



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 60794-1-101:2023**  
**01-oktober-2023**

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**Optični kabli - 1-101. del: Splošna specifikacija - Osnovni preskusni postopki za optične kable - Mehanske preskusne metode - Natezno, metoda E1**

Optical fibre cables - Part 1-101: Generic specification - Basic optical cable test procedures - Mechanical tests methods - Tensile, method E1

**iTeh STANDARD PREVIEW**  
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Câbles à fibres optiques - Partie 1-101: Spécification générique - Procédures fondamentales d'essais des câbles optiques - Méthodes d'essai mécanique - Traction, méthode E1

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**Ta slovenski standard je istoveten z: prEN IEC 60794-1-101:2023**

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33.180.10 (Optična) vlakna in kabli Fibres and cables

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FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
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TITLE: <b>Optical fibre cables - Part 1-101: Generic specification - Basic optical cable test procedures - Mechanical tests methods - Tensile, method E1</b>
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PROPOSED STABILITY DATE: 2026
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NOTE FROM TC/SC OFFICERS:
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## OPTICAL FIBRE CABLES –

**Part 1-101: Generic specification –  
Basic optical cable test procedures –  
Mechanical test method– Tensile, method E1**

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IEC 60794-1-101 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics. It is an International Standard.

This first edition cancels and replaces Method E1 of IEC 60794-1-21:2015, which will be withdrawn. It includes an editorial revision, based on the new structure and numbering system for optical fibre cable test methods.

The text of this is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

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74 Full information on the voting for its approval can be found in the report on voting indicated in  
75 the above table.

76 The language used for the development of this International Standard is English.

77 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in  
78 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available  
79 at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are  
80 described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

81 The committee has decided that the contents of this document will remain unchanged until the  
82 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to  
83 the specific document. At this date, the document will be

- 84 • reconfirmed,
- 85 • withdrawn,
- 86 • replaced by a revised edition, or
- 87 • amended.

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## INTRODUCTION

This document cancels and replaces test method E1 of IEC 60794-1-21:2015, which will be withdrawn. It includes an editorial revision, based on the new structure and numbering system for optical fibre cable test methods. The mechanical tests contained in IEC 60794-1-21:2015 will be individually numbered in the IEC 60794-1-1xx series. Each test method is now considered to be an individual document rather than part of a multi-test method compendium. Full cross-reference details are given in IEC 60794-1-2.

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## OPTICAL FIBRE CABLES –

### Part 1-101: Generic specification – Basic optical cable test procedures – Mechanical test method– Tensile, method E1

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#### 103 **1 Scope**

104 This part of IEC 60794 applies to optical fibre cables for use with telecommunication equipment  
105 and devices employing similar techniques, and to cables having a combination of both optical  
106 fibres and electrical conductors.

107 The object of this standard is to define test procedures to be used in establishing uniform  
108 requirements for mechanical performance- tensile.

109 Throughout this standard the wording “optical cable” may also include optical fibre units,  
110 microduct fibre units, etc.

111 See IEC 60794-1-2 for general requirements and definitions and for a complete reference guide  
112 to test methods of all types.

#### 113 **2 Normative references**

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

118 IEC 60794-1-1, *Optical fibre cables – Part 1-1: Generic specification – General*

119 IEC 60794-1-2, *Optical fibre cables - Part 1-2: Generic specification - Basic optical cable test  
120 procedures - General guidance*

121 IEC 60793-1-22, *Optical fibres – Part 1-22: Measurement methods and test procedures –  
122 Length measurement*

123 IEC 60793-1-46, *Optical fibres – Part 1-46: Measurement methods and test procedures –  
124 Monitoring of changes in optical transmittance*

#### 125 **3 Terms and definitions**

126 For the purposes of this document, the terms and definitions given in IEC 60794-1-1 apply.  
127 ISO and IEC maintain terminological databases for use in standardization at the following  
128 addresses:

- 129
- 130 • IEC Electropedia: available at <http://www.electropedia.org/>
  - 131 • ISO Online browsing platform: available at <http://www.iso.org/obp>

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#### 133 **4 Method E1: Tensile performance**

##### 134 **4.1 Object**

135 This test method applies to optical fibre cables which are tested at a particular tensile strength  
136 in order to examine the behaviour of the attenuation and/or the fibre elongation strain as a  
137 function of the load on a cable which may occur during installation and operation. This method  
138 is intended to be non-destructive.



