquiry.  
Deadline for CENELEC: 2011-05-20.

It has been drawn up by CLC/TC 86BXA.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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**CENELEC**

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

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## Foreword

2 This draft European Standard was prepared by the Technical Committee CENELEC TC 86BXA, Fibre optic  
3 interconnect, passive and connectorised components. It is submitted to the CENELEC enquiry.

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**Fibre organisers and closures to be used in optical fibre communication systems –  
Product specifications**

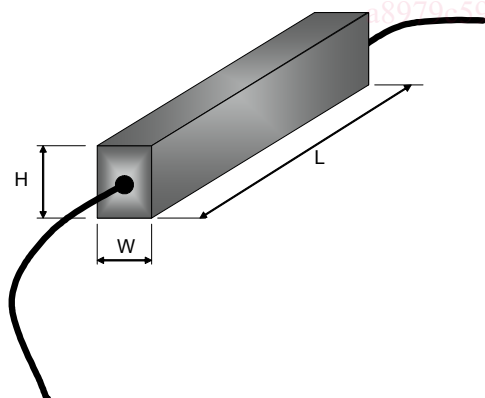
**Part 3-6: Multimode mechanical fibre splice**

Description		Performance	
Type:	Fibre splice	Application:	EN 61753-1:2007, Category U with extension of lower temperature to -40 °C
Style:	Mechanical	Attenuation grades	≤ 0,25 dB maximum (97 %)
Operating wavelength:	850 nm and 1 300 nm	Return loss grades	≥ 20 dB
Fibre category	EN 60793-2-10:2007, type A1a.1, A1a.2, A1a.3 and A1b		

**Related documents:**

EN 60793-2-10:2007	Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres (IEC 60793-2-10:2007)
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 61753-1:2007	Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards (IEC 61753-1:2007)

**Outline and maximum dimensions:**



Variant	Dimension W mm	Dimension H mm	Dimension L mm
Type M1	3,8	6,4	38
Type M2	4,0	4,0	36
Type M3	3,2	3,2	45
Type M4	4,2	4,2	44
Type M5	4,0	4,0	40
Type M6	Ø 5,0		65

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## 42 1 Scope

### 43 1.1 Product definition

44 This standard contains the initial, start of life dimensional, optical, mechanical and environmental  
45 performance requirements, which a multimode mechanical splice must meet in order for it to be categorised  
46 as an EN standard product.

47 Since different variants and grades of performance are permitted, product marking and identification details  
48 are given in 3.5.

49 Although in this document the product is qualified for EN 60793-2-10:2007, type A1a.1, A1a.2, A1a.3 and A1b  
50 multimode fibres it may also be suitable for other fibre types.

### 51 1.2 Interoperability

52 The installed mechanical splice fits into a fibre management system with optical fibre splice cassettes or  
53 splice trays. This standard specifies the following two physical interface dimensions:

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

### 56 1.3 Expected performance

57 In this document, the performance of a mechanical splice is given with identical fibres only. Losses  
58 associated with fibre cladding diameter and mode field mismatch are not taken into account. The measured  
59 attenuation is a function of the core concentricity, cladding non-circularity and alignment capability.  
60 The optical return loss performance is a function of the index matching gel and the fibre end face preparation.

### 61 1.4 Operating environment

62 The tests selected combined with the severities and durations are representative of an outdoor enclosed  
63 environment defined as category U in EN 61753-1:2007. To ensure that the product can be used in closures,  
64 boxes or street cabinet for categories A, G and S (as defined EN 61753-1:2007) the specified lower  
65 temperature is extended to -40 °C and requirements for temporary flooding have been added.

### 66 1.5 Reliability

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

### 70 1.6 Quality assurance

71 Compliance with this specification does not guarantee the manufacturing consistency of the product.  
72 This should be maintained using a recognised quality assurance programme.

