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**Dielectric and resistive properties of solid insulating materials –
Part 2-3: Relative permittivity and dissipation factor – Contact electrode method
for insulating films – AC methods**

**Propriétés diélectriques et résistives des matériaux isolants solides –
Partie 2-3 : Permittivité relative et facteur de dissipation – Méthode d'électrode
de contact pour films isolants – Méthodes en courant alternatif**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIELECTRIC AND RESISTIVE PROPERTIES OF SOLID INSULATING MATERIALS –

Part 2-3: Relative permittivity and dissipation factor – Contact electrode method for insulating films – AC methods

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The text of this International Standard is based on the following documents:

Draft	Report on voting
112/631/FDIS	112/641/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62631 series, published under the general title *Dielectric and resistive properties of solid insulating materials*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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INTRODUCTION

Measuring the relative permittivity and the dielectric dissipation factor ($\tan \delta$) of thin insulating polymer films with a thickness of approximately 10 μm to 100 μm without any additional layer is important for insulation applications. There is currently a lack of suitable technology and standard for the measurement of the relative permittivity and dielectric dissipation factor of very thin single-layer polymer films. By using multilayer polymer films with 20 to 50 layers, it can be feasible to get the average value of the relative permittivity and dielectric dissipation factor of an insulating polymer film, but the effect of air gap inside should not be ignored. With metallized electrodes on the surface of the polymer film, it is possible to get acceptable results of the relative permittivity and dielectric dissipation factor of an insulating polymer film in research laboratory. This document provides the measuring technology and the test method for the relative permittivity and dielectric dissipation factor of thin insulating polymer films without any additional layer or metallization on the sample, under technical frequency.

DIELECTRIC AND RESISTIVE PROPERTIES OF SOLID INSULATING MATERIALS –

Part 2-3: Relative permittivity and dissipation factor – Contact electrode method for insulating films – AC methods

1 Scope

This part of IEC 62631 specifies the measuring technology and the test method for the relative permittivity and dielectric dissipation factor of thin single layer insulating polymer film without any additional metallization on the sample surface. The adaptive thickness range is approximately 10 µm to 100 µm. The proposed frequency is the power frequency (50 Hz or 60 Hz), and it is also suitable in the technical frequency range from 1 Hz to 1 MHz.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60674-2, *Specification for plastic films for electrical purposes – Part 2: Methods of test*

ISO 4593, *Plastics – Film and sheeting – Determination of thickness by mechanical scanning*

ISO 14644-1, *Cleanrooms and associated controlled environments – Part 1: Classification of air cleanliness by particle concentration*

ISO 21920-2, *Geometrical product specifications (GPS) – Surface texture: Profile – Part 2: Terms, definitions and surface texture parameters*

3 Terms, definitions, abbreviated terms and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1.1

thin insulating polymer film

insulating polymer film, planar, even and smooth, without any additional layer, with a 10 µm to 100 µm uniform thickness