

This document is a PDF file generated by EVS

**Madalpingelised sulavkaitsmed. Osa 3:  
Lisanõuded tavaisikute poolt (peamiselt  
majapidamises ja muudel taolistel  
rakendustel) kasutamiseks ettenähtud  
kaitsmete. Kaitsmete  
standardsüsteemide A kuni F näited**

Low-voltage fuses -- Part 3: Supplementary  
requirements for fuses for use by unskilled persons  
(fuses mainly for household or similar applications) -  
Examples of standardized systems of fuses A to F

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-HD 60269-3:2007 sisaldab Euroopa standardi HD 60269-3:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 25.07.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-HD 60269-3:2007 consists of the English text of the European standard HD 60269-3:2007.</p> <p>This document is endorsed on 25.07.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

<p><b>Käsitlusala:</b> Fuses for use by unskilled persons according to the following fuse systems comply with all subclauses of IEC 60269-1 and with the requirements laid down in the relevant fuse systems. This standard is divided into six fuse systems, each dealing with a specific example of standardized fuses for use by unskilled persons: • Fuse system A: D type fuse system Remark: previously Section I in IEC 60269-3-1. • Fuse system B: Cylindrical fuses (NF cylindrical fuse system) Remark: previously Section IIA in IEC 60269-3-1. • Fuse system C: Cylindrical fuses (BS cylindrical fuse system) Remark: previously before Section IIB in IEC 60269-3-1. • Fuse system D: Cylindrical fuses (Italian cylindrical fuse system) Remark: previously Section IIC in IEC 60269-3-1. • Fuse system E: Pin-type fuses Remark: previously Section III in IEC 60269-3-1. • Fuse system F: Cylindrical fuse-links for use in plugs (BS plugtop fuse system) Remark: previously Section IV in IEC 60269-3-1.</p>	<p><b>Scope:</b> Fuses for use by unskilled persons according to the following fuse systems comply with all subclauses of IEC 60269-1 and with the requirements laid down in the relevant fuse systems. This standard is divided into six fuse systems, each dealing with a specific example of standardized fuses for use by unskilled persons: • Fuse system A: D type fuse system Remark: previously Section I in IEC 60269-3-1. • Fuse system B: Cylindrical fuses (NF cylindrical fuse system) Remark: previously Section IIA in IEC 60269-3-1. • Fuse system C: Cylindrical fuses (BS cylindrical fuse system) Remark: previously before Section IIB in IEC 60269-3-1. • Fuse system D: Cylindrical fuses (Italian cylindrical fuse system) Remark: previously Section IIC in IEC 60269-3-1. • Fuse system E: Pin-type fuses Remark: previously Section III in IEC 60269-3-1. • Fuse system F: Cylindrical fuse-links for use in plugs (BS plugtop fuse system) Remark: previously Section IV in IEC 60269-3-1.</p>
---	---

ICS 29.120.50

Võtmesõnad:

English version

**Low-voltage fuses -  
Part 3: Supplementary requirements for fuses  
for use by unskilled persons  
(fuses mainly for household or similar applications) -  
Examples of standardized systems of fuses A to F  
(IEC 60269-3:2006, modified)**

Fusibles basse tension -  
Partie 3: Exigences supplémentaires  
pour les fusibles destinés à être utilisés  
par des personnes non qualifiées  
(fusibles pour usages essentiellement  
domestiques et analogues) -  
Exemples de systèmes de fusibles  
normalisés A à F  
(CEI 60269-3:2006, modifiée)

Niederspannungssicherungen -  
Teil 3: Zusätzliche Anforderungen  
an Sicherungen zum Gebrauch  
durch Laien (Sicherungen überwiegend  
für Hausinstallationen  
oder ähnliche Anwendungen) -  
Beispiele für genormte  
Sicherungssysteme A bis F  
(IEC 60269-3:2006, modifiziert)

This Harmonization Document was approved by CENELEC on 2007-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document at national level.

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

This Harmonization Document exists in three official versions (English, French, German).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the 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 document 32B/484/FDIS, future edition 3 of IEC 60269-3, prepared by SC 32B, Low-voltage fuses, of IEC TC 32, Fuses, was submitted to the IEC-CENELEC parallel vote.

A draft amendment, containing common modifications to document 32B/484/FDIS, was prepared by Reporting Secretariat CLC/SR 32B, Low-voltage fuses, and was submitted to the formal vote.

The combined texts were approved by CENELEC as HD 60269-3 on 2007-03-01.

This Harmonization Document partially supersedes EN 60269-3:1995 + A1:2003 and also supersedes HD 60269-3-1:2004.

This document is to be used in conjunction with EN 60269-1:2007.

