NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI
IEC
127-5

Première édition
First edition
1988

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

Coupe-circuit miniatures

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

Miniature fuses

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

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Code prix
Price code 8

Pour prix, voir catalogue en vigueur
For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MINIATURE FUSES

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

FOREWORD

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 rues 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

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.

MINIATURE FUSES

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

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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.

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 Colour codes	6.1 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.

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.

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 8 9	10 11 12	13 14 15	16 17 18	19 20 21	22 23 24	25 — 30
Marking	6.1	×	×	×	×	×	×	×	
Dimensions Alignment	8.1 8.4	× ×	× ×	× ×	× ×	× ×	× ×	× ×	
Voltage drop	9.1	×	×	×	×	×	×	×	
Time/current characteristic 2.1 I_n 4.0 I_n	9.2.1			 ×			 ×		
Endurance test and maximum sustained dissipation	9.4, items *b)* and *c)*	×							
Breaking capacity tests Rated breaking capacity 10 I_n or 50 I_n (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.