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

GB/T 31838.2-2019

**Solid insulating materials -- Dielectric and resistive properties --
Part 2: Resistive properties (DC methods) -- Volume resistance
and volume resistivity**

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Foreword

GB/T 31838 "Dielectric and Resistance Characteristics of Solid Insulating Materials" currently publishes the following parts.

---Part 1.General Provisions;

---Part 2.Resistance characteristics (DC method) volume resistance and volume resistivity;

---Part 3.Resistance characteristics (DC method) surface resistance and surface resistivity;

---Part 4.Resistance characteristics (DC method) Insulation resistance.

This part is Part 2 of GB/T 31838.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 1410-2006 "Test Method for Volume Resistivity and Surface Resistance of Solid Insulating Materials", and is in line with GB/T 1410-

The main technical changes compared to.2006 are as follows.

---Modified the normative references (see Chapter 2, Chapter 2 of the.2006 edition);

--- Deleted the terms "surface resistance", "surface resistivity" and "electrode" (see the.2006 edition of 3.3, 3.4, 3.5);

--- Added the term "stray current" (see 3.3);

---Integrate "power supply, accuracy, protection, sample, electrode material, sample handling, conditional treatment", etc. into the "test method" (see Chapter 5,

Chapter 5, 6.2, 6.3, Chapter 7~Chapter 10 of the.2006 edition);

- Integrate "measurement methods, test procedures, volume resistivity" into "test procedures" (see Chapter 6,.2006 edition of 6.1, Chapter 11, 12.1);
- Deleted "surface resistance" and "surface resistivity calculation" (see 11.2 and 12.2 of the.2006 edition);
- Modify the "reproducibility" (see Chapter 8,.2006 version 12.3);
- Deleted Appendix A, Appendix B, Appendix C (Appendix A, Appendix B and Appendix C in the.2006 edition).

The translation method used in this part is equivalent to IEC 62631-3-1.2016 ``Dielectric and Resistance Characteristics of Solid Insulating Materials Part 3-1.

Determining resistance characteristics (DC method) General method for volume resistance and volume resistivity".

The Chinese documents that have a consistent correspondence with the international documents cited in this section are as follows.

- GB/T 1981.2-2009 Electrical Insulating Paint Part 2.Test Method (IEC 60464-2..2001 and.2006 First Revision, MOD);
- GB/T 1981.3-2009 Electrical Insulation Paint Part 3.General Specification for Thermal Curing Impregnating Paint (IEC 60464-3-2.2001, IDT);
- GB/T 2411-2008 Plastics and hard rubber use a durometer to determine the indentation hardness (Shore hardness) (ISO 868.2003, IDT);
- GB/T 5132.1-2009 Thermosetting resin industrial hard round laminated pipes and rods for electrical use Part 1.General requirements (IEC 61212-1.2006, IDT);
- GB/T 5132.2-2009 Thermosetting resin industrial hard round laminated tubes and rods for electrical use Part 2.Test methods (IEC 61212-2.2006, IDT);
- GB/T 5132.5-2009 Rigid round laminated pipes and rods for the thermosetting resin industry for electrical purposes Part 5.Round laminated molded rods (IEC 61212-3-3..2006, IDT);
- GB/T 6554-2003 Resin-based reactive compounds for electrical insulation Part 2.Test method for electrical coating powder method (IEC 60455-2-2.1984, MOD);
- GB/T 10580-2015 Standard conditions (IEC 60212.2010, IDT) used before and during the test of solid insulating materials;
- GB/T 15022.1-2009 Resin-based active compounds for electrical insulation Part 1.Definitions and general requirements (IEC 60455-1.1998, IDT);
- GB/T 15022.2-2017 Resin-based active compounds for electrical insulation Part 2.Test methods (IEC 60455-2.2015, NEQ);

---GB/T 15022.3-2011 Resin-based active composites for electrical insulation Part 3.Filler-free epoxy resin composites (IEC 60455-3-1.2003, IDT);

---GB/T 15022.4-2009 Resin-based active composites for electrical insulation Part 4.Unsaturated polyester-based impregnating resin (IEC 60455-3-5.2006, MOD);

---GB/T 15022.5-2011 Resin-based active composites for electrical insulation Part 5.Quartz-filled epoxy resin composites (IEC 60455-3-2.2003, MOD).

This section has made the following editorial changes.

---Revised the standard name to "Dielectric and Resistance Characteristics of Solid Insulating Materials Part 2.Resistance Characteristics (DC Method) Volume

Electrical resistance and volume resistivity".

This part was proposed by China Electrical Equipment Industry Association.

This part is under the jurisdiction of the National Standardization Technical Committee for Evaluation of Electrical Insulation Materials and Insulation Systems (SAC/TC301).

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CRRC Zhuzhou Electric Locomotive Research Institute Co., Ltd., China Quality Certification Center.

1 Scope

This part of GB/T 31838 specifies the test method for determining the volume resistance and volume resistivity of solid insulating materials under DC voltage.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

IEC 60212 Standard conditions for solid insulating materials before and during the test

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Volume resistance

The ratio of the DC voltage applied between the two electrodes in contact with the opposite surface of the insulating medium to the current flowing through the medium at a given time.

Note. The unit of volume resistance is expressed in ohm.

3.2

Volume resistivity

Under a given time and voltage, the ratio of the DC electric field strength to the current density inside the insulating medium.

Note 1. According to IEC 60050-121, "conductivity" is defined as a scalar or tensor, and the product of its electric field strength is the conduction current density; "resistivity" is "conductivity"

The reciprocal of the "rate". The volume resistivity is the average value of the amount of anisotropy that may exist in a unit volume at the time of measurement, and it also includes the possibility of anisotropy between electrodes.

The resulting polarization phenomenon.

Note 2. In practice, the volume resistivity is usually regarded as the volume resistance per unit volume.

Note 3. The unit of volume resistivity is expressed in ohm.m.

3.3

Stray current

Leakage current caused by grounding or buried metal structures.