



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

GB/T 31838.8-2024

**Solid insulating materials - Dielectric and resistive properties - Part 8:
Determination of dielectric properties(AC method) - Relative permittivity and
dielectric dissipation factor(frequencies 1 MHz~300 MHz)**

(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 8 of GB/T 31838 "Dielectric and resistance characteristics of solid insulating materials". GB/T 31838 has been published the following parts.

- Part 1: General;
- 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;
- Part 5: Resistance characteristics (DC method) Volume resistance and volume resistivity of impregnated and coated materials;
- Part 6: Dielectric properties (AC method) Relative dielectric constant and dielectric loss factor (frequency 0.1 Hz ~ 10 MHz);
- Part 7: Resistance characteristics (DC method) Measurement of volume resistance and volume resistivity at high temperature;
- Part 8: Determination of dielectric properties (AC method) Relative dielectric constant and dielectric loss factor (frequency 1 MHz ~ 300 MHz).

This document is equivalent to IEC 62631-2-2:2022 "Dielectric and resistive properties of solid insulating materials - Part 2-2. Relative dielectric constant Measurement of frequency and loss factor - High frequency (1MHz~300MHz) AC method".

The following minimal editorial changes were made to this document.

- To be consistent with the existing standard series, the document name is changed to "Dielectric and resistance properties of solid insulating materials Part 8: Determination Dielectric properties (AC method) Relative dielectric constant and dielectric loss factor (frequency 1MHz~300MHz)".

Introduction

The dielectric constant and dielectric loss factor ($\tan\delta$) are basic parameters for measuring the quality of insulating materials. The dielectric loss factor depends on multiple parameters.

factors such as environmental factors, humidity, temperature, applied voltage, and depends largely on the frequency, the accuracy of the measuring instrument and the the frequency range for measuring dielectric constant and dielectric loss factor is affected by the design of the electrode system, the size of the specimen and the impedance of the lead wire.

This document mainly proposes the measurement of dielectric constant in the high frequency range of 1MHz to 300MHz.

and dielectric loss factor method.

Currently, GB/T 31838 consists of eight parts.

--- Part 1: General. The purpose is to establish the general principles for testing the dielectric and resistance characteristics of solid insulating materials.

--- Part 2: Electrical resistance characteristics (DC method) Volume resistance and volume resistivity. The purpose is to describe the determination of solid insulating materials (excluding impregnated and coated materials, casting materials) Test method for volume resistance and volume resistivity.

--- Part 3: Electrical resistance characteristics (DC method) Surface resistance and surface resistivity. The purpose is to describe the determination of solid insulating materials Test methods for surface resistance and surface resistivity.

--- Part 4: Resistance characteristics (DC method) Insulation resistance. The purpose is to describe the test method for determining the insulation resistance of solid insulating materials.

Test method.

--- Part 5: Resistance characteristics (DC method) Volume resistance and volume resistivity of impregnated and coated materials. The purpose is to describe Test method for determining volume resistance and volume resistivity of impregnated and coated insulating materials.

--- Part 6: Dielectric properties (AC method) Relative dielectric constant and dielectric loss factor (frequency 0.1Hz~10MHz).

The purpose of this test is to describe the test method for determining the dielectric properties of solid insulating materials at frequencies between 0.1 Hz and 10 MHz.

--- Part 7: Resistance specification (DC method) Measurement of volume resistance and volume resistivity at high temperature. The purpose is to describe the determination of temperature Test method for volume resistance and volume resistivity of solid insulating materials at temperatures not exceeding 800°C.

--- Part 8: Determination of dielectric properties (AC method) Relative dielectric constant and dielectric loss factor (frequency 1 MHz~ the purpose is to describe the test for determining the dielectric properties of solid insulating materials at frequencies between 1 MHz and 300 MHz.

method.

Dielectric and resistance properties of solid insulating materials Part 8: Determination of dielectric properties (AC method) Relative dielectric constant and dielectric loss factor (Frequency 1MHz~300MHz)

1 Scope

This document specifies the methods for determining the dielectric constant and dielectric loss factor characteristics of solid insulating materials in the frequency range of 1MHz to 300MHz.

Test method (AC method).

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

Note: GB/T 10580-2015 Standard conditions for solid insulating materials before and during testing (IEC 60212:2010, IDT).

3 Terms and definitions

The following terms and definitions apply to this document.

The terminology databases used for standardization maintained by ISO and IEC are located at.

A solid material of negligibly low electrical conductivity used to separate portions of a conductor at different electrical potentials.

NOTE The term "electrical insulating material" may also refer to insulating liquids and insulating gases. IEC 60247 covers insulating liquids [1].

Dielectric properties the comprehensive properties of insulating materials measured by AC voltage, including capacitance, absolute dielectric constant, relative dielectric constant, relative complex dielectric constant Number, dielectric loss factor.

Absolute permittivity the quotient of electric flux density divided by the electric field strength.

Vacuum dielectric constant ϵ_0 the dielectric constant of a vacuum is related to the magnetic constant μ_0 and the speed of light in a vacuum c_0 , and is expressed by the relationship $\epsilon_0 \mu_0 c_0^2 = 1$.