This Part 3 supplements or modifies the corresponding clauses or subclauses of Part 1.

Where no change is necessary, this Part 3 indicates that the relevant clause or subclause applies.

The following dates were fixed:

- latest date by which the HD has to be implemented  
at national level by publication of a harmonized  
national standard or by endorsement (dop) 2008-03-01
- latest date by which the national standards conflicting  
with the HD have to be withdrawn (dow) 2010-03-01

Tables and figures which are additional to those in Part 1 are numbered starting from 101.

Annex ZA has been added by CENELEC.

-----  
This document is a preview generated by EVS

## Endorsement notice

The text of the International Standard IEC 60269-3:2006 was approved by CENELEC as a Harmonization Document with agreed common modifications as given below.

### COMMON MODIFICATIONS

#### 1 General scope

Replace Note 2 by:

NOTE 2 The following fuse systems are standardized systems in respect to their safety aspects. The National Committees shall select at least one complete fuse system of this standard for their national standards. Colour codes are not specified for each fuse system. Where colour codes are indicated, they apply only to that particular fuse system.

#### Bibliography

Add the following notes for the standards indicated:

IEC 60529	NOTE	Harmonized as EN 60529:1991 (not modified).
ISO 228-1	NOTE	Harmonized as EN ISO 228-1:2003 (not modified).
ISO 228-2	NOTE	Harmonized as EN ISO 228-2:2003 (not modified).

-----

This document is a preview generated by EVS

## Annex ZA (normative)

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

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 60068-2-32	- <sup>1)</sup>	Environmental testing - Part 2: Tests. Test Ed: Free fall	EN 60068-2-32	1993 <sup>2)</sup>
IEC 60269-1	- <sup>1)</sup>	Low-voltage fuses - Part 1: General requirements	EN 60269-1	2007 <sup>2)</sup>
IEC 60664	Series	Insulation coordination for equipment within low-voltage systems	EN 60664	Series
IEC 60898 (mod)	1987	Circuit-breakers for overcurrent protection for household and similar installations	EN 60898 <sup>3)</sup>	1991
IEC 60999	Series	Connecting devices - Safety requirements for screw-type and screwless-type clamping units for electrical copper conductors	EN 60999	Series

---

<sup>1)</sup> Undated reference.

<sup>2)</sup> Valid edition at date of issue.

<sup>3)</sup> EN 60898:1991 and its amendments A11:1994 through A19:2000 are superseded by EN 60898-1:2003, which is based on IEC 60898-1:2002 (modified).

# INTERNATIONAL STANDARD

**IEC**  
**60269-3**

Third edition  
2006-11

---

---

**Low-voltage fuses –**

**Part 3:  
Supplementary requirements for fuses  
for use by unskilled persons  
(fuses mainly for household and  
similar applications) – Examples of  
standardized systems of fuses A to F**

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



Reference number  
IEC 60269-3:2006(E)

## Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

## Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

## Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site** ([www.iec.ch](http://www.iec.ch))

- **Catalogue of IEC publications**

The on-line catalogue on the IEC web site ([www.iec.ch/searchpub](http://www.iec.ch/searchpub)) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

This summary of recently issued publications ([www.iec.ch/online\\_news/justpub](http://www.iec.ch/online_news/justpub)) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

Email: [custserv@iec.ch](mailto:custserv@iec.ch)  
Tel: +41 22 919 02 11  
Fax: +41 22 919 03 00



# INTERNATIONAL STANDARD

**IEC**  
**60269-3**

Third edition  
2006-11

---

---

## Low-voltage fuses –

### Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) – Examples of standardized systems of fuses A to F

© IEC 2006 Copyright - all rights reserved

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 the publisher.

International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: [inmail@iec.ch](mailto:inmail@iec.ch) Web: [www.iec.ch](http://www.iec.ch)



