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MADALPINGELISED LIIGPINGEKAITSEVAHENDID. OSA 31: NÕUDED JA KATSETUSMEETODID FOTOELEKTRILISTE PAIGALDISTE LIIGPINGEKAITSEVAHENDITELE

Low-voltage surge protective devices - Part 31: Requirements and test methods for SPDs for photovoltaic installations

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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See Eesti standard EVS-EN 61643-31:2019 sisaldab Euroopa standardi EN 61643-31:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 61643-31:2019 consists of the English text of the European standard EN 61643-31:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 03.05.2019.	Date of Availability of the European standard is 03.05.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.240, 29.240.10

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61643-31

May 2019

ICS 29.240; 29.240.10

Supersedes EN 50539-11:2013

English Version

Low-voltage surge protective devices - Part 31: Requirements and test methods for SPDs for photovoltaic installations (IEC 61643-31:2018 , modified)

Parafoudres basse tension - Partie 31: Parafoudres pour usage spécifique y compris en courant continu - Exigences et méthodes d'essai des parafoudres pour installations photovoltaïques
(IEC 61643-31:2018 , modifiée)

Überspannungsschutzgeräte für Niederspannung - Teil 31: Anforderungen und Prüfungen für Überspannungsschutzgeräte in Photovoltaik-Installationen
(IEC 61643-31:2018 , modifiziert)

This European Standard was approved by CENELEC on 2018-02-14. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

This European Standard 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Ref. No. EN 61643-31:2019 E

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European foreword

The text of document 37A/306/FDIS, future edition 1 of IEC 61643-31, prepared by SC 37A: “Low-voltage surge protective devices”, of IEC/TC 37: “Surge arresters” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61643-31:2019.

A draft amendment, which covers common modifications to IEC 61643-31, was prepared by CLC/TC 37A "Low-voltage surge protective devices" and approved by CENELEC.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-11-03
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2022-05-03

EN 61643-31:2019 supersedes EN 50539-11:2013.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 61643-31:2019 are prefixed “Z”.

EN 61643-31:2019 includes the following significant technical changes with respect to EN 50539-11:2013: It includes also guidance for verification of conformity for products already tested according EN 50539-11:2013.

The main changes with respect of EN 50539-11:2013 are the complete restructuring and improvement of the test procedures and test sequences.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 61643:2018 was approved by CENELEC as a European Standard with agreed common modifications.

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COMMON MODIFICATIONS

Modify as follows:

Through the complete document: *Replace all IEC 61643 references by EN 61643*

Replace all IEC references by EN when relevant standard is listed in either the Normative reference or in the Bibliography sections.

Foreword *Add to the Foreword the following:*

This standard covers the principle elements and objectives for electrical equipment designed for use within certain voltage limits (LVD - 2014/35/EU) and for electromagnetic compatibility (EMCD - 2014/30/EU).

Introduction *Delete the last sentence in the Introduction.*

Scope *Modify the 5th paragraph to read:*

SPDs with separate input and output terminal(s) that contain specific series impedance between these terminal(s) (so called two-port SPDs according to EN 61643-11) are not covered. As test class III in EN 61643-11 was primarily developed to cover two-port SPDs, SPDs tested according to this test class are not intended to be used in PV-systems.

3.1.19 *Add the following note:*

NOTE EN 62475 provides the current impulse definitions of front time, time to half values and waveshape.

5.3 *Replace 5.3 by the following*:

Types 1 and 2 SPDs- Class I and II tests

Information required for class I and class II tests is given in Table Z1.

Table Z1 – Tests of types 1 and 2 SPDs

Type of SPD	Tests	Required information
Type 1	Class I	I_{imp}
Type 2	Class II	I_n

6.5 *Add new requirement:*

6.5.4 Vibration and shock

Information on vibration and shock tests for transportation and special applications can be found in Annex ZB of EN 61643-11.

