



# **SLOVENSKI STANDARD**

## **SIST EN 60127-3:1999**

**01-julij-1999**

**Nadomešča:**  
**SIST EN 60127-3:1995**

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**Miniature varovalke - 3. del: Subminiatureni taljivi vložki (IEC 60127-3:1988+A1:1991) (vsebuje popravek AC:1996)**

Miniature fuses -- Part 3: Sub-miniature fuse-links

Geräteschutzsicherungen -- Teil 3: Kleinstsicherungseinsätze

Coupe-circuit miniatures -- Partie 3: Eléments de remplacement subminiatures

**Ta slovenski standard je istoveten z: EN 60127-3:1996**

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**ICS:**

29.120.50	Varovalke in druga medtokovna zaščita	Fuses and other overcurrent protection devices
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**SIST EN 60127-3:1999**

**en**



Descriptors: Miniature fuse, sub-miniature fuse, specification, rated characteristic, dimension, test

English version

**Miniature fuses**  
**Part 3: Sub-miniature fuse-links**  
(IEC 127-3:1988 + A1:1991 + corrigendum 1994)

Coupe-circuit miniatures  
Partie 3: Eléments de remplacement  
subminiatures  
(CEI 127-3:1988 + A1:1991 +  
corrigendum 1994)

Geräteschutzsicherungen  
Teil 3: Kleinstsicherungseinsätze  
(IEC 127-3:1988 + A1:1991 +  
Corrigendum 1994)

This European Standard was approved by CENELEC on 1996-03-05. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

### **Foreword**

The text of amendment 1:1991 (with the corrigendum October 1994) to the International Standard IEC 127-3:1988, prepared by SC 32C, Miniature fuses, of IEC TC 32, Fuses, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A1 to EN 60127-3:1991 without any modification.

The ratification of this amendment A1 was changed on 1996-03-05 into the ratification of a new edition of EN 60127-3 based on the text of IEC 127-3:1988 + A1:1991 + corrigendum October 1994.

This European Standard replaces EN 60127-3:1991.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1996-12-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1996-12-01

For products which have complied with EN 60127-3:1991 before 1996-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2001-12-01.

Annexes designated "normative" are part of the body of the standard.  
In this standard, annex ZA is normative.  
Annex ZA has been added by CENELEC.

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### **Endorsement notice**

The text of the International Standard IEC 127-3:1988 and its amendment 1:1991 (with the corrigendum October 1994) was approved by CENELEC as a European Standard without any modification.

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**Annex ZA (normative)**

**Normative references to international publications  
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 68-2-20	1979	Basic environmental testing procedures Part 2: Tests - Test T: Soldering	HD 323.2.20 S3 <sup>1)</sup>	1988
IEC 68-2-21	1983	Test U: Robustness of terminations and integral mounting devices	HD 323.2.21 S3 <sup>2)</sup>	1988
IEC 695	series	Fire hazard testing	EN 60695	series

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1) HD 323.2.20 S3 includes A2:1987 to IEC 68-2-20.

2) HD 323.2.21 S3 includes A1:1985 to IEC 68-2-21.

## Corrigendum to 60127-3:1996

English version

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### Foreword

Replace the paragraphs giving the implementation dates by:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 1996-12-01
  - latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1996-12-01
- 

June 1996

**NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD**

**CEI  
IEC  
127-3**

Deuxième édition  
Second edition  
1988

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**Coupe-circuit miniatures**

**Troisième partie:**  
**Éléments de remplacement subminiatures**

**Miniature fuses**

**Part 3:**  
**Sub-miniature fuse-links**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## MINIATURE FUSES

## Part 3: Sub-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 rules should, as far as possible, be clearly indicated in the latter.

## PREFACE

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

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

Six Months' Rule	Report on Voting
32C(CO)49	32C(CO)58

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

*The following IEC publications are quoted in this standard:*

Publications Nos. 68-2-20 (1979): Basic Environmental Testing Procedures, Part 2: Tests — Test T: Soldering.

68-2-21 (1983): Test U: Robustness of Terminations and Integral Mounting Devices.  
695: Fire Hazard Testing.

## MINIATURE FUSES

### Part 3: Sub-miniature fuse-links

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#### INTRODUCTION

The users of miniature fuses express the wish that 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, e.g. equipment specifications.

