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Interested committees:

Title: Draft BS EN IEC 61643-11 Low-voltage surge protective devices. Part 11: Surge protective devices connected to AC low-voltage power systems - Requirements and test methods.

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



37A/337/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 61643-11 ED2

DATE OF CIRCULATION:

2019-07-12

CLOSING DATE FOR COMMENTS:

2019-10-04

SUPERSEDES DOCUMENTS:

37A/336/RR

IEC SC 37A : LOW-VOLTAGE SURGE PROTECTIVE DEVICES

SECRETARIAT:

United States of America

SECRETARY:

Mr Muhammad Ali

OF INTEREST TO THE FOLLOWING COMMITTEES:

SC 37B, TC 64, TC 81, TC 82, TC 109

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☒ SAFETY

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Low-voltage surge protective devices - Part 11: Surge protective devices connected to AC low-voltage power systems - Requirements and test methods

NOTE FROM TC/SC OFFICERS:

There are some secretary's notes within this document requesting NCs to specifically reply on certain subjects and to provide input. The notes are in *Italics* and framed

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

**Part 11: Surge protective devices connected
to AC low-voltage power systems –
Requirements and test methods**

FOREWORD

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International Standard IEC 61643-11 has been prepared by subcommittee 37A: Low-voltage surge protective devices, of IEC technical committee 37: Surge arresters.

This second edition cancels and replaces the first edition published in 2011-03-09, whereby the common requirements for all SPDs are now contained in IEC 61643-01, and this second edition only contains the specific requirements for SPDs for AC applications. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) *To be completed at CDV stage;*

The text of this International Standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

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163 Full information on the voting for the approval of this International Standard can be found in
164 the report on voting indicated in the above table.

165 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

166 The committee has decided that the contents of this document will remain unchanged until the
167 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to
168 the specific document. At this date, the document will be

- 169 • reconfirmed,
- 170 • withdrawn,
- 171 • replaced by a revised edition, or
- 172 • amended.

173

174 The National Committees are requested to note that for this document the stability date
175 is 20XX.

176 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE
177 DELETED AT THE PUBLICATION STAGE.

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INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of SPDs when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the SPD is connected to the supply mains. However, national wiring rules may differ.

If the intended applications of an SPD are covered by different parts of IEC 61643, all relevant parts shall be applied, as far as is reasonable.

NOTE to entry: Throughout this publication, when "part 01" is mentioned, it refers to IEC 61643-01, and when "part 11" is mentioned, it refers to this standard.

This part of IEC 61643 addresses safety and performance tests for surge protective devices (SPDs) for AC applications in conjunction with part 01.

This part 11 addresses SPDs Type 1, Type 2 and Type 3 according part 01.

The requirements of this part 11 supplement, modify or replace certain of the general requirements contained in part 01 and shall be read and applied together with the latest edition of part 01, as indicated by the undated normative reference in the normative references of this document.

Numbering of clauses follows the numbering of part 01, but, dependent on the application of clauses from part 01, does not necessarily follow sequentially.

If a clause in part 01 is not explicitly called up or referred to in this part 11, then this clause does not apply to SPDs covered by this part 11. Any instructions in this standard calling up clauses from part 01 are written in *Italic type*.

NOTE to entry: In other words, if e.g. clause 4 is called up in this document all subclauses of clause 4 of part 01 shall be applied without modification. But, if e.g. some modifications are required on subclauses of clause 9 of part 01, then the relevant second level subclauses of part 01 (e.g. 9.3, 9.5 etc.) are called up separately and it is indicated how they shall be applied.

The numbering of figures and tables in this document takes the number of this part 11 followed by a sequential number.

The numbering of additional subclauses to part 01 in this document starts with the number 100 in the last section of the subclause added (see e.g. 4.100)

IEC 61643-12 addresses the selection and application principles of SPDs.

LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 11: Surge protective devices connected to AC low-voltage power systems – Requirements and test methods

1 Scope

This part of IEC 61643 is applicable to devices for surge protection against indirect and direct effects of lightning or other transient overvoltages.