## 139 4.2 Sample length

140 Length under tension  $\geq 50$  m unless otherwise defined in the relevant specification. For cables  
 141 requiring specialized anchoring devices (e.g. OPGW, all-dielectric self-supporting (ADSS),  
 142 heavy wire armored cables, etc.), the minimum length shall be 25 m.

143 Short lengths in the tensile test will adversely affect the accuracy of the measurement. The  
 144 lengths shown above are the recommended minimum lengths for this test.

145 Total sample length is longer than the length under tension to allow for clamping and connection  
 146 to test equipment.

## 147 4.3 Apparatus

148 The apparatus consists of

149 a) an attenuation measuring apparatus for the determination of attenuation changes  
 150 (see IEC 60793-1-46), and/or a fibre elongation strain measuring apparatus  
 151 (see IEC 60793-1-22, Method C: Fibre elongation);

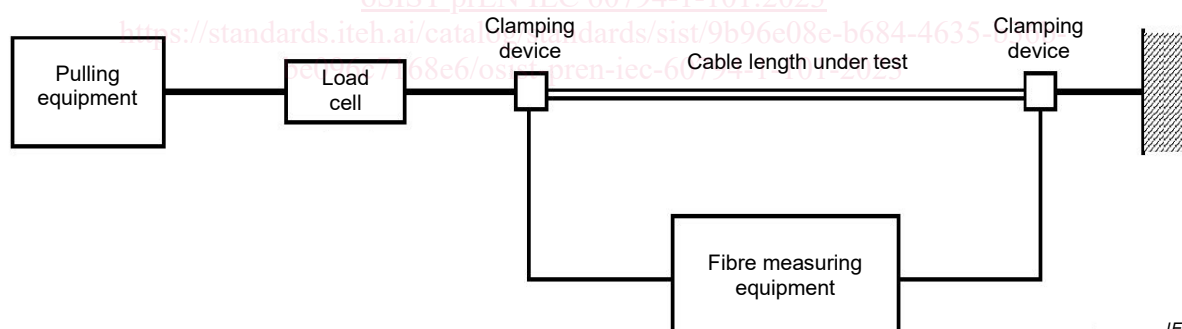
152 b) a tensile strength measuring apparatus which is able to accommodate the minimum length  
 153 to be tested. Transfer devices may be used for testing longer samples under tension  
 154 (see Figure 2). The diameters of sheaves in the transfer device shall be no smaller than the  
 155 minimum bending diameter of the cable under test; for example, 1 m diameter;

156 c) a load cell with a maximum error of  $\pm 3$  % of its maximum range;

157 d) a clamping device to secure all cable components at the ends of the length under test: care  
 158 should be taken that the specific method of capturing the cable components does not affect  
 159 the results. A mandrel is frequently an appropriate device, with a diameter for example 1  
 160 m, but not less than the minimum bending diameter specified for the cable;

161 e) if required, mechanical or electrical means for measuring the cable load or elongation, per  
 162 the detail specification shall be provided.