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE **XG**

*For price, see current catalogue*

## CONTENTS

FOREWORD.....	25
INTRODUCTION.....	29
1 General scope.....	31
1.2 Normative references.....	31
<b>Fuse system A – D type fuse system</b>	
1 General.....	33
1.1 Scope.....	33
2 Terms and definitions.....	33
3 Conditions for operation in service.....	33
4 Classification.....	33
5 Characteristics of fuses.....	33
5.2 Rated voltage.....	33
5.3.1 Rated current of the fuse-link.....	35
5.3.2 Rated current of the fuse-holder.....	35
5.3.3 Rated current of the gauge-piece.....	35
5.5 Rated power dissipation of a fuse-link and rated acceptable power dissipation of a fuse-holder.....	35
5.6 Limits of time-current characteristics.....	35
5.6.1 Time-current characteristics, time-current zones and overload curves.....	35
5.6.2 Conventional times and currents.....	37
5.6.3 Gates.....	37
5.7 Breaking range and breaking capacity.....	37
5.7.2 Rated breaking capacity.....	37
6 Markings.....	37
6.4 Marking of the gauge-pieces.....	39
7 Standard conditions for construction.....	39
7.1 Mechanical design.....	39
7.1.2 Connections including terminals.....	39
7.1.3 Fuse-contacts.....	39
7.1.4 Construction of a gauge-piece.....	41
7.1.6 Construction of a fuse-carrier.....	41
7.1.7 Construction of a fuse-link.....	41
7.1.8 Non-interchangeability.....	43
7.1.9 Construction of a fuse-base.....	43
7.2 Insulating properties.....	43
7.3 Temperature rise, power dissipation of the fuse-link and acceptable power dissipation of the fuse-holder.....	45
7.7 $I^2t$ characteristics.....	47
7.7.1 Pre-arcing $I^2t$ values.....	47
7.7.2 Operating $I^2t$ values.....	47
7.8 Overcurrent discrimination of "gG" fuse-links.....	47
7.9 Protection against electric shock.....	49

8	Tests .....	49
	8.1.4 Arrangement of the fuse and dimensions .....	49
	8.2 Verification of insulating properties.....	51
	8.2.1 Arrangement of the fuse-holder .....	51
	8.2.4 Test method .....	51
	8.2.6 Creepage distances, clearances and distances through sealing compound.....	51
	8.3 Verification of temperature rise and power dissipation .....	53
	8.3.1 Arrangement of the fuse .....	53
	8.3.3 Measurement of the power dissipation of the fuse-link.....	53
	8.3.5 Acceptability of test results .....	53
	8.5.2 Characteristics of the test circuit.....	55
	8.5.5 Test method .....	55
	8.5.8 Acceptability of test results .....	55
	8.7.4 Verification of overcurrent discrimination .....	57
	8.9 Verification of resistance to heat .....	59
	8.9.1 Fuse-base .....	59
	8.9.2 Fuse-carrier.....	61
	8.10 Verification of non-deterioration of contacts.....	61
	8.10.1 Arrangement of the fuse .....	61
	8.10.2 Test method .....	61
	8.10.3 Acceptability of test results.....	63
	8.11 Mechanical and miscellaneous tests.....	65
	8.11.1 Mechanical strength .....	65
	Annex A (informative) Special test for cable overload protection (for fuse system A).....	133
	<b>Fuse system B – Cylindrical fuses (NF cylindrical fuse system)</b>	
1	General .....	135
	1.1 Scope.....	135
2	Terms and definitions .....	135
3	Conditions for operation in service.....	137
4	Classification .....	137
5	Characteristics of fuses .....	137
	5.2 Rated voltage .....	137
	5.3.1 Rated current of the fuse-link.....	137
	5.3.2 Rated current of the fuse-holder .....	137
	5.5 Rated power dissipation of a fuse-link and rated acceptable power dissipation of a fuse-holder .....	137
	5.6.2 Conventional times and currents.....	139
	5.6.3 Gates .....	139
	5.7.2 Rated breaking capacity .....	139
6	Markings .....	139

7	Standard conditions for construction.....	141
7.1	Mechanical design.....	141
7.1.2	Connections including terminals .....	141
7.1.6	Construction of a fuse-carrier .....	141
7.1.7	Construction of a fuse-link.....	141
7.1.8	Non-interchangeability.....	143
7.1.9	Construction of a fuse-base.....	143
7.2	Insulating properties.....	143
7.3	Temperature rise, power dissipation of the fuse-link and acceptable power dissipation of the fuse-holder.....	145
7.7	$I^2t$ characteristics .....	147
7.7.1	Pre-arcing $I^2t$ values.....	147
7.7.2	Operating $I^2t$ values.....	147
7.8	Overcurrent discrimination of "gG" fuse-links.....	147
7.9	Protection against electric shock .....	147
8	Tests.....	149
8.1.6	Testing of fuse-holders.....	149
8.3.1	Arrangement of the fuse .....	149
8.3.3	Measurement of the power dissipation of the fuse-link.....	151
8.4	Verification of operation .....	153
8.4.1	Arrangement of the fuse.....	153
8.5	Verification of the breaking capacity.....	153
8.5.1	Arrangement of the fuse.....	153
8.5.5	Test method .....	155
8.5.8	Acceptability of test results.....	155
8.7.4	Verification of overcurrent discrimination .....	155
8.8	Verification of the degree of protection of enclosures .....	155
8.8.1	Verification of protection against electric shock .....	155
8.9	Verification of resistance to heat .....	155
8.10	Verification of non-deterioration of contacts.....	157
8.10.1	Arrangement of the fuse .....	157
8.10.2	Test method .....	157
8.10.3	Acceptability of test results.....	159
8.12	Verification of the reliability of terminals.....	165
<b>Fuse system C – Cylindrical fuses (BS cylindrical fuse system)</b>		
1	General.....	183
1.1	Scope.....	183
2	Terms and definitions .....	183
3	Conditions for operation in service.....	183
4	Classification.....	183
5	Characteristics of fuses .....	185
5.3	Rated current .....	185
5.3.1	Rated current of the fuse-link.....	185
5.3.2	Rated current of the fuse-holder .....	185
5.5	Rated power dissipation of a fuse-link and rated acceptable power dissipation of a fuse-holder .....	185

