



SLOVENSKI STANDARD
oSIST prEN IEC 60127-7:2024
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Miniaturne varovalke - 7. del: Miniaturni taljivi vložki za posebne namene

Miniature fuses - Part 7: Miniature fuse-links for special applications

Geräteschutzsicherungen - Teil 7: G-Sicherungseinsätze für besondere Anwendungen

Coupe-circuit miniatures - Partie 7: Eléments de remplacement miniatures pour applications spéciales

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Varovalke in druga
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Fuses and other overcurrent
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TITLE: Miniature fuses - Part 7: Miniature fuse-links for special applications
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NOTE FROM TC/SC OFFICERS:

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Miniature fuses - Part 7: Miniature fuse-links for special application

1 Scope

This part of IEC 60127 covers requirements for miniature fuse-links for special applications.

This part of IEC 60127 is applicable to fuse-links with a rated voltage not exceeding 1 000 V, a rated current not exceeding 125 A and a rated breaking capacity not exceeding 50 kA.

Note: Nominal currents above 20A are intended for protection of low power electric devices at low voltage and not for energy distribution.

It does not apply to fuses completely covered by the subsequent parts of IEC 60269-1.

It does not apply to miniature fuse-links for appliances intended to be used under special conditions, such as in corrosive or explosive atmospheres.

This part of IEC 60127 applies in addition to the requirements of IEC 60127-1.

Miniature fuse-links for special applications are not intended to be replaced by the end-user of an electrical / electronic appliance.

The object of this part of IEC 60127 is to establish uniform test methods for miniature fuse-links for special applications, so as to allow verification of the values (for example melting time and breaking capacity values) specified by the manufacturer.

2 Normative references

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

IEC 60068-2-21:2021, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60127-1:2023, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60127-4:20XX, *Miniature fuses – Part 4: Universal modular fuse-links (UMF) – Through-hole and surface mount types*

IEC 60127-6:2023, *Miniature fuses – Part 6: Fuse-holders for miniature fuse-links*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-12:2021, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

37 IEC 60695-2-13:2021, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods –*
 38 *Glow-wire ignition temperature (GWIT) test method for materials*
 39

40 IEC 60695-4:2021, *Fire hazard testing – Part 4: Terminology concerning fire tests for*
 41 *electrotechnical products*

42 IEC 61249-2-7:2002, *Materials for printed boards and other interconnecting structures – Part*
 43 *2-7: Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of*
 44 *defined flammability (vertical burning test), copper-clad*

45
 46 IPC 7351B: 2010 Generic requirements for surface mount design and land pattern standard
 47

48 ISO 3:1973, *Preferred numbers – Series of preferred numbers*

49 **3 Terms and definitions**

50 For the purposes of this document, the terms and definitions given in Clause 3 of IEC 60127-
 51 1:2023, except 3.5, as well as the following apply.

52 **3.1** 53 **miniature fuse-link for special applications**

54 enclosed fuse-link which is not covered in IEC 60127-2, IEC 60127-3 or IEC 60127-4 and of
 55 rated breaking capacity not exceeding 50 kA, with a width and height not exceeding 12 mm and
 56 a length not exceeding 50 mm

57 Note 1 to entry: Special precautions may be necessary to ensure that the fuse-links will be replaced by a fuse-link
 58 with the same technical parameters.

59 Note 2 to entry: For fuse-links having a metallic cap at each end, any member of terminals or terminations other
 60 than the metallic cap such as wire terminations, pins and bolt-in contacts may not be included in the total length of
 61 50 mm and the width and height of 12 mm.

62 **3.2**

63 **t_1 to t_8**

64 limit values for time/current characteristic

65 **3.3**

66 **I_{70}**

67 test current for testing at elevated temperature of 70 °C

68 Note 1 to entry: Preferred values are 0,8 I_N or 1,0 I_N or 1,1 I_N .

69 **3.4**

70 **$I_{\text{test}} \text{ (A)}$**

71 test current for endurance testing according to method A

72 Note 1 to entry: Preferred values are 1,0 I_N or 1,05 I_N or 1,2 I_N .

73 **3.5**

74 **$I_{\text{test}} \text{ (B)}$**

75 test current for endurance testing according to method B

76 Note 1 to entry: Preferred values are 0,8 I_N or 1,0 I_N .

77 **3.6**

78 **$I_{\text{OVL}} \text{ (A)}$**

79 test current for measuring the maximum sustained dissipation according to method A

80 Note 1 to entry: Preferred values are $1,0 I_N$ or $1,25 I_N$ or $1,35 I_N$ or $1,5 I_N$. $1,0 I_N$ is allowable only for nominal currents above
81 20 A.