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

The new IEC Publication 127 series is intended to be subdivided as follows:

- Publications Nos 127: Miniature fuses (general title)  
127-1: Part 1: Definitions for miniatures fuses and general requirements for miniatures fuse-links.  
127-2: Part 2: Cartridge fuse-links.  
127-3: Part 3: Subminiature fuse-links.  
127-4: Part 4: Universal modular fuse-links.  
127-5: Part 5: Guidelines for quality assessment of miniature fuse-links.  
127-6: Part 6: Fuse-holders (until now IEC 257).  
127-7: (free for further documents).  
127-8: (free for further documents).  
127-9: Part 9: Test-holders and test-circuits.  
127-10: Part 10: User guide.

The third part of this standard covers additional requirements, test equipment and Standard Sheets.

#### SECTION ONE — ADDITIONAL REQUIREMENTS AND TEST EQUIPMENT

##### 1. Scope

This standard relates to special requirements applicable to sub-miniature fuse-links adapted to printed circuits and used for the protection of electric appliances, electronic equipment and component parts thereof, normally intended to be used indoors.

It does not apply to sub-miniature fuse-links for appliances intended to be used under special conditions, such as in a corrosive or explosive atmosphere.

*Note.* — Electrical and electronic circuit designers and printed circuit board manufacturers are advised to allow a 10 mm cube space for all sub-miniature fuse-links.

This standard applies in addition to the requirements of Part 1.

##### 2. Object

The object of this standard is:

To define special and additional test methods for sub-miniature fuse-links applying in addition to the requirements of Part 1.

##### 3. Definitions (see Part 1)

**4. General requirements (see Part 1)****5. Standard ratings (see Part 1)****6. Marking**

Additionally to the requirements of Clause 6 in Part 1 the following criterion is to be observed:

6.4 The values for “d” and “s” are given in the relevant Standard Sheet.

**7. General notes on tests**

Additionally to the requirements of Clause 7 in Part 1 the following criteria are to be observed:

7.2.1 The number of sub-miniature fuse-links required in the case of sub-miniature fuse-links in accordance with Standard Sheets 1 and 2 is 66, of which 12 are kept as spares in case some of the tests have to be repeated. The number of sub-miniature fuse-links required in the case of sub-miniature fuse-links in accordance with Standard Sheets 3 and 4 is 51, of which 12 are kept as spares in case some of the tests have to be repeated.

Additionally to the test mentioned in Sub-clause 7.2.1 of Part 1, sub-miniature fuse-links shall be taken and shall be tested or inspected in accordance with the following sub-clause:

**5. Sub-miniature fuse-link terminations (Sub-clause 8.3)****7.3 Fuse-bases for testing**

For tests that require a printed wiring board for mounting and connection of the sub-miniature fuse-link, a standard test board as shown in Figure 1, page 18, shall be used. This standard printed wiring board shall be mounted on the standard test base of Figure 2, page 19. The base material for the board shall be phenolic cellulose paper, copperclad, laminated sheet.

The nominal sheet thickness shall be 1.6 mm.

The nominal thickness of the copper layer shall be 0.035 mm.

Metal parts of the fuse-base shall be made of brass with copper content between 58% and 70%. Contact parts shall be silver-plated.

When two or more sub-miniature 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 sub-miniature fuse-links under test. 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 250 mm and the diameter of the wire shall be approximately 0.64 mm.

*Note.* — Fuse-bases for testing having equivalent electrical and thermal properties and providing for quick insertion of sub-miniature fuse-links are under consideration.

7.4 Schedule for testing sub-miniature fuse-links according to Standard Sheets 1 and 2, Table 1, page 15, and according to Standard Sheets 3 and 4, Table 2, page 17.

**8. Dimensions and construction**

Additionally to the requirements of Clause 8 in Part 1 the following criteria are to be observed:

## 8.2 Construction

The sub-miniature fuse-link shall be resistant to heat according to Sub-clause 9.7 of Part 1 and to fire in accordance with IEC Publication 695.

Compliance is checked by inspection.

This standard is based on the assumption that the case of the sub-miniature fuse-link is made of glass, ceramic or similar non-combustible material. For other material, such as the optional insulating sleeve or epoxy coating or similar material shown on Standard Sheet 2, additional tests are under consideration.