5.6	Limits of time-current characteristics .....	185
5.6.1	Time-current characteristics, time-current curves and overload curves .....	185
5.6.2	Conventional times and currents.....	185
5.7	Breaking range and breaking capacity .....	185
5.7.2	Rated breaking capacity .....	185
6	Markings .....	187
7	Standard conditions for construction.....	187
7.1	Mechanical design.....	187
7.1.2	Connections including terminals .....	187
7.1.6	Construction of a fuse-carrier .....	187
7.1.7	Construction of a fuse-link .....	187
7.1.8	Non-interchangeability.....	187
7.1.9	Construction of a fuse-base.....	187
7.3	Temperature rise, power dissipation of the fuse-link and acceptable power dissipation of the fuse-holder.....	189
7.9	Protection against electric shock .....	189
8	Tests .....	189
8.1	General .....	189
8.1.4	Arrangement of the fuse .....	189
8.3	Verification of temperature rise and power dissipation .....	189
8.3.1	Arrangement of the fuse.....	189
8.3.3	Measurement of the power dissipation of the fuse-link.....	189
8.4	Verification of operation .....	189
8.4.1	Arrangement of fuse .....	189
8.5	Verification of breaking capacity .....	191
8.5.1	Arrangement of the fuse .....	191
8.5.5	Test method .....	191
8.5.8	Acceptability of test results .....	191
8.10	Verification of non-deterioration of contacts.....	191
8.10.1	Arrangement of the fuse .....	191
8.10.2	Test method .....	191
8.10.3	Acceptability of test results.....	191

#### **Fuse system D – Cylindrical fuses (Italian cylindrical fuse system)**

1	General .....	211
1.1	Scope.....	211
2	Terms and definitions .....	211
3	Conditions for operation in service.....	211
4	Classification.....	211
5	Characteristics of fuses .....	211
5.3.1	Rated current of the fuse-link.....	213
5.3.2	Rated current of the fuse-holder .....	213
5.5	Rated power dissipation of a fuse-link and rated acceptable power dissipation of a fuse-holder .....	213
5.6	Limits of time-current characteristics .....	215
5.6.1	Time-current characteristics, time-current zones and overload curves .....	215

5.6.2	Conventional times and currents.....	215
5.6.3	Gates .....	215
5.7.2	Rated breaking capacity .....	217
6	Markings .....	217
7	Standard conditions for construction.....	217
7.1	Mechanical design.....	217
7.1.2	Connections including terminals .....	217
7.1.6	Construction of a fuse-carrier .....	219
7.1.7	Construction of a fuse-link.....	219
7.1.8	Non-interchangeability.....	219
7.1.9	Construction of a fuse-base.....	219
7.2	Insulating properties.....	219
7.3	Temperature rise, power dissipation of the fuse-link and acceptable power dissipation of the fuse-holder.....	221
7.7	$I^2t$ characteristics .....	221
7.7.1	Minimum pre-arcing $I^2t$ values at 0,01 s.....	221
7.7.2	Maximum operating $I^2t$ values at 0,01 s .....	223
7.9	Protection against electric shock .....	223
8	Tests .....	223
8.1.6	Testing of the fuse-holder.....	223
8.3	Verification of temperature rise and power dissipation.....	225
8.3.1	Arrangement of the fuse.....	225
8.3.3	Measurement of the power dissipation of the fuse-link.....	225
8.4	Verification of operation .....	227
8.4.1	Arrangement of the fuse .....	227
8.5	Verification of the breaking capacity.....	227
8.5.1	Arrangement of the fuse .....	227
8.5.5	Test method .....	227
8.5.8	Acceptability of test results.....	227
8.7.4	Verification of discrimination.....	227
8.9	Verification of resistance to heat .....	227
8.9.1	Test in heating cabinet .....	227
8.9.2	Ball-pressure test .....	229
8.10	Verification of non-deterioration of contacts.....	229
8.10.1	Arrangement of the fuse .....	229
8.10.2	Test method .....	229
8.10.3	Acceptability of test results.....	231
8.11	Mechanical and miscellaneous tests.....	231