82 **3.7**

83 **I_{ovL} (B)**

84 test current for measuring the maximum sustained dissipation according to method B

85 Note 1 to entry: Preferred values are $1,0 I_N$ or $1,25 I_N$.

86 **4 General requirements**

87 Clause 4 of IEC 60127-1:2006 applies.

88 **5 Standard ratings**

89 Clause 5 of IEC 60127-1:2006 does not apply.

90 *Replacement:*

91 The following ratings shall be agreed upon between the testing house and the manufacturer:

- 92 – rated voltage;
- 93 – rated current (see standard sheet 1 for preferred ratings);
- 94 – rated breaking capacity (a.c. and/or d.c.);
- 95 – time/current characteristic (at least at $2,0 I_N$ or $2,1 I_N$ and $10 I_N$).

96 The following may be agreed upon on an optional basis:

- 97 – test at elevated temperature;
- 98 – time/current characteristic (additionally at $2,75 I_N$ and $4 I_N$).

99 Any additional specified values are given in standard sheet 1.

100 **6 Marking**

101 Clause 6 of IEC 60127-1:2006 applies except as follows.

102 **6.1**

103 *Replacement:*

104 d) Not applicable.

105 NOTE A symbol denoting the time/current characteristic cannot be stated, because this part of IEC 60127 does not
106 specify any values for this parameter.

107 *Addition:*

108 e) Type designation.

109 f) Rated breaking capacity in amperes (A) or in kilo amperes (kA).

110 **6.2**

111 *Deletion of NOTE 2.*

112 6.3

113 *Addition after first paragraph:*

114 Furthermore the rated breaking capacity in amperes (A) or in kilo amperes (kA) shall be marked
115 on the package label.

116 6.4

117 *Addition of heading title and replacement of text:*

118 6.4 Colour coding for miniature fuse-links for special applications

119 Marking of fuse-links by means of colour bands according to IEC 60127-1:2006, Annex A, is
120 not permitted. It is, however, possible to use colour markings that clearly differ from this colour
121 band system. In this case, the manufacturer shall provide the relevant information, for example
122 colour key.

123 *Additional subclause:*

124 **6.101** Where marking is impracticable due to space limitations, the relevant information should
125 appear on the smallest package and in the manufacturer's technical literature.

126 7 General notes on tests

127 Clause 7 of IEC 60127-1:2006 applies except as follows.

128 7.2 Type tests**129 7.2.1**

130 *Replacement:*

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131 For testing the individual current ratings of fuses with a.c. or d.c. breaking capacity, the number
132 of fuse-links required is 51, of which 12 are kept as spares. For fuse-links with wire terminations
133 six extra samples (E1 to E6) have to be taken by random and not sorted according to voltage
134 drop. If necessary, these samples can be used as additional spares after performing the tests
135 according to 8.3.

136 The testing schedule is shown in Table 2.

137 For testing the individual current ratings of fuses with a.c. and d.c. breaking capacity, the
138 number of fuse-links required is 63, of which 9 are kept as spares. For fuse-links with wire
139 terminations six extra samples (E1 to E6) have to be taken by random and not sorted according
140 to voltage drop. If necessary, these samples can be used as additional spares after performing
141 the tests according to 8.3. The testing schedule is shown in Table 3.

142 For testing the maximum ampere rating of a homogenous series with a.c. or d.c. breaking
143 capacity the number of fuse-links required is 51, of which 22 are kept as spares. For fuse-links
144 with wire terminations six extra samples (E1 to E6) have to be taken by random and not sorted
145 according to voltage drop. If necessary, these samples can be used as additional spares after
146 performing the tests according to 8.3.

147 The testing schedule is shown in Table 4.

148 For testing the maximum ampere rating of a homogenous series with a.c. and d.c. breaking
149 capacity the number of fuse-links required is 66, of which 32 are kept as spares. For fuse-links

150 with wire terminations six extra samples (E1 to E6) have to be taken by random and not sorted
151 according to voltage drop. If necessary, these samples can be used as additional spares after
152 performing the tests according to 8.3.

153 The testing schedule is shown in Table 5.

154 For testing the minimum ampere rating of a homogenous series with a.c. and / or d.c. breaking
155 capacity the number of fuse-links required is 38, of which 16 are kept as spares.

156 The testing schedule is shown in Table 6.

157 For testing all of the intermediate ampere rating of a homogenous series with a.c. and / or d.c.
158 breaking capacity the number of fuse-links required is 38, of which 16 are kept as spares.

159 The testing schedule is shown in Table 7.

160 7.3 Fuse-bases for tests

161 *Addition after first paragraph:*

162 For fuse-links designed for use in a special type of fuse-holder, testing shall be performed in
163 that fuse-holder. Fuse-holder information shall be supplied to users in manufacturer's literature.

