



# SLOVENSKI STANDARD SIST EN 60269-4:1998

01-april-1998

## Low-voltage fuses - Part 4: Supplementary requirements for fuse-links for the protection of semiconductor devices (IEC 60269-4:1986)

Low-voltage fuses -- Part 4: Supplementary requirements for fuse-links for the protection of semiconductor devices

Niederspannungssicherungen -- Teil 4: Zusätzliche Anforderungen an Sicherungseinsätze zum Schutz von Halbleiter-Bauelementen

Fusibles basse tension -- Partie 4: Prescriptions supplémentaires concernant les éléments de remplacement utilisés pour la protection des dispositifs à semi-conducteurs

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Ta slovenski standard je istoveten z: EN 60269-4:1996

### ICS:

29.120.50 Xæ[ çæ\ ^Á\ Ái\ \* æ Fuses and other overcurrent protection devices  
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN 60269-4**

iec/sc 32B

August 1996

ICS 29.120.50

Descriptors: Low-voltage fuses, fuse-links, protection of semiconductor devices, supplementary requirements, characteristics, markings, tests

English version

**Low-voltage fuses**  
**Part 4: Supplementary requirements for fuse-links**  
**for the protection of semiconductor devices**  
(IEC 269-4:1986)

Fusibles basse tension  
Partie 4: Prescriptions supplémentaires  
concernant les éléments de  
remplacement utilisés pour la protection  
des dispositifs à semi-conducteurs  
(CEI 269-4:1986)

Niederspannungssicherungen  
Teil 4: Zusätzliche Anforderungen an  
Sicherungseinsätze zum Schutz von  
Halbleiter-Bauelementen  
(IEC 269-4:1986)

This European Standard was approved by CENELEC on 1996-07-02. 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.

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**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 the International Standard IEC 269-4:1986, prepared by SC 32B, Low-voltage fuses, of IEC TC 32, Fuses, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60269-4 on 1996-07-02 without any modification.

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 1997-06-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1997-06-01

For products which have complied with the relevant national standard before 1997-06-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2002-06-01.

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and appendices A and B are informative.

Annex ZA has been added by CENELEC.

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### Endorsement notice

The text of the International Standard IEC 269-4:1986 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 147-0	1966	Essential ratings and characteristics of semiconductor devices and general principles of measuring methods Part 0: General and terminology	-	-
IEC 269-1	1968 <sup>1)</sup>	Low-voltage fuses Part 1: General requirements	-	-
IEC 269-2A	1975 <sup>2)</sup>	Part 2: Supplementary requirements for fuses for industrial applications Appendix A: Examples of standardized fuses for industrial applications	-	-
IEC 269-3A	1978 <sup>3)</sup>	Part 3: Supplementary requirements for fuses for domestic and similar applications - Appendix A: Examples of standardized fuses for domestic and similar applications	-	-
ISO 3	1973	Preferred numbers - Series of preferred numbers	-	-

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1) IEC 269-1:1986 is harmonized as EN 60269-1:1989.

2) IEC 269-2:1986 is harmonized as EN 60269-2:1995.

3) IEC 269-3:1987 is harmonized as EN 60269-3:1995.

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**Fusibles basse tension**

**Quatrième partie: Prescriptions supplémentaires concernant les éléments  
de remplacement utilisés pour la protection des dispositifs à semi-conducteurs**

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**Low-voltage fuses**

**Part 4: Supplementary requirements for fuse-links for the protection  
of semiconductor devices**

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Bureau Central de la Commission Electrotechnique Internationale

3, rue de Varembe

Genève, Suisse

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## LOW-VOLTAGE FUSES

## Part 4: Supplementary requirements for fuse-links for the protection of semiconductor devices

## FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by the 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 32B: Low-voltage Fuses, of IEC Technical Committee No. 32: Fuses.

This third edition is derived from the second edition of IEC Publication 269-4 (1980), the text of which is based on the following documents:

Six Months' Rule	Reports on Voting
32B(CO)21	32B(CO)24
32B(CO)29	32B(CO)33
32B(CO)30	32B(CO)34
32B(CO)41	32B(CO)44
32B(CO)42	32B(CO)45

Further information can be found in the relevant Reports on Voting indicated in the table above.

This new edition including editorial changes only, should be used in conjunction with the second edition of IEC Publication 269-1: Low-voltage Fuses, Part 1: General Requirements.

The new edition of Publication 269 is divided into the following parts:

- Part 1:** General requirements (Publication 269-1).
- Second part:**
- Part 2: Supplementary requirements for fuses for use by authorized persons (Fuses Mainly for Industrial Application) (Publication 269-2).
  - Part 2-1: Examples of types of standardized fuses for use by authorized persons (Publication 269-2-1) (in preparation).
- Third part:**
- Part 3: Supplementary requirements for fuses for use by unskilled persons (Publication 269-3) (in preparation).
  - Part 3-1: Examples of standardized fuses for use by unskilled persons (Publication 269-3-1) (in preparation).
- Part 4:** Supplementary requirements for fuse-links for the protection of semiconductor devices (Publication 269-4).