### Fuse system E – Pin-type fuses

1	General .....	251
1.1	Scope.....	251
2	Terms and definitions .....	251
2.3	Characteristic quantities .....	251
3	Conditions for operation in service.....	253
4	Classification.....	253
5	Characteristics of fuses .....	253
5.3.3	Rated current of the gauge-piece.....	253

5.5	Rated power dissipation of the fuse-link .....	253
5.6	Limits of time-current characteristics .....	253
5.6.2	Conventional times and currents .....	253
5.6.3	Gates .....	253
5.7.2	Rated breaking capacity .....	255
6	Markings .....	255
6.1	Markings of fuse-holders .....	255
6.2	Markings of fuse-links .....	255
6.4	Markings of the gauge-pieces .....	255
7	Standard conditions for construction .....	255
7.1.4	Construction of the gauge-piece .....	255
7.1.6	Construction of a fuse-carrier .....	257
7.1.7	Construction of a fuse-link .....	257
7.1.8	Non-interchangeability .....	257
7.1.9	Construction of a fuse-base .....	257
7.3	Temperature rise, power dissipation of the fuse-link and acceptable power dissipation of the fuse-holder .....	257
7.9	Protection against electric shock .....	259
8	Tests .....	259
8.3	Verification of temperature rise and power dissipation .....	259
8.3.1	Arrangement of the fuse .....	259
8.3.3	Measurement of the power dissipation of the fuse-link .....	259
8.3.4	Test method .....	261
8.5.5	Test method .....	263
8.10	Verification of non-deterioration of contacts .....	263
8.10.1	Arrangement of the fuse .....	263
8.10.2	Test method .....	263
8.10.3	Acceptability of test results .....	265

#### **Fuse system F – Cylindrical fuse-links for use in plugs (BS plugtop system)**

1	General .....	277
1.1	Scope .....	277
2	Terms and definitions .....	277
3	Conditions for operation in service .....	277
4	Classification .....	277
5	Characteristics of fuses .....	277
5.2	Rated voltage .....	277
5.3.1	Rated current of the fuse-link .....	279
5.3.2	Rated current of the fuse-holder .....	279
5.5	Rated power dissipation of a fuse-link and rated acceptable power dissipation of a fuse-holder .....	279
5.6.1	Time-current characteristics, time-current zones and overload curves .....	279

5.6.2	Conventional times and currents.....	279
5.6.3	Gates .....	279
5.7.2	Rated breaking capacity .....	281
6	Markings .....	281
7	Standard conditions for construction.....	281
7.1.7	Construction of a fuse-link .....	281
7.1.8	Non-interchangeability.....	281
7.3	Temperature rise, power dissipation of the fuse-link and acceptable power dissipation of the fuse-holder.....	281
7.7	$I^2t$ characteristics .....	281
7.7.1	Pre-arcing $I^2t$ values.....	281
7.9	Protection against electric shock .....	283
8	Tests .....	283
8.1.4	Arrangement of the fuse-link for tests .....	283
8.1.5	Testing of fuse-links .....	283
8.2.5	Acceptability of test results.....	287
8.3	Verification of temperature rise and power dissipation .....	287
8.3.1	Arrangement of the fuse .....	287
8.3.4	Test method .....	287
8.3.5	Acceptability of test results.....	287
8.4	Verification of operation .....	287
8.4.1	Arrangement of the fuse.....	287
8.5	Breaking-capacity tests .....	289
8.5.1	Arrangement of the fuse .....	289
8.5.2	Characteristics of the test circuit.....	289
8.5.4	Calibration of the test circuit.....	291
8.5.5	Test method .....	291
8.5.8	Acceptability of test results.....	291
8.7	Verification of $I^2t$ characteristics and overcurrent discrimination .....	291
8.7.3	Verification of compliance for fuse-links at 0,01 s .....	291
8.10	Verification of non-deterioration of contacts.....	291
8.11.1	Mechanical strength.....	291
Annex B (informative) (for all fuse systems) – Alternative tests for tests No. 1 and No. 2 of Table 20 of IEC 60269-1.....		305
Annex C (informative) Recommendations for future designs of fuses (for all fuse systems).....		309
Figure 101 – Time-current zones for "gG" fuse-links .....		71
Figure 102 – Time-current zones for "gG" fuse-links .....		73
Figure 103 – Time-current zone for "gG" fuse-links 13A.....		75
Figure 104 – Dummy fuse-links according to 8.3 and 8.9.1.1 .....		77
Figure 105 – Test rigs for fuse-links .....		79
Figure 106 – Test rigs for fuse-links .....		81
Figure 107 – Test arrangement for fuse-bases according to 8.9.1.2.....		83
Figure 108 – Example of a torque wrench according to 8.9.2 .....		85