164 For tests that require a printed circuit board for mounting and connection of the fuse-links, a
165 test board according to Figure 1 or Figure 2 shall be used.

166 The test board according to Figure 1 shall be used for fuse links with wire terminations intended
167 for insertion in suitably designed holes or sockets.

168 The test board according to Figure 2 shall be used for surface mount fuse-links. The test board
169 shall be made of epoxide woven glass fabric copper-clad laminated sheet, as defined in
170 IEC 61249-2-7. The manufacturer must declare the PCB parameters and provide assembled
171 PCBs for the tests.

171 When two or more fuse-links are tested in series, the fuse-bases shall be located so that there
172 will be a spacing of not less than 50 mm between any two fuse-links under testing. The
173 conductor connecting the fuse-bases together, and connecting the fuse-bases to the ammeter
174 and the source of supply shall be insulated copper wire. The length of each conductor shall be
175 500 mm. The cross-sectional area of the wire shall be according to Table 8.

176 Table 8 – Cross-sections of conductors

Rated current A	Copper conductor cross section mm ²
Up to and including 5	1
More than 5, and up to and including 10	1.5
More than 10, and up to and including 16	2.5
More than 16, and up to and including 25	4
More than 25, and up to and including 35	6
More than 35, and up to and including 60	35

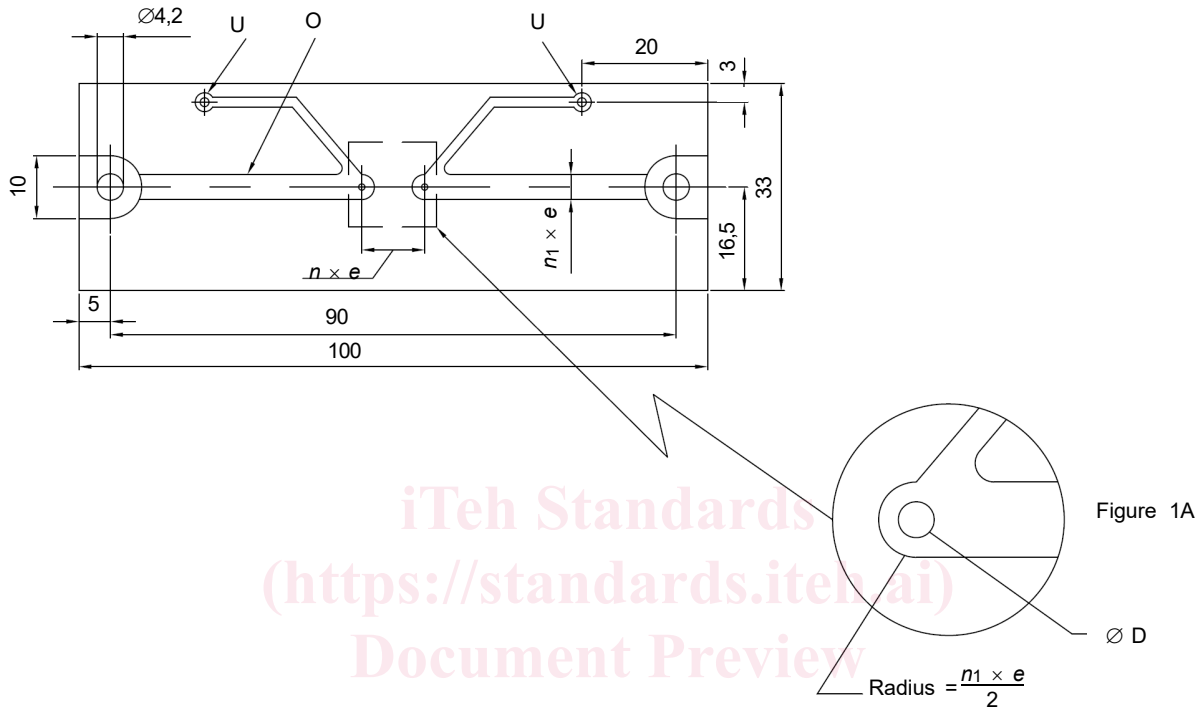
More than 60, and up to and including 125	50
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Dimensions in millimetres



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179 **Key**

- 180 O copper layer; thickness 0,035 mm or 0,070 mm
- 181 U connection for voltage drop measurement
- 182 D diameter of 1 mm for rated currents up to and including 6,3 A;
- 183 diameter of 1,5 mm for rated currents exceeding 6,3 A.
- 184 e 2,5 mm
- 185 n_1 1, 2, 3, 4
- 186 n 1, 2, 3 ... (to be adapted depending on the length of the fuse-link)

187 **Figure 1 – Standard test board for fuse-links with wire terminations**

188 This test board shall be mounted on the fuse-base according to Figure 3a.

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