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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 1408.3-2016

**Insulating materials -- Test methods for electric strength -- Part
3: Additional requirements for 1.2/50 μ s impulse tests
(English Translation)**

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Foreword

GB/T 1408 Electrical Strength of Insulating Materials - Test Methods consists of the following

3 parts:

- Part 1: Tests at Power Frequencies;
- Part 2: Additional Requirements for Tests Using Direct Voltage;
- Part 3: Additional Requirements for 1.2/50 μ s Impulse Tests.

This Part is Part 3 of GB/T 1408.

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Part replaced GB/T 1408.3-2007 Electric Strength of Insulating Materials Test Methods
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Part 3: Additional Requirements for 1.2/50 μ s Impulse Tests. Compared with GB/T 1408.3-2007,

the major technical changes of this Part are as follows:

- Modify GB/T 1408.1-2006 into "GB/T 1408.1-2016" in the whole text;
- Modify "pulse" into "impulse" in the whole text;
- Change the term "virtual" to "apparent" (see 3.3~3.6 of this Edition; 3.3~3.6 of the 2007 Edition);
- Add the terms "impulse breakdown voltage" and "withstand voltage" (see 3.7 and 3.8 of this Edition);
- Modify "report content".

This Part uses translation method to equivalently adopt IEC 60243-3:2013 Electric Strength of

Insulating Materials - Test Methods - Part 3: Additional Requirements for 1.2/50 μ s Impulse Tests (The 3rd Version).

This Part was proposed by China Electrical Equipment Industry Association.

This Part shall be under the jurisdiction of National Technical Committee on Electrical Insulating Materials and Insulating System Evaluation of Standardization Administration of China (SAC/TC 301).

Drafting organizations of this Part: Machinery Industry Beijing Electrotechnical Institute of Economic Research; Jiaxing New World Electromechanical Co., Ltd.; Foshan Shunde Quality

and Technical Supervision Standards and Coding Institute; Guilin Electrical Equipment Scientific Research Institute Co., Ltd.; and Beijing BEIZHONG Stem Turbine Generator Co., Ltd.

Insulating Materials - Test Methods for Electric Strength -
Part 3: Additional Requirements for 1.2/50 μ s Impulse Tests

1 Scope

This Part of GB/T 1408 gives requirements additional to those in GB/T 1408.1 for the determination of the electric strength of solid insulating materials under 1.2/50 μ s impulse voltage stress.

2 Normative References

The following documents are essential to the application of this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the

undated documents, only the latest version (including all the amendments) is applicable to this

Document.

GB/T 1408.1-2016 Electrical strength of insulating materials - Test methods - Part 1: Tests at power frequencies (IEC 60243-1:2013, IDT)

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 1408.1-2016 apply.

3.1 Full impulse-voltage wave

Aperiodic transient voltage that rises rapidly to a maximum value, then falls less rapidly to zero

(see Figure 1).

3.2 Peak value (of an impulse-voltage wave); UP

Maximum value of voltage.

3.3 Virtual peak value of an impulse-voltage wave; U1

Value derived from a recording of an impulse-voltage wave on which high-frequency oscillations, or overshoot of a limited magnitude, may be present.

3.4 Virtual origin of an impulse-voltage wave; O1

peak voltages. The peak voltage of the initial set should be approximately 70 % of the expected

breakdown voltage.

Increase the peak voltage of successive sets by 5 % ~ 10 % of the peak value of the first set.

Table 1 of GB/T 1408.1-2016 is applicable.

Allow sufficient time between successive impulses for the generator to become completely charged. Normally, a time of three times the charging time constant for the generator is sufficient.

Sufficient time shall also be allowed between successive impulses to allow dissipation of any

injected space-charge. For many materials, the charging time of the generator will cover this

eventuality. For materials having a longer space-charge retention time, the necessary time shall

be specified in the material specification sheet. If this information is not known, but a long space-charge retention period is suspected, then additional tests should be run with longer intervals between impulses, to determine if a significant difference in breakdown values is obtained.

A valid test on a test specimen is one in which impulse waves are applied at least two voltage

levels without breakdown, before breakdown occurs at the third or a subsequent level.

The electric strength shall be based on the virtual peak voltage of the last set of three waves

which was applied without breakdown. The breakdown voltage is the nominal voltage of the next set of waves causing breakdown.

When using asymmetrical electrode systems, preliminary tests shall be conducted to determine

the polarity which yields the lower breakdown voltage. If significant differences are obtained,

the polarity giving the lower test results should be used.

10.2 Proof tests

One set of three impulses of specified proof voltage (virtual value) shall be applied to the test

specimen in accordance with Clause 11 of GB/T 1408.1-2016. When necessary for calibration

purposes, up to three impulses with peak voltages not exceeding 80 % of the proof voltage