



DPC: 23 / 30427815 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 31 October 2023

Origin: International

Latest date for receipt of comments: 20 December 2023

Project No. 2020/02714

Responsible committee: PEL/32 Fuses

Interested committees:

Title: BS EN IEC 60127-9 Miniature fuses

Part 9: Miniature fuse-links for special applications with partial-rangebreaking capacity

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

**WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD.
THIS DRAFT IS NOT CURRENT BEYOND 20 December 2023**

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <http://standardsdevelopment.bsigroup.com>

Responsible Committee Secretary: **Mr Simon Bounds (BSI)**
Direct tel: **0208 996 7281**
E-mail: simon.bounds@bsigroup.com

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
------------------	------------------------

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 60127-9 ED1

DATE OF CIRCULATION:

2023-10-27

CLOSING DATE FOR COMMENTS:

2024-01-19

SUPERSEDES DOCUMENTS:

32C/584/NP, 32C/592/RVN

IEC SC 32C : MINIATURE FUSES

SECRETARIAT:

China

SECRETARY:

Mr Jun Cai

OF INTEREST TO THE FOLLOWING COMMITTEES:

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

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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:

IEC 60127-9/Ed.1: Miniature fuses – Part 9: Miniature fuse-links for special applications with partial-range breaking capacity

NOTE FROM TC/SC OFFICERS:

Copyright © 2023 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

CONTENTS

1		
2	FOREWORD	3
3	INTRODUCTION	4
4	1 Scope	5
5	2 Normative references	5
6	3 Terms and definitions	6
7	4 General requirements	7
8	5 Standard ratings	7
9	6 Marking	8
10	7 General notes on tests	8
11	8 Dimensions and construction	13
12	9 Electrical requirements	14
13	10 Standard sheets	24
14	Annex A (informative) Guidance on ratings to be specified by the manufacturer or to	
15	be agreed upon with the testing house	28
16	Bibliography	29
17		
18	Figure 1 – Standard test board for fuse-links with wire terminations	10
19	Figure 2 – Test board for surface mount fuse-links	11
20	Figure 3 – Test fuse base	12
21	Figure 4 – Test circuits for breaking capacity tests	15
22		
23	Table 1 – Power factor and time constant	16
24	Table 2 – Testing schedule for individual ampere ratings for a.c. or d.c. breaking	
25	capacity fuse-links	19
26	Table 3 – Testing schedule for individual ampere ratings for a.c. and d.c. breaking	
27	capacity fuse-links	20
28	Table 4 – Testing schedule for maximum ampere rating of a homogeneous series (a.c.	
29	or d.c. breaking capacity fuse-links)	21
30	Table 5 – Testing schedule for maximum ampere rating of a homogeneous series (a.c.	
31	and d.c. breaking capacity fuse-links)	22
32	Table 6 – Testing schedule for minimum ampere rating of a homogeneous series	23
33	Table 7 – Testing schedule for all intermediate ampere ratings of a homogeneous	
34	series	23
35	Table A.1 – Guidance on ratings to be specified by the manufacturer or to be agreed	
36	upon with the testing house	28
37		
38		

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MINIATURE FUSES –

Part 9: Miniature fuse-links for special applications with partial-range breaking capacity

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

INTRODUCTION

According to the wish expressed by the users of miniature fuses, all standards, recommendations and other documents relating to miniature fuses should have the same publication number in order to facilitate reference to fuses in other specifications, for example, equipment specifications.

Furthermore, a single publication number and subdivision into parts would facilitate the establishment of new standards, because clauses containing general requirements need not be repeated.

The IEC 60127 series, under the general heading *Miniature fuses*, is thus subdivided as follows:

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

IEC 60127-2, *Miniature fuses – Part 2: Cartridge fuse-links*

IEC 60127-3, *Miniature fuses – Part 3: Sub-miniature fuse-links*

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

IEC 60127-5, *Miniature fuses – Part 5: Guidelines for quality assessment of miniature fuse-links*

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

IEC 60127-7, *Miniature fuses – Part 7: Miniature fuse-links for special applications*

IEC 60127-8, *Miniature fuses – Part 8: Fuse resistors with particular overcurrent protection*

IEC 60127-9, *Miniature fuses – Part 9: Miniature fuse-links for special applications with partial-range breaking capacity*

IEC 60127-10, *Miniature fuses – Part 10: User guide for miniature fuses*

MINIATURE FUSES –

Part 9: Miniature fuse-links for special applications with partial-range breaking capacity

1 Scope

This part of IEC 60127 covers requirements for miniature fuse-links for special applications with partial-range breaking capacity.