73 **2 Normative references**

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

EN 60793-2-10:2007	Optical fibres - Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres (IEC 60793-2-10:2007)
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)
EN 61300 series	Fibre optic interconnecting devices and passive components – Basic test and measurement procedures (IEC 61300 series)
EN 61300-2-1	Part 2-1: Tests – Vibration (sinusoidal) (IEC 61300-2-1)
EN 61300-2-4	Part 2-4: Tests – Fibre/cable retention (IEC 61300-2-4)
EN 61300-2-5	Part 2-5: Tests – Torsion/twist (IEC 61300-2-5)
EN 61300-2-7	Part 2-7: Tests – Bending moment (IEC 61300-2-7)
EN 61300-2-9	Part 2-9: Tests – Shock (IEC 61300-2-9)
EN 61300-2-17	Part 2-18: Tests – Cold (IEC 61300-2-17)
EN 61300-2-18	Part 2-18: Tests – Dry heat – High temperature endurance (IEC 61300-2-18)
EN 61300-2-22:2007	Part 2-22: Tests – Change of temperature (IEC 61300-2-22:2007)
EN 61300-2-26	Part 2-26: Tests – Salt mist (IEC 61300-2-26)
EN 61300-2-27	Part 2-27: Tests – Dust – Laminar flow (IEC 61300-2-27)
EN 61300-2-33	Part 2-33: Tests – Assembly and disassembly of fibre optic closures (IEC 61300-2-33)
EN 61300-2-45	Part 2-45: Tests – Durability test by water immersion (IEC 61300-2-45)
EN 61300-3-3:2009	Part 3-3: Examinations and measurements – Active monitoring of changes in attenuation and return loss (IEC 61300-3-3:2009)
EN 61300-3-4:2001	Part 3-4: Examinations and measurements – Attenuation (IEC 61300-3-4:2001)
EN 61300-3-6:2009	Part 3-6: Examinations and measurements – Return loss (IEC 61300-3-6:2008)
EN 61300-3-7:2001	Part 3-7: Examinations and measurements – Wavelength dependence of attenuation and return loss (IEC 61300-3-7:2000)
EN 61300-3-28:2002	Part 3-28: Examinations and measurements – Transient loss (IEC 61300-3-28:2002)
EN 61300-3-46 <sup>1)</sup>	Part 3-46: Measurement – Bore diameter for guide pin in MT ferrules

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1) At draft stage.



### 77 3 Description

78 A multimode mechanical fibre splice is a passive optical interconnection component which provides optical  
79 and mechanical continuity between 2 optical fibres or cables. The products described in this specification are  
80 based on mechanical alignment of 2 cleaved fibres. The fibres are protected against ingress of dust or water  
81 by a sealing material, generally an index matching gel, to both minimise reflections and to improve  
82 attenuation at the glass/gel/glass interface.

83 Some splices may have a limited reinstallation capability. In this case the re-installability shall be clearly  
84 stated and the re-installation test 9 in 8.3 shall be conducted.

#### 85 3.1 Mechanical splice

86 An optical fibre mechanical splice body contains the following pre-assembled elements:

- 87 – an alignment device;
- 88 – a sealing and index matching gel inside;
- 89 – a fibre alignment activation device like a spring, wedge or plunger;
- 90 – a fibre clamping or fixing able to withstand axial fibre loads.

91 Mechanical splices designed for use with cables shall contain strain relief fixing.

#### 92 3.2 Materials

93 Materials which are not specified or which are not specifically described are left to the discretion of the  
94 manufacturer. However, the following requirements shall be met:

- 95 – all materials that are likely to come in contact with personnel shall meet appropriate health and safety  
96 regulations;
- 97 – the sealing and index matching materials shall be compatible with the materials of the fibres and the  
98 mechanical splice parts;
- 99 – all components of the splice shall be resistant to solvents and degreasing agents that are typically used  
100 to clean and degrease fibres and cables;
- 101 – metallic parts shall be resistant to the corrosive influences they may encounter during the lifetime of the  
102 product;
- 103 – exterior polymer materials shall be resistant to mould growth.

#### 104 3.3 Dimensions

105 Outline dimensions are specified. All other dimensions are left to the discretion of the manufacturer.

#### 106 3.4 Colour and marking

107 Marking of the product or packaging shall be in the following order of precedence:

- 108 a) identification of manufacturer;
- 109 b) manufacturing date code: year/week;
- 110 c) manufacturers part number;
- 111 d) variant identification number.

