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Dielectric and resistive properties of solid insulating materials - Part 2-1: Relative permittivity and dissipation factor - Technical frequencies (0,1 Hz to 10 MHz) - AC Methods

## ESTI STANDARDI EESSÕNA

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ICS 17.220.99, 29.035.01

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN IEC 62631-2-1

April 2018

ICS 17.220.99; 29.035.01

English Version

Dielectric and resistive properties of solid insulating materials -  
Part 2-1: Relative permittivity and dissipation factor - Technical  
frequencies (0,1 Hz to 10 MHz) - AC Methods  
(IEC 62631-2-1:2018)

Propriétés diélectriques et résistives des matériaux isolants  
solides - Partie 2-1: Permittivité relative et facteur de  
dissipation - Fréquences techniques (0,1 Hz à 10 MHz) -  
Méthodes en courant alternatif  
(IEC 62631-2-1:2018)

Dielektrische und resistive Eigenschaften fester  
Elektroisolierstoffe Teil 2-1: Dielektrizitätszahl und der  
Verlustfaktor Technische Frequenzen (0,1 Hz - 10 MHz) -  
Wechselspannungsverfahren  
(IEC 62631-2-1:2018)

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

## European foreword

The text of document 112/412/FDIS, future edition 1 of IEC 62631-2-1, prepared by IEC/TC 112 "Evaluation and qualification of electrical insulating materials and systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62631-2-1:2018.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-01-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-04-03

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60216-1	NOTE	Harmonized as EN 60216-1.
IEC 60216-4-1:2006	NOTE	Harmonized as EN 60216-4-1:2006 (not modified).
IEC 60247	NOTE	Harmonized as EN 60247.
IEC 60505	NOTE	Harmonized as EN 60505.
IEC 62631-1	NOTE	Harmonized as EN 62631-1.
IEC 60455 series	NOTE	Harmonized as EN 60455 series.
IEC 60464 series	NOTE	Harmonized as EN 60464 series.
IEC 61212 series	NOTE	Harmonized as EN 61212 series.
ISO 291	NOTE	Harmonized as EN ISO 291.
ISO 294-1	NOTE	Harmonized as EN ISO 294-1.
ISO 294-3	NOTE	Harmonized as EN ISO 294-3.
ISO 295	NOTE	Harmonized as EN ISO 295.

**Annex ZA**  
(normative)**Normative references to international publications  
with their corresponding European publications**

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60212	-	Standard conditions for use prior to and during the testing of solid electrical insulating materials	EN 60212	-
ISO 4593	-	Plastics - Film and sheeting - Determination of thickness by mechanical scanning	-	-

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## INTRODUCTION

Tan  $\delta$ , also called loss tangent, or dissipation factor is a basic parameter for the quality of insulating materials. The measurement of capacitance and loss angle is a classical method well established in the industry over 100 years.

The dissipation factor ( $\tan \delta$ ) is dependent on several parameters, such as electrode design, material characteristics, environmental issues, moisture, temperature, voltage applied, and highly dependent on frequencies, the accuracy of measuring apparatus and other parameters applied to the measured specimen.

The frequency range is limited, depending on the test cell and electrode design, the dimension of the samples and connection leads. In this standard the parameters for the frequencies applied are therefore limited in the range of very low frequency (VLF) from less than 1 Hz and up to 10 MHz. However, measuring instruments can provide a broader frequency range, whereby the usable and suitable frequency range is limited by the whole test setup.