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

GB/T 1408.2-2016

**Insulating materials -- Test methods for electric strength -- Part
2: Additional requirements for tests using direct voltage
(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 1.2/50µs Impulse Tests.

This Part is Part 2 of GB/T 1408.

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

This Part replaced GB/T 1408.2-2006 Electrical Strength of Insulating Materials - Test Methods

- Part 2: Additional Requirements for Tests Using Direct Voltage. Compared with GB/T 1408.2-

2006, 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;
- Delete 10 reference documents including GB/T 1981.2-2003;
- Modify the report content;
- Add Bibliography.

This Part uses translation method to equivalently adopt IEC 60243-2:2013 Electric Strength of

Insulating Materials - Test Methods - Part 2: Additional Requirements for Tests Using Direct Voltage (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: Suzhou Taihu Electric Advanced Material Co., Ltd.;

Machinery Industry Beijing Electrotechnical Institute of Economic Research; Shanghai Electric

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The historical edition replaced by this Part is as follows:

Insulating Materials - Test Methods for Electric Strength -

Part 2: Additional Requirements for Tests Using Direct Voltage

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 direct 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.

4 Significance of the Test

In addition to the requirements of Clause 4 of GB/T 1408.1-2016, the following points shall be

considered when using direct-voltage tests.

For a non-homogeneous test specimen, with alternating voltage, the distribution of voltage stress within the test specimen is determined by impedance (largely capacitive). With an increasing direct voltage, the voltage distribution may still be largely capacitive but depends partly on the rate of voltage increase. The resistive voltage distribution, after constant voltage

application, represents the steady-state condition. The choice between direct or alternating voltage depends upon the purpose for which the breakdown test is to be used and, to some extent, on the intended application of the material.

Upon direct voltage application, the following currents result: the capacitive current, the electric

transients in initiating premature breakdowns.

The controls on voltage shall be capable of varying the test voltage smoothly and uniformly between zero and the maximum test voltage and with the requested rate of voltage rise.

The

rate of voltage rise shall be controllable within $\pm 20\%$ of the specified rate. Steps in voltage rise

shall not exceed 2% of the expected breakdown voltage value. Controls which automatically

increase the voltage at a selectable rate are preferable.

A current-sensitive interrupting device shall be used for switching off the direct voltage source.

For many materials, a dangerous voltage may persist across the test specimen for a considerable

time after the d.c. test voltage is removed. Disconnection of the power supply to the direct voltage source does not necessarily result in the output voltage or the voltage at the electrodes

being reduced to zero. For this reason, it is essential that the electrodes be short-circuited and

connected to earth for a period equal to minimum twice the total charging time to ensure that

the charge is dissipated. For some large test specimens, it will be necessary to maintain the shorted condition for 1 h or even longer.

A current-limiting resistance shall be used in series with the test specimen to prevent damage

to the high-voltage supply and to limit as far as possible the damage to the electrodes on the

test specimen when breakdown takes place. The maximum current permitted will depend on

the material under test and on the amount of damage to the electrodes which can be tolerated.

NOTE 1: The use of a very high-valued resistor may result in breakdown voltages which are higher than

those obtained with a lower-valued resistor.

When making tests where the value or increase in the value of the current is used as a criterion

for breakdown, means of measurement of current through the test specimen shall be