This part of IEC 60127 is applicable to fuse-links with a rated voltage not exceeding 1 000 V, a rated current not exceeding 40 A and a rated breaking capacity not exceeding 50 kA.

Miniature fuse-links with partial-range breaking capacity are used only to operate under short circuit conditions. They cannot be applied under overload conditions.

This part of IEC 60127 does not apply to fuses completely covered by IEC 60127-7 as well as 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 with partial-range breaking capacity 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 with partial-range breaking capacity, 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 60068-2-21:2006, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60127-1:2006, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60127-1:2006/AMD1:2011

IEC 60127-1:2006/AMD2:2015

IEC 60127-4:2005, *Miniature fuses – Part 4: Universal modular fuse-links (UMF) – Through-hole and surface mount types*

IEC 60127-4:2005/AMD1:2008

IEC 60127-4:2005/AMD2:2012

IEC 60127-6:2014, *Miniature fuses – Part 6: Fuse-holders for miniature fuse-links*

IEC 60664-1:2007, *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

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

IEC 60695-4:2012, *Fire hazard testing – Part 4: Terminology concerning fire tests for electrotechnical products*

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in Clause 3 of IEC 60127-1:2006, except 3.5, as well as the following apply.

Note 1 to entry:

ISO and IEC maintain terminological databases for use in standardization are at the following addresses:

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

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

3.1

miniature fuse-link for special applications with partial-range breaking capacity

enclosed fuse-link which is not covered in IEC 60127-2, IEC 60127-3, IEC 60127-4 or IEC 60127-7 and of rated breaking capacity not exceeding 50 kA, with a width and height or diameter not exceeding 12 mm and a length not exceeding 50 mm

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

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

3.2

t_1 to t_6

limit values for time/current characteristic

3.3

I_{70}

test current for testing at elevated temperature of 70 °C

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

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

test current for endurance testing according to method A

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

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

test current for endurance testing according to method B

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

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

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

Note 1 to entry: Preferred values are $1,25 I_N$ or $1,35 I_N$ or $1,5 I_N$.

3.7 **I_{OVL} (B)**

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

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

3.8**minimum breaking current I_{min}**

minimum value of prospective current that a fuse-link is capable of breaking at a stated voltage under prescribed conditions of use and behaviour and that is defined as:

$$2,1 I_N < I_{\text{min}} \leq 4 I_N$$

Note 1 to entry:

The value of I_{min} is defined by the manufacturer.

4 General requirements

Clause 4 of IEC 60127-1:2006 applies.

5 Standard ratings

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

Replacement:

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

- rated voltage;
- rated current (see standard sheet 1 for preferred ratings);
- rated breaking capacity (a.c. and/or d.c.);
- minimum breaking current I_{min}
- time/current characteristic

The following may be agreed upon on an optional basis:

- test at elevated temperature;

228 – time/current characteristic (additional optional currents not required or defined by this
229 standard).

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

231 **6 Marking**

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

233 **6.1**

234 *Replacement:*

235 d) Not applicable.

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

238 *Addition:*

239 e) Type designation.

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

241 g) minimum breaking current.

242 **6.2**

243 *Deletion of NOTE 2.*

244 **6.3**

245 *Addition after first paragraph:*

246 Furthermore the rated breaking capacity in amperes (A) or in kilo amperes (kA) shall be
247 marked on the package label as well as the minimum breaking current (I_{min}).

248 **6.4**

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

250 **6.4 Colour coding for miniature fuse-links for special applications**

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

255 *Additional subclause:*

256 **6.101** Where marking is impracticable due to space limitations, the relevant information
257 should appear on the smallest package and in the manufacturer's technical literature.

258 **7 General notes on tests**

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