SLOVENSKI STANDARD

SIST EN 61643-11:2002/A11:2008

01-januar-2008

Nizkonapetostne naprave za zaģ ito pred prenapetostnimi udari - 11. del: Naprave za zaģ ito pred prenapetostnimi udari za nizkonapetostne napajalne sisteme - Zahteve in preskusi

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

Überspannungsschutzgeräte für Niederspannung - Teil 11: Überspannungsschutzgeräte für den Einsatz in Niederspannungsanlagen - Anforderungen und Prüfungen

Parafoudres basse-tension - Partie 11: Parafoudres connectés aux systemes de distribution basse tension - Prescriptions et essais

Ta slovenski standard je istoveten z: **EN 61643-11:2002/A11:2007**

ICS:

29.120.50	Varovalke in druga medtokovna zaģ ita	Fuses and other overcurrent protection devices
29.240.10	Transformatorske postaje. Prenapetostni odvodniki	Substations. Surge arresters

SIST EN 61643-11:2002/A11:2008 **en,fr**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61643-11/A11

January 2007

ICS 29.240.10

English version

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

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This amendment A11 modifies the European Standard EN 61643-11:2002; it was approved by CENELEC on 2006-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

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

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, 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

Ref. No. EN 61643-11:2002/A11:2007 E

Foreword

This amendment to the European Standard EN 61643-11:2002 was prepared by the Technical Committee CENELEC TC 37A, Low voltage surge protective devices.

The text of the draft was submitted to the formal vote and was approved by CENELEC as amendment A11 to EN 61643-11:2002 on 2006-07-01.

The following dates were fixed:

– latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2007-08-01
– latest date by which the national standards conflicting with the amendment have to be withdrawn	(dow)	2009-07-01

The following table gives an overview on the series of publications from TC 37A.

Publication No	Title	Present status
EN 61643-11	Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and testing methods	Published
TS 61643-12	Low-voltage surge protective devices – Part 12: Surge protective devices connected to low-voltage power systems – Selection and application principles	Published
EN 61643-21	Low-voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signalling networks – Performance requirements and testing methods	Published
TS 61643-22	Low-voltage surge protective devices – Part 22: Surge protective devices connected to telecommunications and signalling networks – Selection and application principles	Published
prEN 50XXX-X	Low voltage surge protective devices – Surge protective devices for specific application including d.c. – Part X: Requirements and tests	At working group level
prTS 50XXX-Y	Low voltage surge protective devices – Surge protective devices for specific application including d.c. – Part Y: Selection and application rules	At working group level

3 Definitions

Replace *the existing definitions by the following:*

3.11
maximum continuous operating voltage U_C
the maximum r.m.s. voltage, which may be continuously applied to the SPD´s mode of protection

3.18
temporary overvoltage test value U_T
test voltage applied, for a specific duration, to the SPD to simulate the stress under TOV conditions

3.22
1,2/50 voltage impulse
voltage impulse with a virtual front time of 1,2 µs and a time to half-value of 50 µs where

– the front time is defined according to IEC 60060-1 to be 1,67 x (t_{90} - t_{30}), where t_{90} and t_{30} are the 90 % and 30 % points on the leading edge of the waveform;

– the time to half-value is defined as the time between the virtual origin and the 50 % point on the tail. The virtual origin is the point where a straight line, drawn through the 30 % and 90 % points on the leading edge of the waveform, intersects the U = 0 line.

3.23
8/20 current impulse
current impulse with a virtual front time of 8 µs and a time to half-value of 20 µs where

– the front time is defined according to IEC 60060-1 to be 1,25 x (t_{90} - t_{10}), where t_{90} and t_{10} are the 90 % and 10 % points on the leading edge of the waveform;

– the time to half-value is defined as the time between the virtual origin and the 50 % point on the tail. The virtual origin is the point where a straight line, drawn through the 10 % and 90 % points on the leading edge of the waveform, intersects the I = 0 line.

Delete *definition 3.45 and* ***replace*** *by Void.*

Add *the following new definitions:*

3.47
multipole SPD
type of SPD with more than one mode of protection, or a combination of electrically interconnected SPDs offered as a unit

3.48
total discharge current I_{Total}
current which flows through the PE or PEN conductor of a multipole SPD during the total discharge current test

NOTE 1 This test is used to check for the cumulative effects that occur when multiple modes of protection of a multipole SPD conduct at the same time.

NOTE 2 I_{total} is particularly relevant for class I tested SPDs used for the purpose of lightning protection equipotential bonding according to IEC 62305 series.

3.49
maximum continuous operating voltage of the power system (U_{CS})
maximum r.m.s. voltage to which the SPD may be permanently subjected at the point of application of the SPD

NOTE This only takes into account voltage regulation and/or voltage drop or increase. It is also called "actual maximum system voltage" and is equal to 1,1 times U_0.