112 There is no preferred colour specified.

113 **4 Variants**

114 **Table 1 – Optical fibre mechanical splice, for category U – variants**

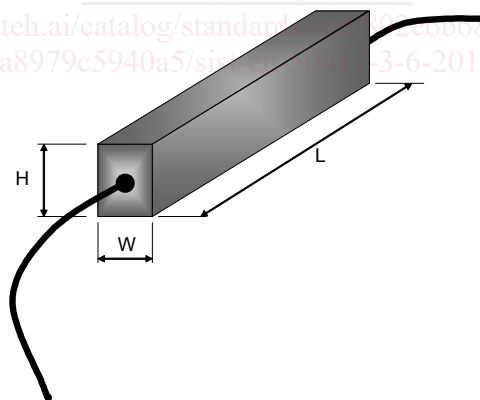
115 **EN 50411-3-6 – XX<sub>1</sub> – X<sub>2</sub> – X<sub>3</sub>**

Variant No. XX <sub>1</sub>	Mechanical splice type (common profile)
<b>M1</b>	Mechanical splice Type 1
<b>M2</b>	Mechanical splice Type 2
<b>M3</b>	Mechanical splice Type 3
<b>M4</b>	Mechanical splice Type 4
<b>M5</b>	Mechanical splice Type 5
<b>M6</b>	Mechanical cable splice Type 6

Variant No. X <sub>2</sub> and X <sub>3</sub>	Fibre types to be spliced
<b>P</b>	Primary coated 125/250 µm
<b>S</b>	Secondary coated 125/900 µm
<b>A</b>	Any single fibre types <b>P</b> or <b>S</b>
<b>R</b>	Reinforced cable

116

117 **5 Dimensional requirements**



118  
119

Variant	Description	Dimension W ± 0,1 mm mm	Dimension H ± 0,1 mm mm	Dimension L ± 1 mm mm
<b>Type M1</b>	Mechanical Type M1	3,8	6,4	38
<b>Type M2</b>	Mechanical Type M2	4,0	4,0	36
<b>Type M3</b>	Mechanical Type M3	3,2	3,2	45
<b>Type M4</b>	Mechanical Type M4	4,2	4,2	44
<b>Type M5</b>	Mechanical Type M5	4,0	4,0	40
<b>Type M6</b>	Mechanical Type M6	Ø 5,0		65

120

121

**Figure 1 – Outline and maximum dimensions**

## 122 **6 Tests**

### 123 **6.1 Introduction**

124 The mechanical and environmental performance of a fibre splice is vital to an optical cabling system.  
125 The purpose of testing is to demonstrate that a mechanical splice remains functional under defined  
126 environmental conditions, without failures.

127 Optical performance testing is accomplished by subjecting the test specimen to a number of mechanical and  
128 environmental conditions and by measuring any optical performance deviations at prescribed intervals during  
129 and after completion of each test.

### 130 **6.2 Test sample preparation**

131 The test samples are prepared by making a mechanical splice on identical fibres. Optical test samples shall  
132 be installed according to the manufacturers' installation instructions. The fibres for the optical test samples  
133 are multimode fibres as described in Annex A. The length of the fibres shall be at least 2 m on each side of  
134 the mechanical splice. For each fibre construction (primary coated, secondary coated or reinforced cable)  
135 a number of test samples will be prepared as defined in Table B.1.

### 136 **6.3 Test and measurement methods**

137 All tests and measurement methods have been selected from EN 61300 series.

138 Unless otherwise stated in the individual test details, all attenuation measurements shall be performed at  
139  $(850 \pm 25)$  nm. All specified optical losses are referenced to the initial attenuation at the start of the test.

140 A pass at 850 nm will also guarantee the performance at 1 300 nm.

141 No deviation from the specified test method is allowed.

142 Unless otherwise specified, tests should be carried out under standard atmospheric conditions according to  
143 EN 61300-1.

### 144 **6.4 Pass/fail criteria**

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

146 In the event of a failure, the test shall be re run using a sample size double that of the original.

## 147 **7 Test report**

148 Conformance to a performance standard shall be supported by a test report. The test report shall clearly  
149 demonstrate that the tests described in Clause 8 have been carried out in accordance with this standard and  
150 shall provide full details of the tests together with a pass/fail declaration. In the case of a failure, an analysis  
151 of the cause of the failure shall be undertaken and any corrective actions taken shall be described.

152 If design changes are made, an assessment shall be carried out to determine whether full or partial  
153 requalification shall be done.

## 154 **8 Performance requirements**

### 155 **8.1 Dimensional and marking requirements**

156 Dimensions and marking of the product shall be in accordance with the requirements of 3.5 and Clause 5,  
157 and shall be measured using the appropriate EN test method.