BS EN 61251:2016

BSI Standards Publication

Electrical insulating materials and systems — A.C. voltage endurance evaluation

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 61251:2016. It is identical to IEC 61251:2015. It supersedes DD IEC/TS 61251:2008 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/112, Evaluation and qualification of electrical insulating materials and systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2016

ISBN 978 0 580 87580 9
ICS 17.220.99; 29.035.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2016.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61251

February 2016

ICS 17.220.99; 29.035.01

English Version

Electrical insulating materials and systems - A.C. voltage endurance evaluation (IEC 61251:2015)

Systèmes et matériaux isolants électriques - Évaluation de l'endurance a la tension alternative (IEC 61251:2015)

Elektrische Isolierstoffe und -systeme - Ermittlung der Wechselspannungsbeständigkei (IEC 61251:2015)

This European Standard was approved by CENELEC on 2015-12-23. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 61251:2016 E

European foreword

The text of document 112/338/FDIS, future edition 1 of IEC 61251, 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 61251:2016.

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)	2016-09-23
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2018-12-23

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61251:2015 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 60243-1	NOTE	Harmonized as EN 60243-1.
IEC 60243-2	NOTE	Harmonized as EN 60243-2.
IEC 60243-3	NOTE	Harmonized as EN 60243-3.
IEC 60343	NOTE	Harmonized as EN 60343.
IEC 61649	NOTE	Harmonized as EN 61649.

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

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

NOTE 1 When 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.

Publication	Year	Title	EN/HD	Year
IEC 62539	-	Guide for the statistical analysis of electrical insulation breakdown data	-	-

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSULATING MATERIALS AND SYSTEMS – AC VOLTAGE ENDURANCE EVALUATION

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 61251 has been prepared by IEC technical committee 112: Evaluation and qualification of electrical insulating materials and systems.

This first edition of IEC 61251 cancels and replaces the second edition of IEC TS 61251, published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the second edition of IEC TS 61251:

a) upgrade from Technical Specification to an International Standard;
b) clarification of issues raised since publication of IEC TS 61251.

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

FDIS	Report on voting
112/338/FDIS	112/347/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 website 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

This International Standard covers insulating materials and systems. Voltage endurance tests are used to compare and evaluate insulating materials and systems. It is complex to determine the capability of electrical insulating materials and systems to endure a.c. voltage stress. The results of voltage endurance tests are influenced by many factors. Therefore this International Standard can be considered as an attempt to present a unified view of voltage endurance for simplified planning and analysis.

ELECTRICAL INSULATING MATERIALS AND SYSTEMS – AC VOLTAGE ENDURANCE EVALUATION

1 Scope

This International Standard describes many of the factors involved in voltage endurance tests on electrical insulating materials and systems. It describes the voltage endurance graph, lists test methods illustrating their limitations and gives guidance for evaluating the sinusoidal a.c. voltage endurance of insulating materials and systems from the results of the tests. This International Standard is applicable over the voltage frequency range 20 Hz to 1 000 Hz. The general principles can also be applicable to other voltage shapes, including impulse voltages. The terminology to be used in voltage endurance is defined and explained.

2 Normative references

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

IEC 62539, *Guide for the statistical analysis of electrical insulation dielectric breakdown data*

3 Terms, definitions and symbols

3.1 Terms and definitions

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

3.1.1
voltage endurance
VE
measures of the capability of a solid insulating material to endure voltage

Note 1 to entry: In this International Standard, only a.c. voltage is considered.

Note 2 to entry: This note only applies to the French language.

3.1.2
life
time to dielectric breakdown

3.1.3
voltage endurance coefficient
VEC
numerical value of the reciprocal of the slope of a straight line log-log VE plot

Note 1 to entry: This note only applies to the French language.

3.1.4
specimen
representative test object for assessing the value of one or more physical properties