These devices are intended to be connected to 50/60 Hz AC power circuits and equipment rated up to 1 000 V r.m.s. Performance characteristics, standard methods for testing and ratings are established. These devices contain at least one nonlinear component and are intended to limit surge voltages and divert surge currents.

The test requirements provided by this standard are based on the assumption that the SPD is connected to an AC power circuit fed by a power source providing a linear voltage-current characteristic. When the SPD is to be connected to a different kind of source or to a different frequency, careful consideration is required. This mainly applies with regard to system and fault conditions to be expected in such a system (e.g. expected short circuit current, TOV-stresses).

This standard does not apply to:

- SPDs for railway applications,
- SPDs for application in circuits with a limited power capability up to 100 W.

NOTE: Such SPDs are covered by IEC 61643-21

Note: Other exclusions based on national regulations are possible.

2 Normative references

For the purposes of this document the normative references given in part 01 apply.

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038:2009, *IEC standard voltages*

IEC 60364-4-44:2018, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60947-1:2014, *Low-voltage switchgear and controlgear - Part 1: General rules*

IEC 61643-01, *Low-voltage surge protective devices – Part 01: General requirements and test methods*

3 Terms, definitions and abbreviated terms

Clause 3 from part 01 applies.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Classification

Clause 4 from part 01 applies with the following additions:

4.12 End of life mode of the SPD-assembly

Clause 4.12 from part 01 applies with the following additions:

For SPDs for AC power circuits fed by a power source providing a linear voltage-current characteristic, only the open circuit mode according 4.12.1 of part 01 is applicable.

Note: A short circuiting SPD, when used with its required SPD disconnectors (SPD-assembly), fulfils the conditions to be classified open circuit mode (OCM).

4.100 Power system

4.100.1 AC between 47 Hz and 63 Hz

4.100.1 AC other than the range of 47 Hz to 63 Hz

This may require additional and/or modified test procedures.

5 Void

6 Marking and other product information

6.1 General

Clause 6.1 from part 01 applies.

6.2 List of items

Clause 6.2 from part 01 applies with the following additions:

The following information from the list of items in clause 6.2 of part 01 shall be provided as required below.

Secretary's note:

National committees are requested to provide comments if they agree with the marking and information requirements provided below, or if they prefer to shift specific items between the groups provided in sub clauses 6.10 to 6.103 below.

6.2.100 Markings which are required on the body, or permanently attached to the body, of the SPD:

6.2.100.1 Markings which shall be visible after installation:

- a1) Manufacturer's name or trademark and model number
- a4) SPD Type classification and discharge parameters shall be printed next to each and, if different, for each mode of protection declared by the manufacturer:
 - For T1 SPDs:
 - “ $\boxed{T1}$ ” (T1 in a square) and “ I_{imp} ” together with the value in kA
(e.g. $\boxed{T1}$ I_{imp} 25 kA)
 - For T2 SPDs:
 - “ $\boxed{T2}$ ” (T2 in a square) and “ I_n ” together with the value in kA
(e.g. $\boxed{T2}$ I_n 25 kA)
 - For T3 SPDs:

“ $\overline{T3}$ ” (T3 in a square) and “ U_{OC} ” together with the value in kV
(e.g. $\overline{T3}$ U_{OC} 6 kV).

- a14) Indication of disconnecter operation (if any) or SC-means operation (if any), see 6.3 of part 01

For portable SPDs and for pluggable SPDs it is sufficient that above markings are visible in the unplugged condition. This does not apply to the minimum marking requirements according 6.1 of part 01.

6.2.100.2 Markings which are not required to be visible after installation:

- a3) Type of current:
- AC or “~” or frequency (if different from 50Hz or 60 Hz)
- a7) Identification of connections or leads (if not otherwise identified on the devices) including any connections to protective earth or any other reference earth.
- a8) Rated load current I_L for two port SPDs and for one port SPDs with separate input and output connections.
- a18) nominal AC system voltages and maximum allowed voltage regulation/voltage variation for which the SPD is designed

