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

GB/T 1410-2006

**[Replaced by GB/T 31838.2-2019] Methods of test for volume
resistivity and surface resistivity of solid electrical insulating
materials**

(English Translation)

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Foreword

This Standard is equivalent to adopt IEC 60093.1980 Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials (English version).

For ease of use, this Standard makes the following editorial changes.

- a) Deleted Contents and Foreword of the international standard;
- b) Used "." to replace the ",", that is acted as decimal point;
- c) Used " ρ_Y " to replace " ρ ", " ρ_s " to replace " δ ";
- d) Marked figures according to GB/T 1.1-2000.

Compared with GB/T 1410-1989, the main changes of this Standard are as follows.

- a) Added "Normative references" (Clause 2 of this Standard);
- b) Added Test voltage range (Clause 5 of this Standard);
- c) Used "medium value" to replace "geometric mean" in test results.

This Standard replaces GB/T 1410-1989 Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials.

Appendix A, Appendix B and Appendix C of this Standard are informative.

This Standard was proposed by National Technical Committee on Insulating Material of Standardization Administration of China.

Drafting organization of this Standard. Guilin Electrical Appliance Scientific Research Institute.

Main drafters of this Standard. Wang Xianfeng, and Gu Xiaoli.

This Standard replaces the following previous standards.

- GB/T 1410-1978;
- GB/T 1410-1989.

Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials

1 Scope

This Standard specifies methods of test for volume resistivity and surface resistivity of solid electrical insulating materials. These methods of test cover procedures for the determination of volume and surface resistance and calculations for the determination of volume and surface resistivity of solid electrical insulating materials.

Both volume resistance and surface resistance tests are affected by the following factors. the magnitude and time of voltage application, the nature and geometry of the electrodes, and the temperature and humidity of the ambient atmosphere and of the specimens during conditioning and measurement.

2 Normative references

The following standards contain the provisions which, through reference in this Standard, constitute the provisions of this Standard. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, the parties who enter into agreement based on this Standard are encouraged to investigate whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB/T 10064-2006 Methods of test for the determination of the insulation resistance of solid insulating materials

GB/T 10580-2003 Standard conditions for use prior to and during the testing of solid insulating materials

IEC 60260.1968 Test enclosures of non-injection type for constant relative humidity

3 Definitions

The following definitions apply to this document.

3.1 volume resistance

the quotient of a direct voltage applied between two electrodes placed on two faces (opposite) of a specimen, and the steady-state current between the electrodes, excluding current along the surface, and neglecting possible polarization phenomena at the electrodes

NOTE Unless otherwise specified, the volume resistance is determined after 1 min of electrification.

3.2 volume resistivity

the quotient of a d.c. electric field strength and the steady-state current density within an insulating material. In practice it is taken as the volume resistance reduced to a cubical unit volume

NOTE The SI unit of volume resistivity is ohm·m. In practice the unit ohm·cm is also used.

3.3 surface resistance

the quotient of a direct voltage applied between two electrodes on a surface of a specimen, and the current between the electrodes at a given time of electrification, neglecting possible polarization phenomena at the electrodes

NOTE 1 Unless otherwise specified, the surface resistance is determined after 1 min of electrification.

NOTE 2 The current generally passes mainly through a surface layer of the specimen and any associated moisture and surface contaminant, but it also includes a component through the volume of the specimen.

3.4 surface resistivity

the quotient of a d.c. electric field strength, and the linear current density in a surface layer of an insulating material. In practice it is taken as the surface resistance reduced to a square area. The size of the square is immaterial

NOTE The SI unit of surface resistivity is ohm. In practice this is sometimes referred to as "ohms per square".

3.5 electrodes

measuring electrodes are conductors of defined shape, size and configuration in contact with the specimen being measured

NOTE Insulation resistance is the quotient of a direct voltage applied between two electrodes in contact with a specimen and the total current between the electrodes. The insulation resistance depends on both volume and surface resistivity of the specimen (see GB/T 10064-2006).

characteristics.

The surface resistance, especially when high, often changes in an erratic manner, and in general depends strongly on the time of electrification; for measurements, 1 min of electrification is usually specified.