

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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

**Coupe-circuits miniatures –  
Partie 1: Définitions pour coupe-circuits miniatures et exigences générales pour  
éléments de remplacement miniatures**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2023 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

---

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Recherche de publications IEC -

##### [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Miniature fuses –**

**Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links**

**Coupe-circuits miniatures –**

**Partie 1: Définitions pour coupe-circuits miniatures et exigences générales pour éléments de remplacement miniatures**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 29.120.50

ISBN 978-2-8322-7639-6

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	4
1 Scope and object.....	7
2 Normative references .....	7
3 Terms and definitions .....	8
4 General requirements .....	11
5 Standard ratings .....	12
6 Marking .....	12
7 General notes on tests .....	13
7.1 General.....	13
7.2 Atmospheric conditions for testing .....	13
7.3 Type tests .....	13
7.4 Fuse-bases for tests .....	14
7.5 Nature of supply.....	14
8 Dimensions and construction .....	14
8.1 Dimensions .....	14
8.2 Construction .....	14
8.3 Terminations .....	14
8.4 Alignment and configuration of terminations.....	15
8.5 Soldered joints.....	15
9 Electrical requirements .....	15
9.1 Voltage drop .....	15
9.2 Time/current characteristic.....	15
9.2.1 Time/current characteristic at normal ambient temperature .....	15
9.2.2 Test at elevated temperature .....	16
9.2.3 Test procedure .....	16
9.2.4 Presentation of results .....	16
9.3 Breaking capacity .....	17
9.3.1 General .....	17
9.3.2 Operating conditions.....	17
9.3.3 Criteria for satisfactory performance .....	18
9.3.4 Insulation resistance.....	18
9.3.5 Type test for fuse-links of homogeneous series .....	18
9.4 Endurance tests .....	18
9.5 Maximum sustained dissipation.....	19
9.6 Not applicable.....	19
9.7 Fuse-link temperature .....	19
Annex A (informative) Colour coding for miniature fuse-links.....	20
Annex B (informative) Example presentations of time/current characteristic.....	22
Annex C (informative) Audit testing and surveillance – Guidelines for the application of the principles of IEC 60303 (CB-FCS) to miniature fuse-links .....	24
C.1 Overview.....	24
C.2 General.....	24
C.3 Properties of miniature fuse-links .....	24
C.4 Different types of fuse-links.....	25
C.4.1 General .....	25
C.4.2 Time/current characteristics.....	25

C.4.3	Breaking capacity .....	26
C.4.4	Cartridge fuse-links (IEC 60127-2).....	26
C.4.5	Sub-miniature fuse-links (IEC 60127-3) .....	27
C.4.6	Universal Modular Fuse-links (IEC 60127-4) .....	27
C.4.7	Miniature fuse-links for special applications (IEC 60127-7) .....	28
C.5	Applications .....	29
C.5.1	Applications – Fuse-link selection criteria .....	29
C.5.2	Electrical criteria.....	29
C.5.3	Mechanical/physical dimensions .....	29
C.6	Protection by $I^2t$ limitation and pulse operation .....	30
C.6.1	$I^2t$ value .....	30
C.6.2	Pulse operation .....	30
C.6.3	$I^2t$ limitation.....	30
C.7	Direct current (DC) applications .....	31
C.7.1	General information .....	31
C.7.2	Battery circuits.....	31
C.7.3	Inductive load circuits .....	31
C.8	Fuse-holders.....	31
C.8.1	Features .....	31
C.8.2	Safety aspects.....	31
C.8.3	Selection of a fuse-holder .....	32
C.8.4	Exchange of fuse-links under load .....	32
C.9	Performance on extra-low voltages .....	32
C.10	Influence of ambient temperature.....	33
	Bibliography.....	35
	Figure A.1 – Layout of colour bands.....	20
	Figure B.1 – Example presentation of time/current characteristic, ratio 2:1 .....	22
	Figure B.2 – Example presentation of time/current characteristic, ratio 3:1 .....	23
	Figure C.1 – Example of power dissipation $P$ and voltage drop $U$ according to rated current $I_N$ .....	33
	Figure C.2 – Example of the re-rating of the fuse-link rated current.....	34
	Table 1 – Prospective current/Breaking Capacity Tolerance.....	17
	Table A.1 – Colour coding for miniature fuse-links .....	21
	Table C.1 – Summary of IEC 60127-2 Standard Sheets .....	26
	Table C.2 – Summary of IEC 60127-3 Standard Sheets .....	27
	Table C.3 – Summary of IEC 60127-4 Standard Sheets .....	27
	Table C.4 – Summary of IEC 60127-7 Standard Sheet.....	28

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## MINIATURE FUSES –

**Part 1: Definitions for miniature fuses and  
general requirements for miniature fuse-links**

## 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.

IEC 60127-1 has been prepared by subcommittee 32C: Miniature fuses, of IEC technical committee 32: Fuses. It is an International Standard.

This third edition cancels and replaces the second edition published in 2006, Amendment 1:2011 and Amendment 2:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) modification of 6.3 to clarify the marking items;
- b) modification of 9.3.1 to introduce a tolerance for the prospective current for the breaking capacity test;
- c) deletion of contents of 9.6, Pulse test;
- d) deletion of Annex C;
- e) addition of new Annex C user guide for miniature fuse-links.

The text of this International Standard is based on the following documents:

Draft	Report on voting
32C/615/FDIS	32C/624/RVD

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

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

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

A list of all parts in the IEC 60127 series, published under the general title *Miniature fuses*, can be found on the IEC website.

This Part 1 of the IEC 60127 series covers definitions, general requirements and tests applicable to all types of miniature fuses (e.g. cartridge fuse-links, sub-miniature fuse-links, universal modular fuse-links and miniature fuse-links for special applications). All subsequent parts of the complete series are to be read in conjunction with this Part 1.

IEC 60127 consists of the following parts:

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, (free for further documents)

IEC 60127-10, Moved to IEC 60127-1 as Annex C.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.