6.2.101 Information which shall be provided with the products to be delivered (installation instructions):

- a2) Maximum continuous operating voltage U_C for each mode of protection (if U_C is different)
- a5) Voltage protection level U_P for each mode of protection (if U_P is different)
- a6) Degree of protection provided by the enclosure (IP code) if > IP20
- a9) Location (See 4.5 of part 01)
- a10) Number of ports
- a11) Method of mounting
- a12) Short-circuit current rating I_{SCCR} (exemptions see 8.3.6.3 of part 01)
- a13) Ratings and characteristics for external disconnecter(s), if required
- a15) Orientation for normal installation, if significant
- a16) type of systems for which the SPD is designed (e.g. TN-system, TT-system, IT-system)
- a17) intended connection (e.g. line to neutral, line to ground, neutral to ground, line to line, etc.)
- a19) mechanical dimensions, lead lengths, etc.
- a20) Temperature and humidity range (see 7.3 and 7.4 of part 01)
- a21) Continuous current I_C for each mode of protection (if I_C is different)
- a22) Protective conductor current I_{PE}
- a23) Short-circuiting SPD and its transition surge current rating I_{trans} (if declared by the manufacturer)
- a24) The minimum distance from any earthed conductive surface at which the SPD can be installed
- a25) I_{max} (if declared by the manufacturer)
- a26) End of life mode of the SPD assembly

6.2.102 Information which shall be provided in a product datasheet:

- a27) Temporary overvoltage U_T and/or the type(s) of power system(s) the SPD is designed for and corresponding connection details. Test values and details are provided in the relevant subsequent part(s) of IEC 61643 as applicable.
- a28) Total discharge current I_{Total} for multimode SPDs and the respective SPD Type (if declared by the manufacturer), except for T3 SPDs
- a29) Voltage drop for two port SPDs (if declared by the manufacturer)
- a30) Load-side surge withstand capability for two-port SPDs (if declared by the manufacturer)
- a31) Information about replaceable parts (indicators, fuses, etc. if applicable)
- a32) Voltage rate of rise du/dt (if declared by the manufacturer)
- a33) Current factor k , if different from **Table 18** of part 01
- a34) Modes of protection (for multimode SPDs)

6.2.103 Information which shall be provided by the manufacturer for type testing, as applicable:

- a35) Presence of switching component(s) (see Annex B)
- a36) Follow current to be expected, if applicable see Annex B
- a37) If the status indication circuitry does not use certified components operated within their ratings, the manufacturer shall provide the appropriate testing standards for the specific component to allow it to be tested.
- a38) Insulation and dielectric withstand of separate circuits
- a39) Rating and characteristic for the internal overcurrent protection, if required
- a40) Prospective short-circuit current for the test at low short-circuit current, if required according **9.3.6.3.4** of part 01
- x1) prospective short-circuit current for conditioning according **9.3.6.4.101**.

6.3 Information about status indicator

Clause 6.3 from part 01 applies.

7 Service conditions

Clause 7 from part 01 applies with the following addition:

7.100 Frequency

The standard frequency range is from 47 Hz to 63 Hz AC

Other frequencies may require additional and/or modified test procedures

8 Requirements**8.1 General requirements**

Clause 8.1 from part 01 applies.

8.2 Marking

Clause 8.2 from part 01 applies.

8.3 Electrical requirements

Clause 8.3 from part 01 applies with the following additions:

8.3.9 Behaviour under temporary overvoltages

Clause 8.3.9 from part 01 applies with the following additions:

SPD shall either withstand the overvoltages caused by faults or disturbances in the high or low voltage system, or fail in a manner not creating a hazard.

NOTE 1 The tests given in 9.3.9 do not take into account the possibility of a surge occurring simultaneously with a TOV event.

SPDs, for which the manufacturer declares in his installation instructions that they may be installed in TT-systems between neutral and PE upstream of the main RCD, shall pass the TOV test 9.3.9.101 in withstand mode according to 9.3.9.101.2, b).

NOTE 2: This covers the requirements for fault protection from clause 534.4.6 of IEC 60364-5-53.

8.3.9.100 TOVs caused by faults or disturbances in the low voltage system

For SPDs with a U_C greater than or equal to U_T there is no need to perform this test.