Figure 109 – Measuring points for the voltage drop (B, C) or the temperature rise (A, D).....	87
Figure 110 – Fuse-link, D-type. Sizes DO1-DO3 .....	89
Figure 111 – Fuse-link, D-type. Sizes DII-DIV .....	91
Figure 112 – Fuse-carrier, D-type. Sizes DO1-DO3 .....	95
Figure 113 – Fuse-carrier, D-type. Sizes DII-DIII .....	97
Figure 114 – Fuse-carrier, D-type. Size DIV.....	99
Figure 115 – Edison thread for D-type fuses; limit dimensions .....	101
Figure 116 – Gauges for Edison thread for D-type fuses for screwed shells of fuse-carrier go ring gauges.....	103
Figure 117 – Gauges for Edison thread, D-type fuses, go and not-go plug gauges for screwed shells of fuse-bases .....	105
Figure 118 – Fuse-base, D-type. Sizes DO1-DO3 .....	109
Figure 119 – Fuse-base, D-type. Sizes DII-DIV .....	111
Figure 120 – Fuse-base, D-type for push-in gauge rings. Size DII-DIII .....	115
Figure 121 – Gauge-piece and hand-key, D-type. Sizes DO1-DO3.....	119
Figure 122 – Gauge-piece and hand-key, D-type. Sizes DII-DIV .....	121
Figure 123 – Gauge-piece and hand-key, D-type push-in gauge rings. Size DII-DIII.....	125
Figure 124 – Whitworth thread W 3/16 for screw-in gauge rings and corresponding fuse-bases of sizes DII and DIII .....	129
Figure 125 – Gauges C 17 for concentricity of fuse-bases .....	131
Figure 201 – Fuse-link .....	167
Figure 202 – Dummy fuse-link .....	169
Figure 203 – Test-rig and ferrules for the measurement of the voltage drop and the verification of operating characteristics of the cartridge .....	171
Figure 204 – Fuse-base, A-type and B-type .....	175
Figure 205 – Housing for verification of operation of the fuse-links with a test rig according to Figure 203 .....	177
Figure 206 – Test rig and ferrules for verification of breaking capacity.....	179
Figure 207 – Gauge for verification of the upholding of the cartridge in the fuse-carrier during withdrawal.....	181
Figure 301 – Details of cylindrical fuse-links .....	195
Figure 302 – Typical outline dimension of carriers and bases for 240 V cylindrical fuse-links.....	197
Figure 303 – Typical carrier and base for 415 V cylindrical fuse-links, size IIa and IIb.....	199
Figure 304 – Time-current zones for "gG" fuse-link .....	201
Figure 305 – Time-current zones for "gG" fuse-link.....	203
Figure 306 – Standard test rig for power-dissipation test.....	205
Figure 307 – Breaking-capacity test rig .....	207
Figure 401 – Cylindrical fuse-link type C .....	239
Figure 402 – Fuse-base .....	241
Figure 403 – Time-current zones .....	243
Figure 404 – Time-current zones .....	245

Figure 405 – Test rig.....	247
Figure 406 – Dummy fuse-link .....	249
Figure 407 – Housing for verification of operation of the fuse-links .....	249
Figure 501 – Pin-type fuses – Fuse-links .....	269
Figure 502 – Pin-type fuses – Fuse-holder.....	271
Figure 503 – Pin-type fuses – Gauge-pieces 230 V.....	273
Figure 504 – Dummy fuse-link for the temperature-rise test .....	275
Figure 601 – Dimensions for cylindrical fuse-links (primarily used in plugs) .....	295
Figure 602 – Time-current zones for "gG" fuse-links .....	297
Figure 603 – Test fuse-base .....	299
Figure 604 – Typical diagram of the circuit used for breaking-capacity tests .....	303
Figure B.1 – Instant of making for Test No. 1 .....	307
Table 101 – Maximum values of power dissipation.....	35
Table 102 – Conventional time and current for "gG" fuse-links .....	37
Table 103 – Gates for specified pre-arcing times of "gG" fuse-links with rated currents 2 A, 4 A, 6 A, 10 A, 13 A and 35 A .....	37
Table 104 – Cross-sections of rigid (solid or stranded) or flexible copper conductors.....	39
Table 105 – Creepage distances, clearances and distances through sealing compound .....	45
Table 106 – Temperature-rise limits for terminals .....	45
Table 107 – Pre-arcing $I^2t$ values at 0,01 s for "gG" fuse-links.....	47
Table 108 – $I^2t$ values for the discrimination with circuit breakers.....	47
Table 109 – Survey of tests on fuse-links.....	49
Table 110 – Survey of tests on fuse-bases, fuse-carriers and gauge-pieces .....	51
Table 111 – Test torque for verification of temperature rise and power dissipation.....	53
Table 112 – Test according to 8.5.5.1 .....	55
Table 113 – Test currents and $I^2t$ limits for the discrimination test .....	57
Table 114 – Power dissipation of a dummy fuse-link at rated and conventional fusing currents including tolerances .....	59
Table 115 – Test-torque for mechanical strength .....	67
Table 116 – Mechanical strength of screw-thread .....	67
Table 201 – Maximum values of rated power dissipation and values of rated acceptable power dissipation .....	137
Table 202 – Conventional times and currents for "gG" fuse-links .....	139
Table 203 – Gates for specified pre-arcing times of "gG" fuse-links with rated currents lower than 16 A.....	139
Table 204 – Minimum rated breaking capacities.....	139
Table 205 – Nominal section of copper conductors that the terminals shall accept.....	141