4 Classification

***Add** the following new subclause:*

4.11 Multipole SPD (if declared by manufacturer)

***Replace** the title of Clause 5 by:*

5 Preferred values

***Add** the following note at the beginning of Clause 5*

NOTE Preferred values means values which are often used in practice. Depending on real conditions lower and in some cases higher values may be needed.

***Replace** Subclause 5.1 by*

5.1 Preferred values of peak impulse current for class I tests I_{peak}

I_{peak}: 25; 20; 12,5; 10 and 5 kA

NOTE these values and related parameters are described in Table 3.

***Add** the following new subclause:*

5.6 Preferred values for I_{Total}

Type 1: 100; 75 and 50 kA

Type 2: 80; 60; 40 and 20 kA

Type 3: not applicable

6 Requirements

6.1.1 Identification

***Replace** items e) and* f) *by the following:*

e) Maximum continuous operating voltage U_c (one value for each mode of protection except if all values are equal)

f) SPD type and discharge parameters for each mode of protection declared by the manufacturer:
   – type 1 and I_{imp} in kA or alternatively "T1" (T1 in a square) and I_{imp} in kA
   – type 2 and I_{max} in kA or alternatively "T2" (T2 in a square) and I_{max} in kA
   – type 3 and U_{oc} in kV or alternatively "T3" (T3 in a square) and U_{oc} in kV

Replace *item p) by the following:*

p) installation instructions (e.g. type of LV systems: TN, TT, IT etc , connections to LV systems and rated system voltages for which the SPD is designed, mechanical dimensions, lead lengths, etc.)

Add *a new item x) as follows:*

x) Total discharge current I_{Total} for multipole SPDs (if declared by the manufacturer)

6.1.2 Marking

Replace *the first sentence by the following:*

Markings a), e), f), g), h), j), l), o) and q) in 6.1.1 are mandatory on the body, or permanently attached to the body, of the SPD.

6.2.11 Short-circuit withstand capability

Replace *the existing text of Subclause 6.2.11 by the following:*

An overstressed (short-circuited) SPD shall withstand the power short-circuit currents that may occur in service. Testing is in accordance with 7.7.3.

Replace *Subclause 6.5.5 by the following:*

6.5.5 Behaviour under temporary overvoltages

An SPD shall either withstand a TOV without changes in functionality, or fail in a manner described in 7.7.4 and 7.7.6.

NOTE The tests given in 7.7.4 and 7.7.6 do not take into account the possibility of a surge occurring simultaneously with a TOV event.

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

SPDs connected to PE and for use on power distribution systems shall be tested at U_T in accordance with 7.7.4 and Table B.1.

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

If U_C is greater or equal to U_T there is no need to perform this test.

All other SPDs shall be tested using either the TOV voltages U_T given in Table B.1 or the TOV voltages stated by the manufacturer according to 6.1.1 w), whichever values are higher. This test shall be performed in accordance with 7.7.6.

Add *the following new subclause:*

6.5.6 Total discharge current I_{Total}

This test is only conducted if the manufacturer claims a total discharge current in accordance with 7.9.10.

6.6 Additional test requirements for two-port SPDs and one-port SPDs with separate input/output terminals

Add *the following new subclause:*

6.6.4 Overload behaviour

The SPD shall not be damaged or altered by overloads, which may occur in normal use. Compliance with this requirement is checked according to 7.8.5.

7 Type tests

Replace *the full clause by the following:*

Type tests are carried out as indicated in Table 2 on three samples per test series. Within any test series, the tests shall be carried out in the order given in Table 2. The order in which test series are carried out may be varied.

If all samples pass a test series, the design of the SPD is acceptable for that test series. If two or more test samples fail a test series, the SPD does not comply with this standard.

In the event that a single sample does not pass a test, this test, and those preceding in the same test series that may have influenced the result of this test, shall be repeated with three new samples, but this time no failure of any sample is allowed.

A set of three samples may be used for more than one test series, if agreed by the manufacturer.

If the SPD is an integral part of a product covered by another international standard, the requirements of the other international standard shall apply to those parts of the product which do not belong to the SPD section of the product.

7.1 General testing procedures

Add *the following new paragraph after the first paragraph*:

Unless otherwise specified, a.c. values given in this standard are r.m.s values.