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7.4.4.2.2 *Replace:*

in less than 60 s when PV_4 with I_{SCPV} or DC_3 with 2,7 times I_{SCPV} is applied. During the tests when DC_3 with 2,7 times I_{SCPV} is applied, the fuse for detection shall not operate;

in less than 5 min when DC_3 with a prospective short-circuit current of equal to I_{SCPV} is applied.

by:

in less than 20 s when PV_4 with I_{SCPV} or DC_3 with 2,7 times I_{SCPV} is applied. During the tests when DC_3 with 2,7 times I_{SCPV} is applied, the fuse for detection shall not operate;

in less than 1 min when DC_3 with a prospective short-circuit current of equal to I_{SCPV} is applied.

7.4.4.3.2 *Replace:*

In less than 60 s during the test when PV_4 with a prospective short-circuit current of I_{SCPV} is applied;

by:

In less than 20 s during the test when PV_4 with a prospective short-circuit current of I_{SCPV} is applied;

Annex ZA *Add Annex ZA (See annexes)*

Annex ZB *Add Annex ZB (See annexes)*

Annex ZZ *Add Annex ZZ (See annexes)*

Bibliography *Modify Bibliography (See Annexes)*

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Add the following annexes:

Annex ZA
(informative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60060-1	2010	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	2010
IEC 60112	2003	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	2003
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 61000	series	Electromagnetic compatibility (EMC)	EN 61000	series
IEC 61000-6-1	2005	Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments	EN 61000-6-1	2007
IEC 61000-6-3	2006	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments	EN 61000-6-3	2007
IEC 60068-2-78	2012	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2013
IEC 61180-1	1992	High-voltage test techniques for low-voltage equipment - Part 1: Definitions, test and procedure requirements	EN 61180-1	1994
IEC 60364-5-51	-	Electrical installation of buildings – Part 5-51: Selection and erection of electrical equipment; Common rules	HD 60364-5-51	2009

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IEC 61643-11	2011	Low-voltage surge protective devices –Part 11: Surge protective devices connected to low-voltage power systems –Requirements and test methods	EN 61643-11 + A11	2012 2018
IEC 62475	-	High-current test techniques - Definitions and requirements for test currents and measuring systems	EN 62475	2010

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Annex ZB
(normative)

Reduced test procedure

This annex addresses the number of samples to be submitted and test sequence to be applied for verification of conformity for products already tested according EN 50539-11:2013.

The simplified test procedure according to Table ZB.1 may then be applied for verification of conformity.

For new products complete type tests and samples according to Clause 7 are required.

Table ZB.1 - Simplified test procedure for SPDs already complying with EN 50539-11

Test sequence	Test description	Subclause	Testing required
1	Identification and marking	6.1.1 / 6.1.2 / 7.2	Yes[a]
	Mounting	6.3.1	No
	Terminals and connections	6.3.2 / 6.3.3	No
	Testing for protection against direct contact	6.2.1	Yes[b]
	Environment, IP code	6.4	No
	Residual current	6.2.2 / 7.4.1	No
	Continuous current	6.2.8 / 7.4.6	Yes
	Operating duty test	6.2.4 / 7.4.2	No
	Operating duty test for test classes I and II	7.2.3.2 / 7.4.2.3 / 7.4.2.4	No
	Additional duty test for test class I	7.4.2.5	No
	Thermal stability	6.2.5.3 / 7.4.3.2	Yes
	Air clearances and creepage distances	6.6.3.4 / 7.5.1	No
	Ball pressure test	6.4	No
	Resistance to abnormal heat and fire	6.4	No
	Tracking resistance	6.4	No
2	Voltage Protection level	6.2.3	No
3	Insulation resistance	6.2.6	No
	Dielectric withstand	6.2.7 / 7.4.5	No
3a	**See below - only if applicable**		
	Mechanical strength	6.3.5	No
	Temperature withstand	6.2.5 / 7.4.3.1	No
3b	**See below - only if applicable**		
4	Heat resistance	6.4	No
5[c]	SPD failure mode test	6.2.5.4 / 7.4.4	Yes[d]
6	Live test under damp heat	7.6.1	No
7	Total discharge current test for multipole SPDs	6.2.9	No
Additional tests for one-port-SPDs with separate input / output terminals			
3b	Rated load current	6.5.1 / 7.7.1.1	No
Additional tests for outdoor use SPDs			
8	Environmental tests for outdoor SPDs	6.5.2 / 7.7.2	No
Additional tests for SPDs with separate isolated circuits			
3a	Isolation between separate circuits	6.5.3 / 7.4.5	No

[a] This is related to 6.1.1 only.