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

- Publication Nos. 147-0 (1966): Essential Ratings and Characteristics of Semiconductor Devices and General Principles of Measuring Methods, Part 0: General and Terminology.
- 269-1 (1968): Low-Voltage Fuses, Part 1: General Requirements.
- 269-2A (1975): First Supplement to Publication 269-2 (1973), Part 2: Supplementary Requirements for Fuses for Industrial Applications – Appendix A: Examples of Standardized Fuses for Industrial Applications.
- 269-3A (1978): First Supplement to Publication 269-3 (1973), Part 3: Supplementary Requirements for Fuses for Domestic and Similar Applications – Appendix A: Examples of Standardized Fuses for Domestic and Similar Applications.

*Other publication quoted:*

- ISO Standard 3 (1973): Preferred Numbers – Series of Preferred Numbers.

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## LOW-VOLTAGE FUSES

### Part 4: Supplementary requirements for fuse-links for the protection of semiconductor devices

#### EXPLANATORY NOTE

In view of the fact that this standard should be read together with IEC Publication 269-1: Low-voltage Fuses, Part 1: General Requirements, the numbering of its clauses, sub-clauses and tables is made to correspond to the latter.

#### 1. General

Fuse-links for the protection of semiconductor devices shall comply with all requirements of IEC Publication 269-1, if not otherwise indicated hereinafter, and shall also comply with the supplementary requirements laid down below.

##### 1.1 Scope

These supplementary requirements apply to fuse-links for application in equipment containing semiconductor devices for circuits of rated voltages up to 1000 V a.c. or circuits of nominal voltages up to 1500 V d.c. and also, in so far as they are applicable, for circuits of higher nominal voltages.

*Notes 1.* – Such fuse-links are commonly referred to as “semiconductor fuse-links”.

*2.* – In most cases, a part of the associated equipment serves the purpose of a fuse-base. Owing to the great variety of equipment, no general rules can be given; the suitability of the associated equipment to serve as a fuse-base should be subject to agreement between the manufacturer and the user. However, if separate fuse-bases or fuse-holders are used, they should comply with the appropriate requirements of IEC Publication 269-1.

##### 1.2 Object

The object of these supplementary requirements is to establish the characteristics of semiconductor fuse-links in such a way that they can be replaced by other fuse-links having the same characteristics, provided that their dimensions are identical. For this purpose, this standard refers in particular to:

##### 1.2.1 The following characteristics of fuses:

- a) their rated values;
- b) their temperature rises in normal service;
- c) their power dissipation;
- d) their time-current characteristics;
- e) their breaking capacity;
- f) their cut-off current characteristics and their  $I^2t$  characteristics;
- g) their arc voltage limits.

##### 1.2.2 Type tests for verification of the characteristics of fuses.

##### 1.2.3 The markings on fuses.

##### 1.2.4 Availability and presentation of technical data (see Appendix B).

## 2. Definitions

### 2.2 General terms

#### 2.2.10 Utilization category (of a fuse-link)

Not applicable.

#### 2.2.14 Semiconductor device (according to IEC Publication 147-0\*: Essential Ratings and Characteristics of Semiconductor Devices and General Principles of Measuring Methods, Part 0: General and Terminology)

A device whose essential characteristics are due to the flow of charge carriers within a semiconductor.

#### 2.2.15 Semiconductor fuse-link

A current-limiting fuse-link capable of breaking, under specific conditions, any current value within the breaking range (see Sub-clause 7.4).

## 3. Conditions for operation in service

### 3.4 Voltage

#### 3.4.1 Rated voltage

For a.c., the rated voltage of a fuse-link is related to the applied voltage; it is based on the r.m.s. value of a sinusoidal a.c. voltage. It is further assumed that the applied voltage retains the same value throughout the operation of the fuse-link. All tests to verify the ratings are based on this assumption.

*Note.* – In many applications, the applied voltage will be sufficiently close to the sinusoidal form for the significant part of the operating time, but there are many cases where this condition is not satisfied.

The performance of a fuse-link subjected to a non-sinusoidal applied voltage can be evaluated by comparing, for the first approximation, the arithmetic mean values of the non-sinusoidal and sinusoidal applied voltages.

For d.c., the rated voltage of a fuse-link is related to the applied voltage. It is based on the mean value. When d.c. is obtained by rectifying a.c., the ripple is assumed not to cause a variation of more than 5% above or 9% below the mean value.

#### 3.4.2 Applied voltage in service

Under service conditions, the applied voltage is that voltage which, in the fault circuit, causes the current to increase to such proportions that the fuse-link will operate.

For a.c., consequently, the value of the applied voltage in a single-phase a.c. circuit is usually identical to the power-frequency recovery voltage. For all cases other than the sinusoidal a.c. voltage, it is necessary to know the applied voltage as a function of time. For a unidirectional voltage, the important values are:

- the average value over the entire period of the operation of the fuse-link;
- the instantaneous value near the end of the arcing period.

\* IEC Publication 147 is under revision and will be replaced by IEC Publication 747: Semiconductor Devices. Discrete Devices and Integrated Circuits.