

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Dielectric and resistive properties of solid insulating materials –
Part 1: General**

**Propriétés diélectriques et résistives des matériaux isolants solides –
Partie 1: Généralités**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIELECTRIC AND RESISTIVE PROPERTIES OF SOLID INSULATING MATERIALS –

Part 1: General

FOREWORD

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International Standard IEC 62631-1 has been prepared by IEC technical committee 112: Evaluation and qualification of electrical insulating materials and systems.

This International Standard, together with its future parts, is intended to replace certain standards as set out and explained in the Introduction.

Such standards will, however, remain valid until the respective part of IEC 62631 is published.

The text of this standard is based on the following documents:

FDIS	Report on voting
112/169/FDIS	112/176/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The IEC 62631 series is divided into four main parts, which are further subdivided into component parts. The present Part 1 of IEC 62631 considers, general aspects related to the measurement of dielectric and resistive properties of solid electric insulating materials. Parts 2 and 3 outline basic procedures for the measurement of dielectric and resistive properties by means of AC and DC methods. These parts will gradually replace hitherto existing International Standards. Part 4 will cover special methods of measurement and computational methods.

Table 1 shows the planned future structure of IEC 62631, together with the standards it will replace.

Table 1 – Planned structure of IEC 62631

Main title	DIELECTRIC AND RESISTIVE PROPERTIES OF SOLID INSULATING MATERIALS	
Part number	Part title	Remarks
IEC 62631-1	– General	Amends and replaces IEC 60093, IEC 60167, IEC 60250, IEC 60345
IEC 62631-2	– Permittivity and dielectric dissipation factors (AC methods)	New
IEC 62631-2-1	– Technical frequencies (1 Hz to 100 MHz)	Replaces IEC 60250
IEC 62631-2-2	– High frequencies (1 MHz to 300 MHz)	Replaces IEC 60250
IEC 62631-2-3	– Very high frequencies (above 300 MHz)	Replaces IEC 60377-1 and IEC 60377-2
IEC 62631-2-4	– Low frequencies (1 MHz to 1 kHz)	New
IEC 62631-3	– Resistive properties (DC methods)	New
IEC 62631-3-1	– Volume resistance and volume resistivity	Replaces IEC 60093
IEC 62631-3-2	– Surface resistance and surface resistivity	Replaces IEC 60093
IEC 62631-3-3	– Insulation resistance	Replaces IEC 60167
IEC 62631-3-4	– Special requirements for the determination of resistive material properties at elevated temperatures	Replaces IEC 60345
IEC 62631-4	– Special methods	New
IEC 62631-4-1	– Computational methods for the evaluation of data gained by the use of broadband dielectric spectrometers	New
IEC 62631-4-2	– Thermal analysis by means of observation of dielectric properties	New

Measured values of dielectric and resistive properties of solid insulating materials are dependent upon different factors such as the magnitude and time of voltage application, frequency, the nature and geometry of the electrodes, the surface condition, contamination, temperature and humidity of the ambient atmosphere and of the specimens during conditioning and measurement and, in certain cases, on electric field strength also.

Therefore, the electrical and dielectric properties covered by the IEC 62631 series may only be comparable as far as the circumstances of the measurement's parameters are stipulated. The test specimen's shape and dimensions, as well as the measurement parameters, may be defined in product standards or the relevant parts of this series of standards dealing with test procedures, depending on the requirements to be considered for a certain demand of measurement. Care should be taken when using measured values from the IEC 62631 series for the purposes of designing an electric product.

NOTE It is not possible to give a comprehensive overview covering the dielectric and resistive properties of solid electrical insulating materials within a framework of an International Standard. Therefore, the user is encouraged to read up on the literature such as that recommended in the bibliography.

DIELECTRIC AND RESISTIVE PROPERTIES OF SOLID INSULATING MATERIALS –

Part 1: General

1 Scope

This part of IEC 62631 gives general guidelines for the determination of dielectric and resistive properties of solid electrical insulating materials.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-212, *International Electrotechnical Vocabulary – Part 212: Electrical insulating solids, liquids and gases*

NOTE For IEC 60050, free online access is provided by www.electropedia.org.

IEC 60093:1980, *Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials*

IEC 60167:1964, *Methods of test for the determination of the insulation resistance of solid insulating materials*

IEC 60250:1969, *Recommended methods for the determination of the permittivity and dielectric dissipation factor of electrical insulating materials at power, audio and radio frequencies including metre wavelengths*

IEC 60345:1971, *Method of test for electrical resistance and resistivity of insulating materials at elevated temperatures*

IEC 60377-1:1973, *Recommended methods for the determination of the dielectric properties of insulating materials at frequencies above 300 MHz – Part 1: General*

IEC 60377-2:1977, *Recommended methods for the determination of the dielectric properties of insulating materials at frequencies above 300 MHz – Part 2: Resonance methods*

ISO 291, *Plastics – Standard atmospheres for conditioning and testing*

ISO 558, *Conditioning and testing – Standard atmospheres – Definitions*

3 Terms and definitions

For the purposes of this document, the following terms and definitions, as well as those given in IEC 60050-212, apply.