



SLOVENSKI STANDARD
oSIST prEN IEC 60794-1-104:2023
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Optični kabli - 1-104. del: Splošna specifikacija - Osnovni preskusni postopki za optične kable - Mehanska preskusna metoda - Vpliv, metoda E4

Optical fibre cables - Part 1-104: Generic specification - Basic optical cable test procedures - Mechanical tests method - Impact, method E4

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Câbles à fibres optiques - Partie 1-104: Spécification générique - Procédures fondamentales d'essais des câbles optiques - Méthode d'essai mécanique - Choc, méthode E4

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TITLE:

Optical fibre cables - Part 1-104: Generic specification - Basic optical cable test procedures - Mechanical tests method - Impact, method E4

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRE CABLES –

**Part 1-104: Generic specification –
Basic optical cable test procedures –
Mechanical test method– Impact, method E4**

FOREWORD

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IEC 60794-1-104 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This first edition cancels and replaces Method E4 of IEC 60794-1-21:2015, which will be withdrawn.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

71
72 Full information on the voting for its approval can be found in the report on voting indicated in
73 the above table.

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

75 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
76 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
77 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
78 described in greater detail at www.iec.ch/standardsdev/publications.

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

- 82 • reconfirmed,
- 83 • withdrawn,
- 84 • replaced by a revised edition, or
- 85 • amended.

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INTRODUCTION

This document cancels and replaces test method E4 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 1-104: Generic specification – Basic optical cable test procedures – Mechanical test method– Impact, method E4

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100 **1 Scope**

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

104 The object of this standard is to define test procedures to be used in establishing uniform
105 requirements for mechanical performance- impact.

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

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

110 **2 Normative references**

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

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

116 IEC 60794-1-2, *Optical fibre cables – Part 1-2: Generic specification – Cross reference table
117 for optical cable test procedures*

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

120 **3 Terms and definitions**

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

124

125 • IEC Electropedia: available at <http://www.electropedia.org/>

126 • ISO Online browsing platform: available at <http://www.iso.org/obp>

127

128 **4 Method E4: Impact**

129 **4.1 Object**

130 The purpose of this test is to determine the ability of an optical fibre cable to withstand impact.

131 **4.2 Sample**

132 **4.2.1 Sample length**

133 The sample length shall be sufficient to carry out the specified test. When only physical damage
134 is to be evaluated, the length may range from 1 m (i.e., small diameter jumper cords or duplex
135 cables) to 5 m (i.e., larger diameter cables). Longer lengths may be necessary to permit optical
136 measurements.

137 **4.2.2 Termination**

138 The sample shall be terminated at each end in a connector, or in a manner such that the fibres,
139 sheathings and any strain members are clamped together in a representative manner. Clamps
140 on the impact apparatus may be used, or the sample may be long enough so that no restraint
141 is needed.

142 **4.3 Apparatus**

143 The apparatus shall allow an impact to be imparted to the cable sample which is fixed to a flat
144 steel base which is solidly mounted such that no visual motion is detected during test. When a
145 single or only a few impacts are required, a suitable apparatus, as shown in Figure 1a, is used.
146 This allows a hammer with the required weight to drop vertically onto a piece of steel which
147 transmits the impact to the cable sample. When repeated impacts are required (say, more than
148 five), a more practical apparatus, as shown in Figure 1b, is used, which allows multiple impacts
149 by a drop hammer. The apparatus shall be arranged to impart minimal friction to the moving
150 hammer.

151 NOTE This issue of friction has been found to be a particular problem when the apparatus is used at temperature
152 extremes.

153 In both cases, other equivalent apparatus may also be used.

154 The striking surface shall either be flat or have a curved surface with curvature radius of no
155 less than 300 mm. If using a flat striking surface, the edges of the face shall be curved to avoid
156 a stress concentration riser, Figure 1c, detail B. If using a 300 mm curvature radius striking
157 surface, then the surface may also be a spherical segment, as shown in Figure 1c, detail A,
158 since for such a large curvature radius this gives an equivalent test method to that when using
159 a rounded cylinder.

160 The radius on the edge on the flat striking surface and on the 300 mm curvature radius striking
161 surface shall be approximately 0,5 mm.

162 The apparatus shall include any optical test equipment needed to measure the changes in
163 optical performance as required in the detail specification, and specified in Method A
164 (Transmitted power) of IEC 60793-1-46.

165 **4.4 Procedure**

166 Unless otherwise specified, the conditions for testing shall be in accordance with standard
167 atmospheric conditions as defined in IEC 60794-1-2.

168 The mass of the drop hammer and the height from which it falls shall be adjusted to give the
169 value of impact energy shown in the detail specification. The number and rate of impacts, and
170 their location on the sample shall be as specified in the detail specification. For more than one
171 impact, the location of each impact is to be at different places on the cable sample typically
172 spaced not less than 500 mm apart.

173 **4.5 Requirements**

174 The acceptance criteria for the test shall be as stated in the detail specification. Typical failure
175 modes include loss of optical continuity or change in attenuation beyond specified value and
176 physical damage to the cable that does not affect the function of the cable.

177 **4.6 Details to be specified**

178 The detail specification shall include the following:

- 179 a) number of impacts;
- 180 b) impact energy;
- 181 c) test temperature;
- 182 d) radius of the striking surface if other than specified herein;
- 183 e) frequency of multiple impacts (if any);
- 184 f) location of impacts on the sample;

185 g) if optical continuity or change in attenuation is to be measured.

186

187 **4.7 Details to be reported**

188 The test report shall include all the information given in 4.6 and, where applicable, the following:

189 a) detailed description of sample (cable type);

190 b) length of sample;

191 c) type of fixing all cable elements at both ends, if any;

192 d) number of samples;

193 e) description of the test set-up;

194 f) description of the optical measurement equipment;

195 g) preconditioning procedure, if any.

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