SLOVENSKI STANDARD
kSIST FprEN 61643-311:2010

01-marec-2010

Sestavni deli za nizkonapetostne naprave za zaščito pred prenapetostnimi udari - 311. del: Preskusni tokokrogi in metode preskušanja plinskih odvodnikov

Components for low-voltage surge protective devices -- Part 311: Test circuits and methods for gas discharge tubes

Composants pour parafoudres basse tension -- Partie 311: Circuits et méthodes d'essai pour tubes à décharge de gaz

Ta slovenski standard je istoveten z: **FprEN 61643-311:2010**

ICS:

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

kSIST FprEN 61643-311:2010 **en,fr**

37B/98/CDV

COMMITTEE DRAFT FOR VOTE (CDV)
PROJET DE COMITÉ POUR VOTE (CDV)

	Project number Numéro de projet IEC 61643-311 Ed. 2.0	
	IEC/TC or SC: **SC 37B** CEI/CE ou SC:	Secretariat / Secrétariat **USA**
☒ Submitted for parallel voting in CENELEC Soumis au vote parallèle au CENELEC	Date of circulation Date de diffusion **2010-01-15**	Closing date for voting (Voting mandatory for P-members) Date de clôture du vote (Vote obligatoire pour les membres (P)) **2010-06-18**

Also of interest to the following committees Intéresse également les comités suivants TC 37, SC 37A, TC 81	Supersedes document Remplace le document 37B/92/CD and 37B/95A/CC

Proposed horizontal standard
Norme horizontale suggérée

☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the TC/SC secretary
Les autres CE/SC sont requis d'indiquer leur intérêt, si nécessaire, dans ce CDV à l'intention du secrétaire du CE/SC

Functions concerned
Fonctions concernées

☐ Safety / Sécurité ☐ EMC / CEM ☐ Environment / Environnement ☐ Quality assurance / Assurance qualité

Titre : CEI 61643-311 Ed. 2.0: Composants pour parafoudres basse tension - Partie 311: Circuits et méthodes d'essai pour tubes à décharge de gaz

Title : IEC 61643-311 Ed. 2.0: Components for low-voltage surge protective devices - Part 311: Test circuits and methods for gas discharge tubes

Introductory note

The existing IEC 61643-311 standard was published in 2001. The document has a title "Specification for gas discharge tubes (GDT)" which can be interpreted as a specification for testing, of performance values or both. The contents of the published IEC 61643-311 standard has elements of test specification, performance specification and applications principles.

IEC 37/262/INF introduced a more logical numbering scheme for all IEC-Standards developed within IEC-SC 37B. Each of the component technologies had three associated documents; a test specification, a performance specification and a selection and applications principles guide.

For this reason, IEC 37/262/INF defines IEC 61643-311 as "Test circuits and methods for gas discharge tubes", IEC 61643-312 as "Preferred values and characteristics for gas discharge tubes", and IEC 61643-313 is defined as "Selection and applications principles for gas discharge tubes".

ATTENTION
VOTE PARALLÈLE
CEI – CENELEC

L'attention des Comités nationaux de la CEI, membres du CENELEC, est attirée sur le fait que ce projet de comité pour vote (CDV) de Norme internationale est soumis au vote parallèle.
Les membres du CENELEC sont invités à voter via le système de vote en ligne du CENELEC.

ATTENTION
IEC – CENELEC
PARALLEL VOTING

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) for an International Standard is submitted for parallel voting.
The CENELEC members are invited to vote through the CENELEC online voting system.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMPONENTS FOR LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 311: Test circuits and methods for gas discharge tubes

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61643-311 has been prepared by subcommittee 37B: Specific components for surge arresters and surge protective devices, of IEC technical committee 37: Surge arresters.

