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Part 7: Miniature fuse-links for special applications

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



PROJECT NUMBER: IEC 60127-7 ED3	
DATE OF CIRCULATION: 2023-11-10	CLOSING DATE FOR COMMENTS: 2024-02-02
SUPERSEDES DOCUMENTS: 32C/628/RR	

IEC SC 32C : MINIATURE FUSES	
SECRETARIAT: China	SECRETARY: Mr Jun Cai
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 32B	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY	

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Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

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

NOTE FROM TC/SC OFFICERS:

The texts in red indicate the change compared to the existing IEC 60127-7 Ed2.0.

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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 **120 A*** and a rated breaking capacity not exceeding 50 kA.

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.

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

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 60068-2-21:2006, *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 60695-2-12:2010, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-12:2010/AMD1:2014

37 IEC 60695-2-13:2010, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods –*
38 *Glow-wire ignition temperature (GWIT) test method for materials*
39 IEC 60695-2-13:2010/AMD1:2014

40 IEC 60695-4:2012, *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 ISO 3:1973, *Preferred numbers – Series of preferred numbers*

46 **3 Terms and definitions**

47 For the purposes of this document, the terms and definitions given in Clause 3 of IEC 60127-
48 1:2023, except 3.5, as well as the following apply.

49 **3.1**

50 **miniature fuse-link for special applications**

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

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

56 Note 2 to entry: For fuse-links having a metallic cap at each end, any member of terminals or terminations other
57 than the metallic cap such as wire terminations, pins and bolt-in contacts may not be included in the total length of
58 50 mm and the width and height of 12 mm.

59 **3.2**

60 **t_1 to t_8**

61 limit values for time/current characteristic

62 **3.3**

63 **I_{70}**

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

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

66 **3.4**

67 **I_{test} (A)**

68 test current for endurance testing according to method A

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

70 **3.5**

71 **I_{test} (B)**

72 test current for endurance testing according to method B

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

74 **3.6**

75 **I_{OVL} (A)**

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

77 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 currents above
78 20 A.

79 3.7

80 I_{ovL} (B)

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

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

83 4 General requirements

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

85 5 Standard ratings

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

87 *Replacement:*

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

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

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

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

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

97 6 Marking

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

99 6.1

100 *Replacement:*

101 d) Not applicable.

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

104 *Addition:*

105 e) Type designation.

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

107 6.2

108 *Deletion of NOTE 2.*

6.3

Addition after first paragraph:

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

6.4

Addition of heading title and replacement of text:

6.4 Colour coding for miniature fuse-links for special applications

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

Additional subclause:

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

7 General notes on tests

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

7.2 Type tests**7.2.1**

Replacement:

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

The testing schedule is shown in Table 2.

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

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

The testing schedule is shown in Table 4.

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

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

The testing schedule is shown in Table 5.

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

The testing schedule is shown in Table 6.

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

The testing schedule is shown in Table 7.

7.3 Fuse-bases for tests

Addition after first paragraph:

For fuse-links designed for use in a special type of fuse-holder, testing shall be performed in that fuse-holder.

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

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

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

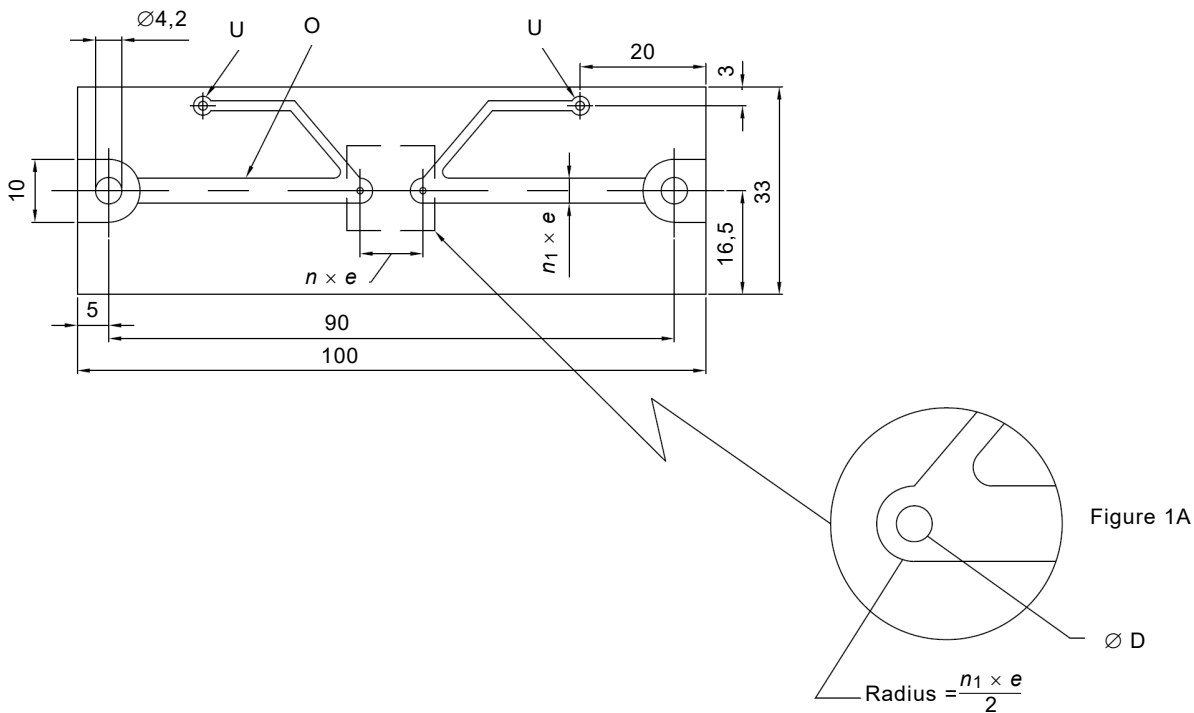
When two or more fuse-links are tested in series, the fuse-bases shall be located so that there will be a spacing of not less than 50 mm between any two fuse-links under testing. The conductor connecting the fuse-bases together, and connecting the fuse-bases to the ammeter and the source of supply shall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

Table 8 – Cross-sections of conductors (Taken and extended from IEC 60127-6)

Rated fuse 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 (to be defined)

More than 60, and up to and including 100	50 (to be defined)
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Dimensions in millimetres



IEC

Key

- O copper layer; thickness 0,035 mm or 0,070 mm
- U connection for voltage drop measurement
- D diameter of 1 mm for rated currents up to and including 6,3 A;
diameter of 1,5 mm for rated currents exceeding 6,3 A.
- e 2,5 mm
- n₁ 1, 2, 3, 4
- n 1, 2, 3 ... (to be adapted depending on the length of the fuse-link)

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

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