Add *the following new paragraph after the paragraph starting with "When not otherwise specified..."*

If not otherwise specified, for all tests where a power supply at U_C is required, the voltage tolerance for testing shall be $U_{c\,-5}^{\;\,0}$ *%.*

Replace *the existing Table 2 by the following new Table 2:*

Table 2 – Type test requirements where applicable for SPDs

Test series	Test description	Subclause	ACCESSIBLE						OUT OF REACH		
			FIXED			PORTABLE			FIXED		
			Test class								
			I	II	III	I	II	III	I	II	III
1	Identification and marking	6.1.1/6.1.2/7.2	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Terminals and connections	6.2.1/6.3/7.3	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Testing for protection against direct contact	6.5.1/7.4	Y	Y	Y	Y	Y	Y	–	–	–
	Standby power consumption and residual current	6.5.3/6.5.4/7.7.5	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Protection level	6.2.2/7.5									
	Determination of the presence of a switching component	7.5.1	N	N	N	N	N	N	N	N	N
	Residual voltage	7.5.2	Y	Y	–	Y	Y	–	Y	Y	–
	Front of wave sparkover voltage	7.5.3	Y	Y	–	Y	Y	–	Y	Y	–
	Limiting voltage with combination wave	7.5.4/7.5.5	–	–	Y	–	–	Y	–	–	Y
	Determination of the magnitude of the follow current	7.6.2	N	N	N	N	N	N	N	N	N
3	Operating duty test	6.2.6/7.6									
	Preconditioning	7.6.4 7.7.1	Y	Y	–	Y	Y	–	Y	Y	–
	Class I and II operating duty test	6.2.3/6.2.4/7.6.5/ 7.6.6/7.7.1	Y	Y	–	Y	Y	–	Y	Y	–
	Class III operating duty test	6.2.5/7.6.7/7.7.1	–	–	Y	–	–	Y	–	–	Y
4	Class I and II total discharge current	6.5.6/7.9.10	N	N	–	N	N	–	N	N	–
5	Test of thermal stability	6.2.7/7.7.2	Y	Y	Y	Y	Y	Y	Y	Y	Y
6*	Short-circuit withstand capability test	6.2.7/6.2.11/ 7.7.3	Y	Y	Y	Y	Y	Y	Y	Y	Y
7*	TOV test	6.2.7/6.5.5/7.7.6	Y	Y	Y	Y	Y	Y	Y	Y	Y
	TOV test	6.2.7/6.5.5/7.7.4	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	Flexible cables and cords and their connection	7.9.1	–	–	–	Y	Y	Y	–	–	–
	Mechanical strength	6.3/6.5.1.1/ 7.9.2.1	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Mechanical strength	6.3/6.5.1.1/ 7.9.2.2	–	–	–	Y	Y	Y	–	–	–
	Insulation resistance	6.5.1.3/7.9.7	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Dielectric withstand	6.2.10/7.9.8	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Environment, IP code	6.4/6.5.1/7.9.9	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Heat resistance	6.5.1.2/7.9.3	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Air clearances and creepage distances	6.2.8/7.9.5.1	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Resistance to abnormal heat and fire	6.5.2/7.9.4	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Tracking resistance	6.2.9/7.9.6	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	Additional tests for two-port SPDs and one port-SPDs with separate input/output terminals										
	Percentage voltage regulation	6.6.1/7.8.1	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Rated load current	6.6.2/7.8.2	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Load side surge withstand	6.6.3/7.8.4	N	N	N	N	N	N	N	N	N
	Overload behaviour	6.6.4/7.8.5	N	N	N	N	N	N	N	N	N
	Load side short-circuit withstand capability test	6.2.7/7.8.3	Y	Y	Y	Y	Y	Y	N	N	N
10	Additional checks and tests										
	Status indicator operation	6.2.12	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Isolation between separate circuits	6.2.13	Y	Y	Y	Y	Y	Y	Y	Y	Y
Y: applicable; N: not mandatory (optional); –: not applicable.											
* For this test series more than one set of samples may be needed.											

Replace *the existing Table 3 by the following new Table 3:*

Table 3 – Typical test values for class I test parameters

I_{peak} **within 50 µs** kA	Q **within 10 ms** As	W/R **within 10 ms** kJ/Ω
25	12,5	156
20	10	100
12,5	6,25	39
10	5	25
5	2,5	6,25

The following tolerances shall apply:

– I_{peak} ±10 %;

– Q ±20 %;

– W/R ±35 %.

7.1.2 Delete *last paragraph*

7.1.3 Class I and II voltage impulse test

Replace *the paragraph that begins with "The measurement of the voltage …" by:*

Oscillations exceeding 3 % of the peak value are not allowed at the rising portion of the voltage impulse.

The measuring devices shall have an overall bandwidth of at least 25 MHz and the overshoot shall be less than 3 %.

NOTE For SPDs with low nominal discharge currents the 20% value may be exceeded to ensure firing of the switching components.

Replace *the last paragraph by the following:*

The short-circuit current of the test generator shall preferably be less than 20 % of the nominal discharge current I_n, but sufficient to ensure that the SPD´s voltage switching component(s) conduct during the test.

