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BS EN
60127-5 : 1991

# Miniature fuses

## Part 5. Guide for the quality assessment of miniature fuse-links

This European Standard EN 60127-5 : 1991 has the status of a British Standard

Coupe-circuit miniatures
Cinquième partie: Directives pour l'évaluation de la qualité des éléments de remplacement miniatures

Geräteschutzsicherungen
Teil 5: Leitlinien für die Gütebestätigung von G-Sicherungseinsätzen

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British Standards

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This British Standard was published under the authority of the Standards Board and comes into effect on 30 August 1991

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# National foreword

This British Standard has been prepared under the direction of the Power Electrical Engineering Standards Policy Committee and is the English language version of EN 60127-5 'Miniature fuses. Part 5 : Guidelines for quality assessment of miniature fuse-links' which endorses IEC 127-5 : 1988 'Miniature fuses. Part 5 : Guidelines for quality assessment of miniature fuse-links' published by the International Electrotechnical Commission (IEC).

This British Standard is one of a series. Together the standards supersede BS 4265 which is withdrawn. The new standards are as follows.

BS EN 60127-1 Definitions for miniature fuses and general requirements for miniature fuse-links
BS EN 60127-2 Specification for cartridge fuse-links
BS EN 60127-3 Specification for sub-miniature fuse-links
BS EN 60127-5 Guide for the quality assessment of miniature fuse links

It is anticipated that when IEC 127-4 and IEC 127-6 are published they will be approved by CENELEC as EN 60127-4 and EN 60127-6 respectively.
IEC 127-4 TTD : 1989 is identical with DD 183 : 1989 'Specification for universal modular fuses'.

The foreword and preface of IEC 127-5 : 1988 which do not form part of the text of EN 60127-5 have been quoted in national appendix NA.

Annexes designated 'normative' are part of the body of the standard. Annexes designated 'informative' are given for information only. National appendices are designated 'informative'.

For the purposes of this British Standard, any references to IEC page numbers in the text should be ignored.

**Cross-references**. Details of international standards quoted in this British Standard for which there is an identical or technically equivalent British Standard are given in national appendix NC.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

# EN 60127-5

April 1991

UDC 621.316.923-18 : 658.562

Supersedes HD 109.5 S1 : 1989

Descriptors: Miniature fuse, quality assessment, type test, lot-by-lot inspection, acceptance criteria

English version

# Miniature fuses
# Part 5 : Guidelines for quality assessment of miniature fuse-links

(IEC 127-5 : 1988)

Coupe-circuit miniatures
Cinquième partie: Directives pour l'évaluation de la qualité des éléments de remplacement miniatures
(CEI 127-5 : 1988)

Geräteschutzsicherungen
Teil 5: Leitlinien für die Gütebestätigung von G-Sicherungseinsätzen
(IEC 127-5 : 1988)

This European Standard was approved by CENELEC on 15 March 1991. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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## Foreword

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 127-5 : 1988 could be accepted without textual changes, has shown that no CENELEC common modifications were necessary for the acceptance as European Standard. The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 60127-5 on 15 March 1991.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1992-03-01
- latest date of withdrawal of conflicting national standards (dow) 1992-03-01

For products which have complied with HD 109.5 S1 : 1989 before 1992-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1997-03-01.

## Endorsement notice

The text of the International Standard IEC 127-5 : 1988 was approved by CENELEC as a European Standard without any modification.

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# MINIATURE FUSES

## Part 5: Guidelines for quality assessment of miniature fuse-links

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 new IEC 127 series is thus subdivided as follows:

IEC 127 : Miniature fuses (general title).
IEC 127-1 : Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links.

IEC 127-2 : Part 2: Cartridge fuse-links.
IEC 127-3 : Part 3: Sub-miniature fuse-links.
IEC 127-4 : Part 4: Universal modular fuse-links.
IEC 127-5 : Part 5: Guidelines for quality assessment of miniature fuse-links.

IEC 127-6 : Part 6: Fuse-holders (until now IEC 257).
IEC 127-7 : (Free for further documents.)
IEC 127-8 : (Free for further documents.)
IEC 127-9 : Part 9: Test-holders and test-circuits.
IEC 127-10: Part 10: User guide.