Compliance is checked by the test in accordance with 9.3.9.100.

8.3.9.101 TOVs caused by faults in the high (medium) voltage system

For SPDs with a U_C greater than or equal to U_T there is no need to perform this test.

Compliance is checked by the test in accordance with 9.3.9.101.

8.4 Mechanical requirements

Clause 8.4 from part 01 applies.

8.5 Environmental and material requirements

Clause 8.5 from part 01 applies with the following exemption:

8.5.5 Ageing behaviour under damp heat

This clause from part 01 does not apply.

8.6 Additional requirements for specific SPD designs

Clause 8.6 from part 01 applies with the following exemption:

8.6.4 Total discharge current I_{Total} (for multimode SPDs)

This clause applies only, if a Total discharge current is declared by the manufacturer.

9 Tests

9.1 General

Clause 9.1 from part 01 applies with the following additions:

9.1.1 General testing procedures

Clause 9.1.1 from part 01 applies with the following additions:

The test voltage U_{Test} shall be selected from Annex H based on the information given by the manufacturer according to 6.2.100.2, a18) and 6.2.101, a16) and a17).

The test frequency shall be 50Hz or 60 Hz unless otherwise specified.

For SPDs with a designated N terminal/connection, which may be applied in systems without distributed neutral according to the manufacturer's instructions, separate testing is required for the L-PE mode of protection with the neutral being unconnected.

The tests, the use of the tissue paper and/or the metallic screen as required for certain tests are shown in Table 11.1.

Secretary's note:

National committees are requested to carefully check the content of below Table 11.1.

Table 11.1 – Type test requirements for SPDs

Test	Test clause	Requirement clause	External dis-connectors ^{a)}	Tissue paper used	Metallic screen used	SPD type 1	SPD type 2	SPD type 3	SPD assembly classified		SPD / mode of protection			SPD N-PE ^{e)}	SPD outdoor & inaccessible ^{f)}
									OCM	SCM	voltage limiting	combination	voltage switching		
Marking and product information	9.2	6 / 8.2	-	-	-	A	A	A	A	A	A	A	A	A	A
Protection against direct contact	9.3.1	8.3.1	-	-	-	A	A	A	A	A	A	A	A	A	A
Continuous current	9.3.2	8.3.2	-	-	-	A	A	A	A	A	A	A	A	A	A
Protective conductor current	9.3.3	8.3.3	-	-	-	A	A	A	A	A	A	A	A	A	A
Voltage protection level	9.3.4	8.3.4	-	-	-	A	A	A	A	A	A	A	A	A	A
Residual voltage	9.3.4.2		-	-	-	A	A	-	A	A	A	A	A	A	A
Front-of-wave sparkover voltage	9.3.4.3		-	-	-	A	A	-	A	A	-	A	A	A	A
Limiting voltage with combination wave	9.3.4.4		-	-	-	-	-	A	A	A	A	A	A	A	A
Operating duty test	9.3.5 ^{b)}	8.3.5	A ^{c)}	-	-	A	A	A	A	A	A	A	A	A	A
Class I and II operating duty tests	9.3.5.3		A ^{c)}	-	-	A	A	-	A	A	A	A	A	A	A
Additional duty test for test class I	9.3.5.4		A ^{c)}	-	-	A	-	-	A	A	A	A	A	A	A
Class III operating duty tests	9.3.5.5		A ^{c)}	-	-	-	-	A	A	A	A	A	A	A	A
Temperature withstand	9.3.6.1	8.5.2	-	-	-	A	A	A	A	A	A	A	A	A	A
Thermal disconnection test ^{d)}	9.3.6.2	8.3.6.2	A	-	-	A	A	A	A	A	A	A	A	A	A
Short-circuit current behaviour ^{d)}	9.3.6.3	8.3.6.3	A	-	A	A	A	A	A	-	A	A	A	-	-
Dedicated overstress test ^{d)}	9.3.6.4	8.3.6.4	A	-	A	A	A	A	A	A	A	A	A	-	-
Insulation resistance and	9.3.7	8.3.7	-	-	-	A	A	A	A	A	A	A	A	A	A?