The text of this standard is based on the following documents:

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

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date[1)] indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

1) The National Committees are requested to note that for this publication the maintenance result date is 2015

COMPONENTS FOR LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 311: Test circuits and methods for gas discharge tubes

1 Scope

This international standard 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 series of gaps, in an enclosed discharge medium other than air. They are designed to protect apparatus or personnel, or both, from high transient voltages. This standard contains a series of test criteria, test methods and test circuits for determining the electrical characteristics 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 GDTs connected in series with voltage-dependent resistors in order to limit follow-on currents in electrical power systems;
- does not deal with hybrid or composite GDT devices.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61643. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61643 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60068-2-1: 2007, *Environmental testing – Part 2: Tests. Tests A: Cold*

IEC 60068-2-20: 1979, *Environmental testing – Part 2: Tests. Test T: Soldering*

IEC 60068-2-21: 2006, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60364-5-51: 2005, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment - Common rules*

IEC 61000-4-5: 2005, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 5: Surge immunity test*

IEC 61180-1: 1992, *High-voltage test techniques for low voltage equipment – Part 1: Definitions, test and procedure requirements*

IEC 61643-312: 2008, *Components for low voltage surge protective devices – Part 312: Preferred values and characteristics for gas discharge tubes*

ITU-T Recommendation K.20: 2003, *Resistibility of telecommunication equipment installed in a telecommunications centre to overvoltages and overcurrents*

3 Technical data

3.1 Symbols

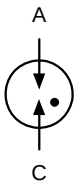


Figure 1 – Symbol for a two-electrode GDT

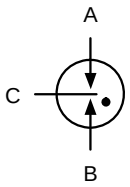


Figure 2 – Symbol for a three-electrode GDT

3.2 Definitions

For the purpose of this standard of IEC 61643-311 the following definitions apply.

3.2.1
arc current
current that flows after sparkover when the circuit impedance allows a current to flow that exceeds the glow-to-arc transition current

3.2.2
arc voltage (arc mode voltage)
voltage drop across the GDT during arc current flow

NOTE See figure 3a region A.

3.2.3
arc-to-glow transition current
current required for the GDT to pass from the arc mode into the glow mode

3.2.4
current turn-off time
time required for the GDT to restore itself to a non-conducting state following a period of conduction.

NOTE This applies only to a condition where the GDT is exposed to a continuous d.c. potential (see d.c. holdover).

3.2.5
d.c. sparkover voltage (d.c. breakdown voltage)
voltage at which the GDT transitions from a high-impedance off to a conduction state when a slowly rising d.c. voltage up to 2 kV/s is applied

NOTE The rate of rise for d.c. sparkover voltage measurements is usually equal or less 2000 V/s.

3.2.6
d.c. holdover
state in which a GDT continues to conduct after it is subjected to an impulse sufficient to cause breakdown.

NOTE In applications where a d.c. voltage exists on a line. Factors that affect the time required to recover from the conducting state (current turn-off time) include the d.c. voltage and the d.c. current

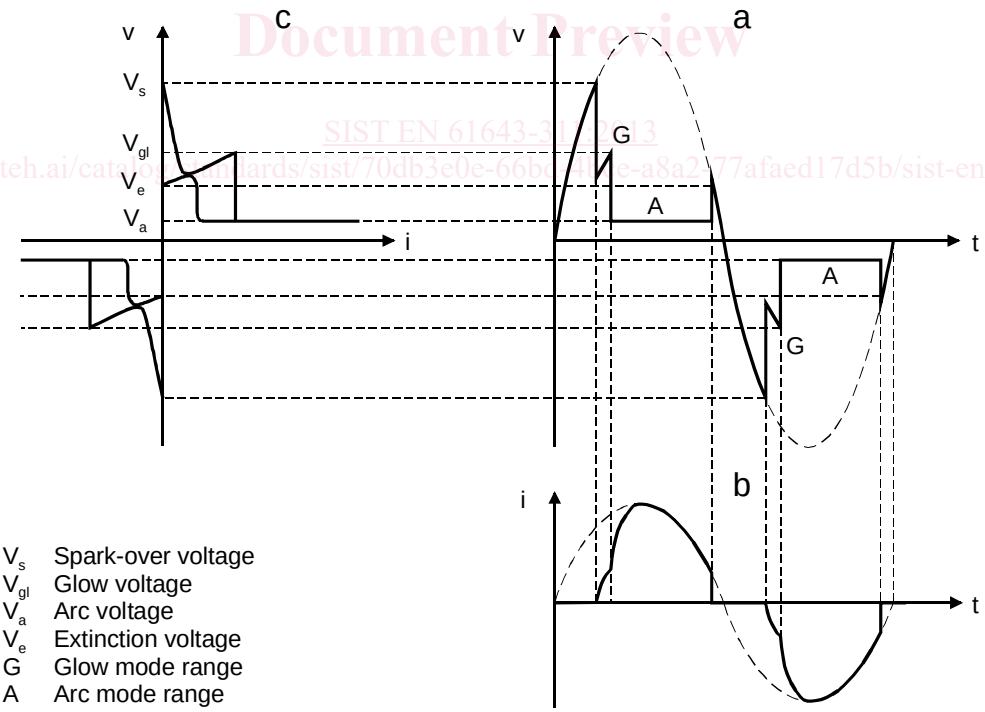
3.2.7
d.c. holdover voltage
maximum d.c. voltage across the terminals of a gas discharge tube under which it may be expected to clear and to return to the high-impedance state after the passage of a surge, under specified circuit conditions

3.2.8
discharge current
current that flows through a GDT after sparkover occurs

NOTE In the event that the current passing through the GDT is alternating current, it will be r.m.s. value. In instances where the current passing through the GDT is an impulse current, the value will be the peak value.

3.2.9
discharge voltage
peak value of voltage that appears across the terminals of a GDT during the passage of GDT discharge current

3.2.10
discharge voltage current characteristic (V/I characteristic)
variation of peak values of discharge voltage with respect to GDT discharge current



V_s Spark-over voltage
V_{gl} Glow voltage
V_a Arc voltage
V_e Extinction voltage
G Glow mode range
A Arc mode range

Figure 3a – Voltage at the GDT as a function of time when limiting a sinusoidal voltage surge

Figure 3b – Current at theGDT as a function of time when limiting a sinusoidal voltage surge

Figure 3c – V/I characteristic of the GDT obtained by combining the graphs of voltage and current

3.2.11
extinction voltage
voltage at which discharge (current flow) ceases

3.2.12
fail-short (failsafe)
thermally-activated external shorting mechanism

3.2.13
follow (on) current
current that the GDT conducts from a connected power source after sparkover

NOTE The GDT is expected to extinguish after sparkover to avoid overheating

3.2.14
gas discharge tube (GDT)
gap, or gaps, in an enclosed discharge medium, other than air at atmospheric pressure, designed to protect apparatus or personnel, or both, from high transient voltages

3.2.15
glow current (glow mode current)
current that flows after breakdown when the circuit impedance limits the follow current to a value less than the glow-to-arc transition current

NOTE See figure 3a region A.

3.2.16
glow-to-arc transition current
current required for the GDT to pass from the glow mode into the arc mode

NOTE See figure 3a region A.

3.2.17
glow voltage (glow mode voltage)
peak value of voltage drop across the GDT when a glow current is flowing

NOTE See figure 3a region A.

3.2.18
impulse sparkover voltage
highest value of voltage attained by an impulse of a designated voltage rate-of-rise and polarity applied across the terminals of a GDT prior to the flow of the discharge current

3.2.19
impulse waveshape
outline of an electrical surge designated as *x*/*y* having a rise time of *x* μs and a decay time to half value of *y* μs as standardized in IEC 61180-1

3.2.20
nominal alternating discharge current
current which the GDT is designed to conduct for a defined time

NOTE For currents with a frequency of 15 Hz to 62 Hz

3.2.21
nominal d.c. sparkover voltage
voltage specified by the manufacturer to indicate the target value of sparkover voltages of a particular type of GDT products

NOTE 1 The nominal value is generally a rounded number such as: 75 V, 90 V, 150 V, 200 V, 230 V, 250 V, 300 V, 350 V, 420 V, 500 V, 600 V, 800 V, 1000 V, 1200 V, 1400 V, 1800 V, 2100 V, 2700 V, 3000 V, 3600 V, 4000 V and 4500 V

NOTE 2 Values in between shall be agreed jointly between the manufacturer and the user.