### 1. Scope

This standard gives a guide for tests for assessing the quality of miniature fuse-links other than type tests, for the case where there is no complete agreement between the user and the manufacturer on what such tests should be.

### 2. Object

To provide guidelines and limits generally acceptable for quality control purposes by large scale users and manufacturers of miniature fuse-links. This standard has validity for large scale series with lot sizes of 10 000 and more. It is also applicable for smaller lot sizes, if necessary.

Periodic inspections by reduced type tests (Clause 6) are intended to be carried out periodically in order to ensure that the level of technical performance previously verified by complete type tests as given in subsequent parts of IEC 127 is maintained. The frequency of periodic inspections in relation to lot-by-lot inspections is not established in this standard.

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## 3. Reference documents

| | |
|---|---|
| (IEC 127: | Miniature fuses.) |
| IEC 127-1 (1988): Part 1: | Definitions for miniature fuses and general requirements for miniature fuse-links. |
| IEC 127-2: Part 2: | Cartridge fuse-links. (In preparation.) |
| IEC 127-3 (1988): Part 3: | Sub-miniature fuse-links. |
| IEC 127-4: Part 4: | Universal modular fuse-links. (Under consideration.) |
| IEC 410 (1973): | Sampling plans and procedures for inspection by attributes. |
| IEC 419 (1973): | Guide for the inclusion of lot-by-lot and periodic inspection procedures in specifications for electronic components (or parts). |
| IEC Guide 102 (1979): | Specification structures for the quality assessment of electronic components. |

## 4. Lot-by-lot inspection

### 4.1 *Test conditions*

The sample appropriate to the acceptable quality level (AQL) and the inspection level shall be as designated in IEC 410.

### 4.2 *Non-destructive tests*

TABLE I

*Primary characteristics (inspection level II)*
*(Samples may be returned to the lot after inspection)*

| Category | Test | Sub-clause of IEC 127-1 | Classification of defects | | AQL | |
|---|---|---|---|---|---|---|
| | | | Major | Minor | Each defect | Total/ category |
| Marking | Fuse-links<br>Colour codes | 6.1<br>6.4 | × | — | 0.25 | — |
| Mechanical | Terminations* | 8.3 | × | — | 0.25 | 0.65 |
| | Alignment | 8.4 | × | — | | |
| | Dimensions | 8.1 | × | — | | |
| | Cracked insulation (visible) | — | × | — | | |
| Electrical continuity | Cold resistance** | | × | — | 0.25 | |

* Without being immersed in water.

** Limiting values given by the manufacturer and based upon voltage drop measured in accordance with Sub-clause 9.1 of IEC 127-1 but with a current not greater than 10% of the rated current of the fuse.

*Note.* – If defective units are found in any category which will also result in a defective status in another category, these units will be replaced by new units. This procedure should be applied only when the AQL in that category has not been exceeded.

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4.3 *Destructive tests*

TABLE II
*Time/current characteristic (IEC 127-1, Sub-clause 9.2.1)*
*(Inspection level S 4, destructive test)*

| Fraction in percentage of $z$, at multiple of $I_n$ | | | | | AQL |
|---|---|---|---|---|---|
| 1.0 $I_n$ or 1.5 $I_n$* | 2.0 $I_n$ or 2.1 $I_n$ | 2.75 $I_n$ | 4 $I_n$ | 10 $I_n$ | |
| 10 | 40 | 30 | 10 | 10 | 0.65 |

$z$ = sample sizes according to sampling plan.
* Modified endurance test according to Items *b)* and *c)* of Sub-clause 9.4 of IEC 127-1.

*Notes 1.* – Any failed fuses found in testing to Table I should be replaced by good units, before continuing with sampling and testing to Table II.

*2.* – When an acceptance number other than zero is indicated in the sampling plan, and any fuse-links fail to operate at 2.1 $I_n$ within the maximum time indicated on the relevant Standard Sheet, the test current should be increased without interruption to 2.2 $I_n$ as follows:

For fuse-links having a melting time of maximum 30 min at 2.1 $I_n$ for an additional 10 min.

For fuse-links having a melting time of maximum 2 min at 2.1 $I_n$ for an additional 2 min.

For fuse-links having a melting time of maximum 5 s at 2.0 $I_n$ for an additional 5 s.

If any fuse-link fails to operate within this additional time, the lot should be deemed to be unacceptable, regardless of the acceptance number indicated in the sampling plan.

4.4 *Acceptance criteria*

A batch of miniature fuse-links made in accordance with IEC 127 will be considered as having an acceptable quality level, if the tests specified in Tables I and II are performed in the order indicated and the number of defects found does not exceed the acceptance number given in the relevant sampling plan.

*Note.* – Acceptance tests requiring lower AQL limits than are given above should be subject to special agreement between the user and the manufacturer.

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## 5. Reliability and life tests

(Under consideration.)

## 6. Periodic inspection

### 6.1 *Reduced type tests*

TABLE III

| Description | Sub-clause of IEC 127-1 | Sample numbers in decreasing values of voltage drop | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1–6 | 7<br>8<br>9 | 10<br>11<br>12 | 13<br>14<br>15 | 16<br>17<br>18 | 19<br>20<br>21 | 22<br>23<br>24 | 25<br>—<br>30 |
| Marking | 6.1 | × | × | × | × | × | × | × | |
| Dimensions<br>Alignment | 8.1<br>8.4 | ×<br>× | ×<br>× | ×<br>× | ×<br>× | ×<br>× | ×<br>× | ×<br>× | |
| Voltage drop | 9.1 | × | × | × | × | × | × | × | |
| Time/current characteristic<br>2.1 $I_n$<br>4.0 $I_n$ | 9.2.1 | | | | | | × | | |
| Endurance test and maximum sustained dissipation | 9.4, items *b)* and *c)* | × | | | | | | | |
| Breaking capacity tests<br>Rated breaking capacity<br>10 $I_n$ or 50 $I_n$<br>(see *Note 1*) | 9.3 | | × | | | × | | | |

*Notes 1.* – Ratings 32 mA to 125 mA to be tested at 50 $I_n$.
Ratings 160 mA to 6.3 A to be tested at 10 $I_n$.

*2.* – Where failures occur, tests should be repeated as specified in Sub-clause 7.2.3 of IEC 127-1.

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## National appendix NA (informative)

## Deletions from IEC Publication 127-5 : 1988

### Foreword

The foreword has been deleted. It read as follows.

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

4) The IEC has not laid down any procedure concerning marking as an indication of approval and has no responsibility when an item of equipment is declared to comply with one of its recommendations.

**Preface**

The preface has been deleted. It read as follows.

This standard has been prepared by Sub-Committee 32C: Miniature Fuses, of IEC Technical Committee No. 32 : Fuses. It forms Part 5 of IEC 127.

The text of this standard is based on the following documents:

| Six Months' Rule | Report on Voting |
|---|---|
| 32C(CO)44 | 32C(CO)55 |

Full information on the voting for the approval of this standard can be found in the Voting Report indicated in the above table.

## National appendix NB (informative)

The United Kingdom participation in the preparation of this European Standard was entrusted by the Power Electrical Engineering Standards Policy Committee (PEL/-) to Technical Committee PEL/78, upon which the following bodies were represented:

ASTA Certification Services

ERA Technology Ltd.

Electrical Installation Equipment Manufacturers Association (BEAMA Ltd.)

Electricity Supply Industry in United Kingdom

Engineering Equipment and Materials Users Association

Institution of Electrical Engineers

Institution of Incorporated Executive Engineers

London Regional Transport

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Electronic Components Industry Federation

Ministry of Defence

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## National appendix NC (informative)

The British Standards corresponding to some of the International Standards referred to in EN 60127-5 are as follows:

| International standard | British Standard |
|---|---|
| IEC 127 | BS EN 60127 Miniature fuses |
| IEC 127-1 : 1988 | BS EN 60127-1 : 1991<br>Definitions for miniature fuses and general requirements for miniature fuse-links<br>(Identical) |
| IEC 127-2 : 1989 | BS EN 60127-2 : 1991<br>Specification for cartridge fuse-links<br>(Identical) |
| IEC 127-3 : 1988 | BS EN 60127-3 : 1991<br>Specification for sub-miniature fuse-links<br>(Identical) |
| 27-4 TTD | DD 183 : 1989<br>Specification for universal modular fuses<br>(Identical) |

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