Add *the following new subclause:*

7.1.5 Testing of SPDs classified outdoor only and for mounting out of reach

For SPDs classified outdoor only and for mounting out of reach, the tests of 7.7 and 7.8 are performed without the cubic wooden box.

NOTE Application of such SPDs inside closed shelters may require special attention.

7.5 Determination of the measured limiting voltage

Replace *the first sentence of item b) by the following:*

For a one-port SPD having terminals, the test is performed without external disconnectors and the measured limiting voltage is measured at the terminals. For a one-port SPD having connecting leads, the measured limiting voltage is measured with an external lead length of 150 mm.

Replace *the existing Figure 3 by the following new Figure 3:*

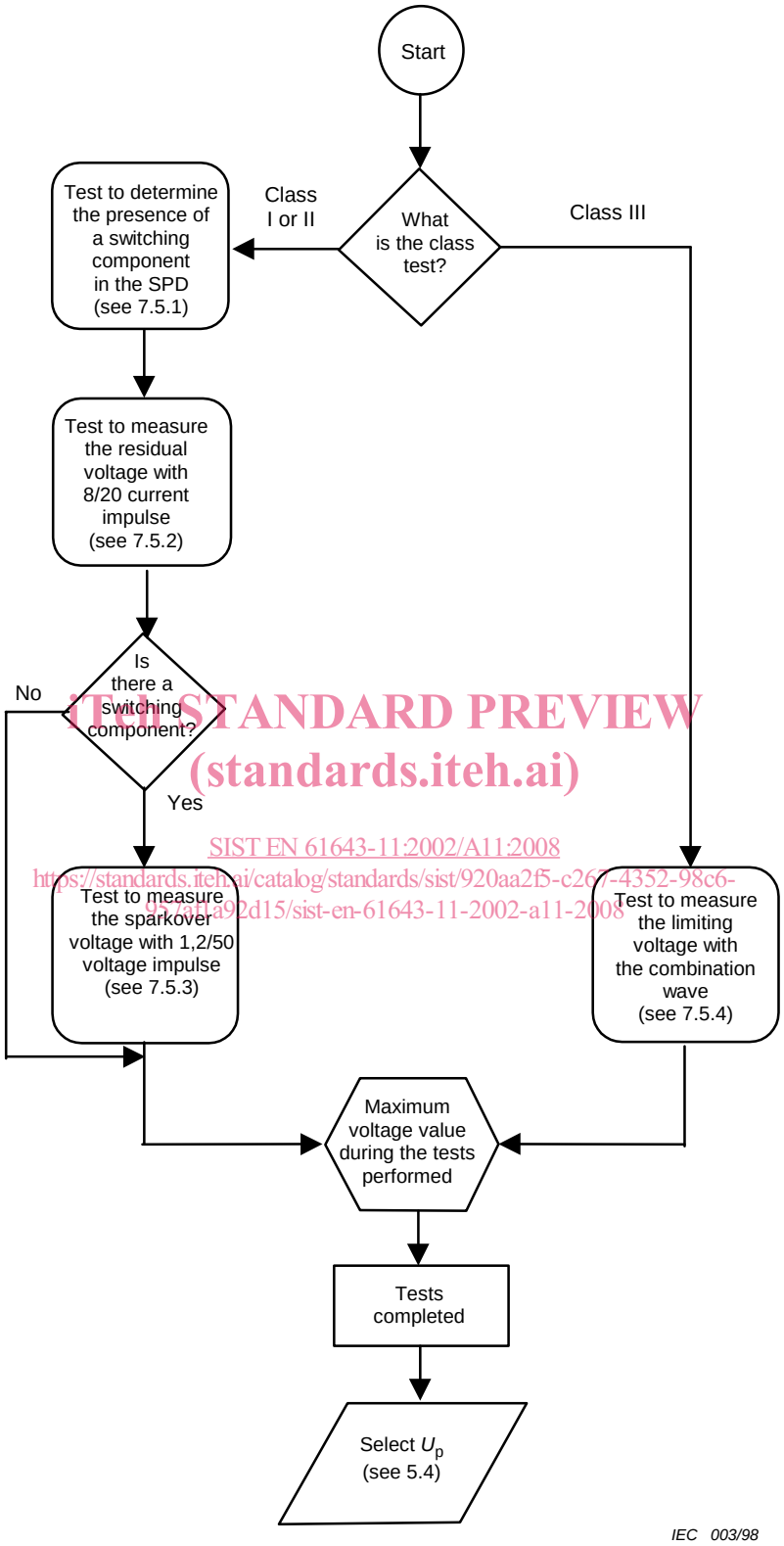

Figure 3 – Test flow chart to determine the voltage protection level U_p