Table 206 – Creepage distances and clearances .....	145
Table 207 – Temperature rise limits for terminals.....	145
Table 208 – Pre-arcing $I^2t$ values at 0,01 s for "gG" fuse-links.....	147
Table 209 – Survey of tests on fuse-link .....	149
Table 210 – Survey of tests on fuse-holder and number of fuse-holders to be tested .....	149
Table 211 – Screw-thread diameters and applied torques.....	151
Table 212 – Values concerning the choice and the adjustment of the test base .....	153
Table 213 – Values for adjustment of the test base.....	153
Table 214 – Hammer and height of fall for test for verification of resistance to shocks .....	161
Table 215 – Torque to be applied to the fuse-carrier.....	163
Table 216 – Mechanical strength of screw-thread .....	165
Table 301 – Conventional time and current for "gG" fuse-links.....	185
Table 302 – Temperature-rise limits for terminals .....	189
Table 303 – Mechanical strength of screw-thread .....	193
Table 401 – Fuse-links: rated currents, sizes and colours of indicating devices (if any).....	213
Table 402 – Rated currents of fuse-holders .....	213
Table 403 – Maximum rated power dissipation of fuse-links .....	213
Table 404 – Rated acceptable power dissipation of fuse-holder .....	215
Table 405 – Conventional times and currents for fuse-links of $I_n < 16$ A .....	215
Table 406 – Gates for specified pre-arcing times of "gG" fuse-links with rated currents lower than 16 A.....	217
Table 407 – Minimum rated breaking capacities.....	217
Table 408 – Cross-sectional areas.....	217
Table 409 – Creepage distances and clearances .....	221
Table 410 – Temperature-rise limits for terminals .....	221
Table 411 – Minimum pre-arcing $I^2t$ values at 0,01 s.....	221
Table 412 – Maximum operating $I^2t$ values at 0,01 s .....	223
Table 413 – Survey of the complete tests on fuse-holders and number of fuse-holders to be tested .....	223
Table 414 – Contact forces of the test rig .....	225
Table 415 – Torque to be applied to the screw-type fuse-carrier.....	225
Table 416 – Mechanical strength of screw-thread .....	231
Table 501 – Maximum values of rated power dissipation.....	253
Table 502 – Conventional times and currents for fuse-links of $I_n < 16$ A .....	253
Table 503 – Gates for specified pre-arcing times of "gG" fuse-links with rated currents lower than 16 A.....	255
Table 504 – Temperature-rise limits for terminals .....	259
Table 505 – Torques.....	259

Table 506 – Cross-sectional areas .....	261
Table 507 – Power dissipation of the dummy fuse-link .....	261
Table 508 – Dummy fuse-link.....	263
Table 509 – Mechanical strength of screw-thread .....	267
Table 601 – Conventional times and conventional currents .....	279
Table 602 – Gates for specified pre-arcing times of "gG" fuse-links for use in plugs.....	279
Table 603 – Temperature-rise limits for terminals .....	281
Table 604 – Pre-arcing $I^2t$ values at 0,01 s for "gG" fuse-links .....	283
Table 605 – Survey of tests on fuse-links.....	285
Table 606 – Values for breaking-capacity tests .....	289

This document is a preview generated by EVS

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## LOW-VOLTAGE FUSES –

**Part 3: Supplementary requirements for fuses  
for use by unskilled persons  
(fuses mainly for household and similar applications) –  
Examples of standardized systems of fuses A to F**

## 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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.

International Standard IEC 60269-3 has been prepared by subcommittee 32B: Low-voltage fuses, of IEC technical committee 32: Fuses.