## 8.3 Sub-miniature fuse-link terminations

The sub-miniature fuse-link terminations should be firmly attached so that it is not possible to remove them without damaging the sub-miniature fuse-link.

The samples are pre-conditioned by immersion in water for 24 h at a temperature between 15 °C and 35 °C.

Terminations shall withstand the mechanical forces likely to be encountered during normal use. With the sub-miniature fuse-link held in a fixed position, each terminal in turn is subjected at ambient temperature to the forces laid down in this standard. These forces shall be exerted in the direction of the axis of the terminal and applied progressively without jerks. Test sample groups shall be equally divided among the specific termination tests stipulated in the relevant Standard Sheets.

Present test methods are to be performed in accordance with IEC Publication 68-2-21.

- For the tensile test ( $U_{a1}$ ), the force applied shall be 10 N.
- For the thrust test ( $U_{a2}$ ), the force applied shall be 2 N.
- For the bending test ( $U_b$ ), if applicable, the force applied shall be 5 N and the number of bends shall be one.

At the conclusion of testing, the sub-miniature fuse-link terminations shall remain firmly attached and the voltage drop shall not exceed the maximum allowed in the relevant Standard Sheet.

## 8.4 Termination configuration

The sub-miniature fuse-link terminations shall be designed to permit easy installation on printed circuit wiring boards having a grid system of holes located on 2.54 mm centres, or into fuse-bases having a spacing between the terminations which is compatible with the 2.54 mm grid system.

*Note.* — Electrical and electronic circuit designers are advised to note that grid systems for holes located on 2.54 mm centres may result in spacings between conductive tracks, in some applications, which do not provide sufficient creepage or clearance for open-circuit conditions. In such circumstances, it may be necessary to modify the land area around the mounting hole to ensure an acceptable minimum distance between conductive tracks or select a sub-miniature fuse-link with longer terminations which can be formed to fit into hole spacings offering the necessary degree of protection.

More details are given in the User Guide (under consideration as Part 10).

## 9. Electrical requirements

Additionally to the requirements of Clause 9 in Part 1 the following criteria are to be observed:

### 9.1 Voltage drop

The use of a high impedance voltmeter is recommended for measuring the voltage drop. Voltage drop shall be measured at the points marked with U in Figure 1, page 18.

### 9.3 *Breaking capacity*

9.3.1 Additionally to the requirements of Sub-clause 9.3.1 in Part 1 the following is to be observed:

Typical test circuits for a.c. and d.c. are given in Figure 3, page 20.

When alternating current is stipulated by the relevant Standard Sheets, the circuit power factor shall be larger than 0.95. To obtain this result, the circuit current shall be adjusted by the use of resistors with negligible inductance.

9.3.2 In addition to the criteria of failure prescribed in Part 1, in each of the tests, the sub-miniature fuse-link shall operate satisfactorily without any of the following phenomena:

- fusing together of the contacts or terminations;
- illegibility of marking after test;
- piercing of the external surfaces visible to the naked eye.

The following phenomena are neglected:

- black spots on the sub-miniature fuse-link terminations;
- small deformations of the sub-miniature fuse-link terminations;
- cracking of the subminiature fuse-link.

### 9.4 *Endurance tests*

#### 9.4.1 *Endurance test at normal ambient temperature*

Compliance is checked by subjecting the sub-miniature fuse-links to test method A or B as required in the relevant Standard Sheets.

#### 9.4.2 *Test method A*

As specified in Part 1, Sub-clause 9.4 a) to d).

#### 9.4.3 *Test method B*

- a) A direct current, specified in the relevant Standard Sheet, is passed through the sub-miniature fuse-link for a period of 100 h. The current stability during the test shall be maintained within  $\pm 1\%$  of the adjustable value.
- b) Finally, the voltage drop across the fuse-link is measured again according to Sub-clause 9.1. The voltage drop across the fuse-link after the test shall not have increased by more than 10% of the value measured before the test.
- c) After the tests, the marking shall still be legible and soldered joints on end caps etc. shall not show any appreciable deterioration.

### 9.8 *Additional tests (under consideration)*

Additional tests under consideration including environmental, physical and electrical characteristics are as follows:

- a) Flammability.
- b) Solderability (IEC Publication 68-2-20).
- c) Resistance to soldering heat.
- d) Resistance to solvents.
- e) Dielectric withstand voltage.
- f) Environmental test.