

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 60269-3:2006

<https://standards.iteh.ai/en/standards/iec/c9/b1c42-c3b0-44fd-bd44-761e63e808bc/iec-60269-3-2006>

*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)

- **Catalogue of IEC publications**

The on-line catalogue on the IEC web site (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 On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.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) 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
Tel: +41 22 919 02 11
Fax: +41 22 919 03 00

<https://standards.iteh.ai/catalog/standards/iec/c3/b1c42-c3b0-44fd-bd44-761e63e808bc/iec-60269-3-2006>

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 Web: 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
Fuse system A – D type fuse system	
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

Fuse system B – Cylindrical fuses (NF cylindrical fuse system)

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

Fuse system C – Cylindrical fuses (BS cylindrical fuse system)

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

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

IEC 60269-3:2006

<https://standards.iteh.ai/standards/iec/c9/bfc42-c3b0-44fd-bd44-761e63e808bc/iec-60269-3-2006>

Withheld