This third edition cancels and replaces the second edition published in 1987 and amendment 1 (2003), as well as IEC 60269-3-1 (2004) and constitutes a minor revision.

The general re-organization of the IEC 60269 series has led to the creation of this new edition.

This part is to be used in conjunction with IEC 60269-1:2006, Part 1:General requirements.

This Part 3 supplements or modifies the corresponding clauses or subclauses of Part 1.

Where no change is necessary, this Part 3 indicates that the relevant clause or subclause applies.

Tables and figures which are additional to those in Part 1 are numbered starting from 101.

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

FDIS	Report on voting
32B/484/FDIS	32B/491/RVD

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

IEC 60269 consists of the following parts, under the general title *Low-voltage fuses*:

**Part 1: General requirements**

NOTE This part includes IEC 60269-1 (third edition, 1998) and parts of IEC 60269-2 (second edition, 1986) and IEC 60269-3 (second edition, 1987).

**Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) – Examples of standardized systems of fuses A to I**

NOTE This part includes parts of IEC 60269-2 (second edition, 1986) and all of IEC 60269-2-1 (fourth edition, 2004).

**Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household or similar application) – Examples of standardized systems of fuses A to F**

NOTE This part includes parts of IEC 60269-3 (second edition, 1987) and all of IEC 60269-3-1 (second edition, 2004).

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

NOTE This part includes IEC 60269-4 (third edition, 1986) and IEC 60269-4-1 (first edition, 2002).

**Part 5: Guidance for the application of low-voltage fuses**

NOTE Currently IEC/TR 61818 (2003).

For reasons of convenience, when a part of this publication has come from other publications, a remark to this effect has been inserted in the text.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

## INTRODUCTION

A reorganization of the different parts of the IEC 60269 series has been carried out, in order to simplify its use, especially by the laboratories which test the fuses.

IEC 60269-1, IEC 60269-2, IEC 60269-3 and IEC 60269-3-1 have been integrated into either the new part 1 or the new parts 2 or 3, according to the subjects considered, so that the clauses which deal exclusively with “fuses for authorised persons” are separated from the clauses dealing with “fuses for unauthorised persons”.

As far as IEC 60269-4 and IEC 60269-4-1 are concerned, they have been integrated into the new part 4 which deals with the fuse-links used for semiconductor protection.

This document is a preview generated by EVS

## LOW-VOLTAGE FUSES –

### Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) – Examples of standardized systems of fuses A to F

#### 1 General scope

Fuses for use by unskilled persons according to the following fuse systems comply with all subclauses of IEC 60269-1 and with the requirements laid down in the relevant fuse systems.

This standard is divided into six fuse systems, each dealing with a specific example of standardized fuses for use by unskilled persons:

- Fuse system A: D type fuse system  
*Remark: previously Section I in IEC 60269-3-1.*
- Fuse system B: Cylindrical fuses (NF cylindrical fuse system)  
*Remark: previously Section IIA in IEC 60269-3-1.*
- Fuse system C: Cylindrical fuses (BS cylindrical fuse system)  
*Remark: previously before Section IIB in IEC 60269-3-1.*
- Fuse system D: Cylindrical fuses (Italian cylindrical fuse system)  
*Remark: previously Section IIC in IEC 60269-3-1.*
- Fuse system E: Pin-type fuses  
*Remark: previously Section III in IEC 60269-3-1.*
- Fuse system F: Cylindrical fuse-links for use in plugs (BS plugtop fuse system)  
*Remark: previously Section IV in IEC 60269-3-1.*

NOTE 1 Examples of standardized fuses complying with the requirements of IEC 60269-1 are listed in the present standard. Other examples may be added, provided that they comply with these requirements.

For recommendations for future designs of fuses, see Annex C.

NOTE 2 The following fuse systems are standardized systems with respect to their safety aspects.

The National Committees may select from the examples of standardized fuses one or more systems for their own standards. Colour codes are not specified for each fuse system. Where colour codes are indicated, they apply only to that particular fuse system.

#### 1.2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-32, *Environmental testing – Part 2: Tests. Test Ed: Free fall*

IEC 60269-1, *Low-voltage fuses – Part 1: General requirements*

IEC 60664 (all parts), *Insulation co-ordination for equipment within low-voltage systems*

IEC 60898:1987, *Circuit-breakers for overcurrent protection for household and similar installations*

IEC 60999:1990, *Connecting devices – Safety requirements for screw-type and screwless-type clamping units for electrical copper conductors*