

**Components for low-voltage surge protective devices -
Part 312: Selection and application principles for gas
discharge tubes (IEC 61643-312:2013 + corrigendum Jul.
2013)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 61643-312:2013 sisaldab Euroopa standardi EN 61643-312:2013 ingliskeelset teksti.	This Estonian standard EVS-EN 61643-312:2013 consists of the English text of the European standard EN 61643-312:2013.
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 09.08.2013.	Date of Availability of the European standard is 09.08.2013.
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 31.100, 33.040.99

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Aru 10, 10317 Tallinn, Eesti; www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:
Aru 10, 10317 Tallinn, Estonia; www.evs.ee; phone 605 5050; e-mail info@evs.ee

**Components for low-voltage surge protective devices -
Part 312: Selection and application principles for gas discharge tubes**
(IEC 61643-312:2013 + corrigendum Jul. 2013)

Composants pour parafoudres basse
tension -
Partie 312: Principes de choix et
d'application pour les tubes à décharge de
gaz
(CEI 61643-312:2013
+ corrigendum Jul. 2013)

Bauelemente für
Überspannungsschutzgeräte für
Niederspannung -
Teil 312: Auswahl- und
Anwendungsprinzipien für
Gasentladungsableiter
(IEC 61643-312:2013
+ corrigendum Jul. 2013)

This European Standard was approved by CENELEC on 2013-05-27. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 37B/114/FDIS, future edition 1 of IEC 61643-312, prepared by SC 37B, "Specific components for surge arresters and surge protective devices", of IEC/TC 37, "Surge arresters" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61643-312:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-02-27
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-05-27

This document partially supersedes EN 61643-311:2001.

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

Endorsement notice

The text of the International Standard IEC 61643-312:2013 + corrigendum July 2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60364-5-51:2001	NOTE	Harmonised as HD 60364-5-51:2006 (modified).
IEC 60068-2-1	NOTE	Harmonised as EN 60068-2-1.
IEC 60068-2-20	NOTE	Harmonised as EN 60068-2-20.
IEC 60068-2-21	NOTE	Harmonised as EN 60068-2-21.
IEC 60721-3-3	NOTE	Harmonised as EN 60721-3-3.
IEC 61643-11	NOTE	Harmonised as EN 61643-11.
IEC 61643-21	NOTE	Harmonised as EN 61643-21.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60068-2-1	-	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-20	-	Environmental testing - Part 2-20: Tests - Test T: Test methods for solderability and resistance to soldering heat of devices with leads	EN 60068-2-20	-
IEC 60068-2-21	-	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN 60068-2-21	-
IEC 61643-311	-	Components for low-voltage surge protective devices - Part 311: Performance requirements and test circuits and methods for gas discharge tubes (GDT)	EN 61643-311	-

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms, definitions and symbols	6
3.1 Terms and definitions	6
3.2 Symbols	10
4 Service conditions	10
4.1 General	10
4.2 Low temperature	10
4.3 Air pressure and altitude	10
4.4 Ambient temperature	10
4.5 Relative humidity	11
5 Mechanical requirements and materials	11
5.1 General	11
5.2 Robustness of terminations	11
5.3 Solderability	11
5.4 Radiation.....	11
5.5 Marking	11
6 General	11
7 Construction	12
7.1 Design.....	12
7.2 Description	12
7.3 Fail-short (failsafe)	13
8 Function	14
8.1 Protection principle.....	14
8.2 Operating mode.....	14
8.3 Response behaviour.....	14
8.3.1 Static response behavior	14
8.3.2 Dynamic response behavior.....	14
8.4 Fail-short (failsafe)	15
9 Applications.....	16
9.1 Protective circuits	16
9.1.1 General	16
9.1.2 2-point (signal line) protection	16
9.1.3 3-point protection	17
9.1.4 5-point protection	18
9.2 Telephone/fax/modem protection.....	19
9.3 Cable TV/coaxial cable protection	19
9.4 AC line protection.....	20
Bibliography.....	21
Figure 1 – Voltage and current characteristics of a GDT	8
Figure 2 – Symbol for a two-electrode GDT	10
Figure 3 – Symbol for a three-electrode GDT	10
Figure 4 – Example of a two-electrode GDT.....	12

Figure 5 – Example of a three-electrode GDT	12
Figure 6 – Failsafe construction of a three-electrode GDT using a solder pill as sensitive spacer	13
Figure 7 – Failsafe construction of a three-electrode GDT, using a plastic foil as sensitive spacer	13
Figure 8 – Typical response behaviour of a 230 V GDT	15
Figure 9 – Spark-over voltages versus response time	15
Figure 10 – Current through the GDT versus response time of fail-short (failsafe).....	16
Figure 11 – 2-point (Signal line) protection	17
Figure 12 – 3-point protection using two-electrode GDTs	17
Figure 13 – 3-point protection using three-electrode GDTs	17
Figure 14 – 3-point protection using two-electrode GDTs with fail-short	18
Figure 15 – 3-point protection using three-electrode GDTs with fail-short.....	18
Figure 16 – 5-point protection using two-electrode GDTs	18
Figure 17 – 5-point protection using three-electrode GDTs	18
Figure 18 – 5-point protection using two-electrode GDTs with fail-short	19
Figure 19 – 5-point protection using three-electrode GDTs with fail-short.....	19
Figure 20 – Telephone/fax/modem protection using two-electrode GDTs	19
Figure 21 – Telephone/fax/modem protection using three-electrode GDTs.....	19
Figure 22 – Cable TV/ coaxial cable protection	20
Figure 23 – AC line protection.....	20

COMPONENTS FOR LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 312: Selection and application principles for gas discharge tubes

1 Scope

This part of IEC 61643 is applicable to gas discharge tubes (GDT) used for overvoltage protection in telecommunications, signalling and low-voltage power distribution networks with nominal system voltages up to 1 000 V (r.m.s.) a.c. and 1 500 V d.c. They are defined as a gap, or several gaps with two or three metal electrodes hermetically sealed so that gas mixture and pressure are under control. They are designed to protect apparatus or personnel, or both, from high transient voltages. This standard provides information about the characteristics and circuit applications of GDTs having two or three electrodes. This standard does not specify requirements applicable to complete surge protective devices, nor does it specify total requirements for GDTs employed within electronic devices, where precise coordination between GDT performance and surge protective device withstand capability is highly critical.

This part of IEC 61643

- does not deal with mountings and their effect on GDT characteristics. Characteristics given apply solely to GDTs mounted in the ways described for the tests;
- does not deal with mechanical dimensions;
- does not deal with quality assurance requirements;
- may not be sufficient for GDTs used on high-frequency (>30 MHz);
- does not deal with electrostatic voltages;
- does not deal with hybrid overvoltage protection components or composite GDT devices.

2 Normative references

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

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-20, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-21, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 61643-311, *Components for low-voltage surge protective devices – Part 311: Specification for gas discharge tubes (GDT)*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply: