

Components for low-voltage surge protective devices —

Part 311: Specification for gas discharge tubes (GDT)

The European Standard EN 61643-311:2001 has the status of a
British Standard

ICS 31.100; 29.240.10

National foreword

This British Standard is the official English language version of EN 61643-311:2001. It was derived by CENELEC from IEC 61643-311:2001.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by common modification tags **C** **CI**.

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CENELEC

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Foreword

The text of document 37B/57/FDIS, future edition 1 of IEC 61643-311, 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 was approved by CENELEC as EN 61643-311 on 2001-12-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
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- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2004-12-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative
Annex ZA has been added by CENELEC.

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COMPONENTS FOR LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 311: Specification for gas discharge tubes (GDT)

1 Scope

Gas discharge tubes (GDTs) are used for applications up to 1 000 V [C] A.C. [C] or 1 500 V [C] D.C. [C] in communication or signalling circuits. 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 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

- deals with GDTs having two or three electrodes;
- 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 or multi-channel systems;
- 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 60068-2-1:1990, *Environmental testing – Part 2: Tests. Tests A: Cold*

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

IEC 60068-2-21:1999, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 61000-4-5:1995, *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*

ITU-T Recommendation K.20:2000, *Resistibility of telecommunication equipment installed in a telecommunications centre to overvoltages and overcurrents*

3 Definitions and symbols

3.1 Definitions

For the purpose of this part of IEC 61643, the following definitions apply.

3.1.1

arc current

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

3.1.2

arc voltage (arc mode voltage)

voltage drop across the GDT during arc current flow

3.1.3

arc-to-glow transition current

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

3.1.4

current turn-off time

time required for the GDT to restore itself to a non-conducting state following a period of conduction. This applies only to a condition where the GDT is exposed to a continuous specified $\square$ D.C. $\square$ potential under a specified circuit condition

3.1.5

$\square$ D.C. $\square$ breakdown voltage

voltage at which the GDT transitions from a high-impedance off to a conduction state when a slowly rising $\square$ D.C. $\square$ voltage is applied

3.1.6

$\square$ D.C. $\square$ holdover

in applications where a $\square$ D.C. $\square$ voltage exists on a line, a holdover condition is one in which a GDT continues to conduct after it is subjected to an impulse large enough to cause breakdown. Factors that affect the time required to recover from the conducting state include the $\square$ D.C. $\square$ voltage and the $\square$ D.C. $\square$ current

3.1.7

$\square$ D.C. $\square$ holdover voltage

maximum $\square$ D.C. $\square$ voltage across the terminals of a GDT 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

3.1.8

$\square$ D.C. $\square$ sparkover voltage

voltage at which the GDT sparks over when slowly increasing $\square$ D.C. $\square$ voltage is applied

3.1.9

GDT 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.

3.1.10

discharge voltage

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

3.1.11

discharge voltage current characteristic

variation of peak values of discharge voltage with respect to GDT discharge current

3.1.12

gas discharge tube

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

3.1.13

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

3.1.14

glow-to-arc transition current

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

3.1.15

glow voltage (glow mode voltage)

peak value of voltage drop across the GDT when a glow current is flowing

3.1.16

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

3.1.17

impulse waveform

impulse waveform designated as x/y having a rise time of x and a decay time to half value of y as standardized in IEC 61180-1

3.1.18

nominal alternating discharge current

for currents with a frequency of 15 Hz to 62 Hz, current which the GDT is designed to carry for a defined time

3.1.19

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

3.1.20

nominal impulse discharge current

peak value of the impulse current with a defined waveshape with respect to time for which the GDT is rated

3.1.21

sparkover (breakdown)

abrupt transition of the gap resistance from practically infinite value to a relatively low value