[b] This is related to SPDs having a U_{CPV} equal to or below 120 V only.

[c] For this test sequence more than one set of samples may be needed.

[d] This is related to combination SPDs only (no additional test for other types of SPDs).

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Annex ZZ

(informative)

Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European standard has been prepared under a Commission's standardisation request relating to harmonised standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

Table ZZ.1 – Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
(1)(a)	Clauses 6.1, 6.3.1 Clause 7.3	
(1)(b)	Clause 6.1	
(1)(c)	Clauses 1, 2, 3, 4, 5 and refer to 2a) to 2d) below and 3a) to 3c) below	
(2)(a)	Clause 5.5, 6.2.1, 6.2.2 Clause 7.1, 7.2, 7.4.1, 7.2.1 table 5 and table 4 pass criteria c, e, h, l, j, and clause 8	
(2)(b)	Clauses 6.5.1, 6.2.5.3, 6.2.5, 6.2.4, 6.5.1 Clauses 7.1, 7.2, 7.4.2, 7.4.3.2, 7.4.3, 7.4.4, 7.7.1, 8	
(2) (c)	Clauses 6.4.3.1, 6.4.3.2 Clause 8	
(2)(d)	Clauses 6.3.4, 6.2.6, 6.2.7, 6.5.2 Clauses 7.1, 7.2, 7.5.1, 7.5.2, 7.4.5, 7.7.2, 8	
(3)(a)	Clause 6.3.5 Clause 7.1, 7.2, 8	

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(3)(b)	Clauses 6.4.2, 6.4.1, 6.5.2 Clauses 7.1, 7.2, 7.6.1, 7.6.2, 7.7.2, 8 Clause 8.5.2, 8.5.3, 8.3.5.1	
(3)(c)	Clauses 6.2.5 Clauses 7.1, 7.2, 7.4.3, 7.4.4, 8	

WARNING 1: Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2: Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

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Bibliography

For the following references,

Replace:

IEC 60950:1991, Information technology equipment-Safety

by:

EN 60950-1, Information technology equipment – Safety – Part 1: General requirements (IEC 60950-1)

Replace:

ISO 4892-2, Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps

ISO 4892-1, Plastics - Methods of exposure to laboratory light sources - Part 1: General guidance

ISO 4628-3, Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting

by:

EN ISO 4892-2, Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps (ISO 4892-2)

EN ISO 4892-1:2000, Plastics – Methods of exposure to laboratory light sources – Part 1: General guidance (ISO 4892-1)

EN ISO 4628-3, Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3: Assessment of degree of rusting (ISO 4628-3)

Add the following references:

EN 50521:2008, Connectors for photovoltaic systems - Safety requirements and tests

EN 60068-2-11:1999, Environmental testing – Part 2: Tests – Test Ka: Salt mist (IEC 60068-2-11:1981)

EN 60068-2-14:2009, Environmental testing – Part 2-14: Tests - Test N: Change of temperature (IEC 60068-2-14:2009)

EN 60068-2-30:2005, Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle) (IEC 60068-2-30:2005)

EN 60099-4:2004, Surge arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems (IEC 60099-4:2004, mod.)

EN 60112:2003, Method for the determination of the proof and the comparative tracking indices of solid insulating materials (IEC 60112:2003)

EN 60228: 2005, Conductors of insulated cables (IEC 60228: 2004)

EN 60947-1:2007, Low voltage switchgear and controlgear – Part 1: General rules (IEC 60947-1:2007)

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