NSAI Standards

Irish Standard
I.S. EN 62631-1:2011

Dielectric and resistive properties of solid insulating materials -- Part 1: General (IEC 62631-1:2011 (EQV))

I.S. EN 62631-1:2011

Incorporating amendments/corrigenda issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces:	*This document is based on:*	*Published:*
HD 429 S1:1983 (partially), HD 438 S1:1984 (partially),HD 568 S1:1990 (partially	EN 62631-1:2011	17 June, 2011

This document was published under the authority of the NSAI and comes into effect on: 22 June, 2011	ICS number: 29.035.01

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie

W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62631-1

June 2011

ICS 29.035.01

Supersedes HD 429 S1:1983 (partially), HD 438 S1:1984 (partially), HD 568 S1:1990 (partially)

English version

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

(IEC 62631-1:2011)

Propriétés diélectriques et résistives des matériaux isolants solides - Partie 1: Généralités (CEI 62631-1:2011)

Dielektrische und resistive Eigenschaften fester Elektroisolierstoffe - Teil 1: Grundlagen (IEC 62631-1:2011)

This European Standard was approved by CENELEC on 2011-06-02. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62631-1:2011 E

Foreword

The text of document 112/169/FDIS, future edition 1 of IEC 62631-1, prepared by IEC TC 112, Evaluation and qualification of electrical insulating materials and systems, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62631-1 on 2011-06-02.

This European Standard partially supersedes HD 429 S1:1983, HD 438 S1:1984 and HD 568 S1:1990.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2012-03-02
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-06-02

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62631-1:2011 was approved by CENELEC as a European Standard without any modification.

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 60247	NOTE	Harmonized as EN 60247.
IEC 60505	NOTE	Harmonized as EN 60505.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60050-212	-	International Electrotechnical Vocabulary (IEV) - Chapter 212: Insulating solids, liquids and gases	-	-
IEC 60093	1980	Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials	HD 429 S1	1983
IEC 60167	1964	Methods of test for the determination of the insulation resistance of solid insulating materials	HD 568 S1	1990
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	HD 438 S1	1984
IEC 60377-1	1973	Methods for the determination of the dielectric properties of insulating materials at frequencies above 300 MHz - Part 1: General	-	-
IEC 60377-2	1977	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	EN ISO 291	-
ISO 558	-	Conditioning and testing - Standard atmospheres - Definitions	-	-

This page is intentionally left BLANK.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIELECTRIC AND RESISTIVE PROPERTIES OF SOLID INSULATING MATERIALS –

Part 1: General

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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.