163 Examples of suitable apparatus are shown in Figure 1 and Figure 2.

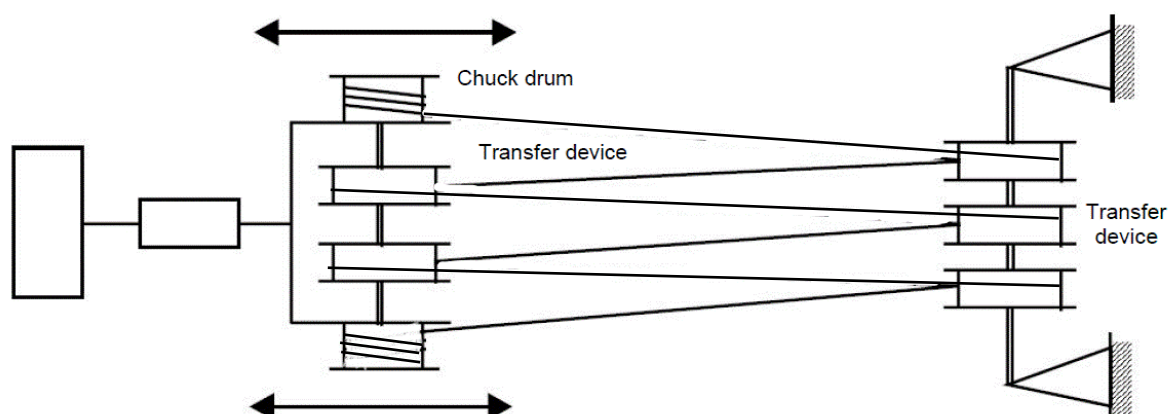


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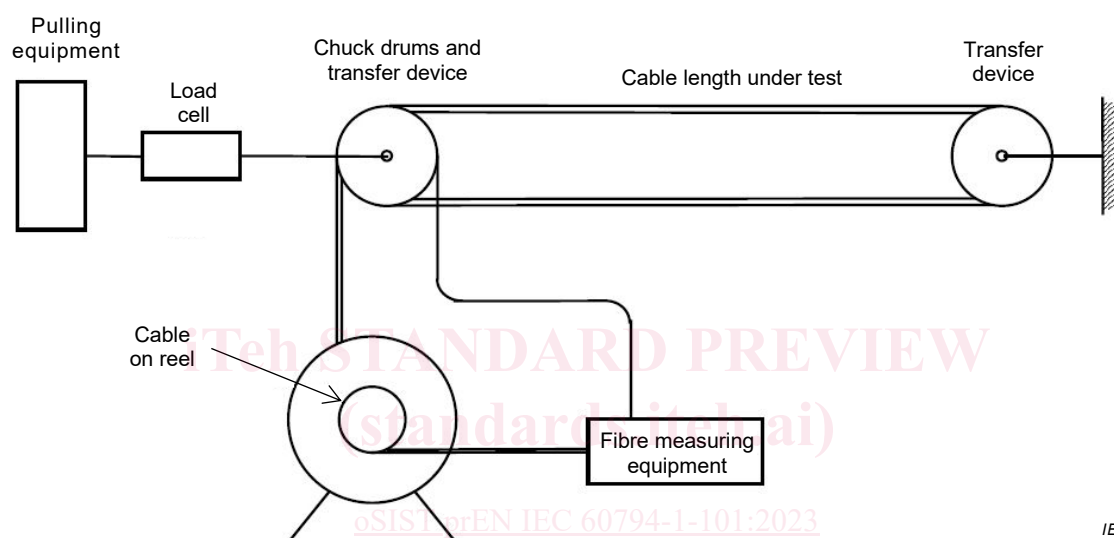
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**Figure 1 – Tensile performance measuring apparatus**

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#### 171 4.4 Procedure

##### 172 4.4.1 General requirements and preparation

173 a) Unless otherwise specified, the conditions for testing shall be in accordance with the  
174 expanded test conditions as defined in IEC 60794-1-2.

175 b) Cable should be loaded into tensile apparatus and cable ends should be secured in such a  
176 way that all cable components, including fibres, are restricted in movement and no slippage  
177 occurs. For most cable constructions (e.g. stranded type cables), clamping on cable  
178 elements, except the fibres, is practical and sufficient to obtain attenuation changes and/or  
179 both the maximum allowable pulling load and the strain margin of the cable. However, for  
180 certain cable constructions (e.g. single loose tube), it may be necessary to prevent the  
181 fibres from slipping in order to obtain the correct strain margin figures.

182 For aerial cable types, if required by the detail specification, the fixing of the cable may be  
183 made by means of the anchoring devices relevant to the type of cable considered. For  
184 certain heavily armoured cables, a clamping device involving a stocking grip or similar  
185 anchoring device may be used.

186 c) Connect the test fibre of the cable under tensile test to the measurement apparatus. For  
187 the pulse delay (time of flight) technique of Method C of IEC 60793-1-22:2001, care shall  
188 be taken that, during the pulling of the sample, the reference length does not change.

Figure 2 – Example of tensile performance measuring apparatus using transfer devices and chuck drums

IEC