Electric strength of insulating materials - Test methods - - Part 1: Tests at power frequencies

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 60243-1:2013 sisaldab Euroopa standardi EN 60243-1:2013 ingliskeelset teksti.	This Estonian standard EVS-EN 60243-1:2013 consists of the English text of the European standard EN 60243-1:2013.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 12.07.2013.	Date of Availability of the European standard is 12.07.2013.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 17.220.99, 29.035.01

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60243-1

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ICS 17.220.99; 29.035.01

Supersedes EN 60243-1:1998

English version

Electric strength of insulating materials - Test methods - Part 1: Tests at power frequencies

(IEC 60243-1:2013)

Rigidité diélectrique des matériaux isolants - Méthodes d'essai - Partie 1: Essais aux fréquences industrielles
(CEI 60243-1:2013)

Elektrische Durchschlagfestigkeit von isolierenden Werkstoffen - Prüfverfahren - Teil 1: Prüfungen bei technischen Frequenzen
(IEC 60243-1:2013)

CENELEC

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

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Foreword

The text of document 112/237/FDIS, future edition 3 of IEC 60243-1, 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 60243-1:2013.

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)	2014-01-30
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-04-30

This document supersedes EN 60243-1:1998.

EN 60243-1:2013 includes the following significant technical changes with respect to EN 60243-1:1998:

The significant technical change with respect to the previous edition is that the current version now includes an option for testing elastomeric materials.

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 60243-1:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 60674-2	NOTE	Harmonised as EN 60674-2.

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 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 60212	-	Standard conditions for use prior to and during the testing of solid electrical insulating materials	EN 60212	-
IEC 60296	-	Fluids for electrotechnical applications - Unused mineral insulating oils for transformers and switchgear	EN 60296	-
IEC 60455-2	-	Resin based reactive compounds used for electrical insulation - Part 2: Methods of test	EN 60455-2	-
IEC 60464-2	-	Varnishes used for electrical insulation - Part 2: Methods of test	EN 60464-2	-
IEC 60684-2	-	Flexible insulating sleeving - Part 2: Methods of test	EN 60684-2	-
IEC 60836	-	Specifications for unused silicone insulating liquids for electrotechnical purposes	EN 60836	-
IEC 61099	-	Insulating liquids - Specifications for unused synthetic organic esters for electrical purposes	EN 61099	-
ISO 293	-	Plastics - Compression moulding of test specimens of thermoplastic materials	EN ISO 293	-
ISO 294-1	-	Plastics - Injection moulding of test specimens of thermoplastic materials - Part 1: General principles, and moulding of multipurpose and bar test specimens	EN ISO 294-1	-
ISO 294-3	-	Plastics - Injection moulding of test specimens of thermoplastic materials - Part 3: Small plates	EN ISO 294-3	-
ISO 295	-	Plastics - Compression moulding of test specimens of thermosetting materials	EN ISO 295	-
ISO 10724	Series	Plastics - Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs)	EN ISO 10724	Series

CONTENTS

ELECTRIC STRENGTH OF INSULATING MATERIALS – TEST METHODS –

Part 1: Tests at power frequencies

1 Scope

This part of IEC 60243 provides test methods for the determination of short-time electric strength of solid insulating materials at power frequencies between 48 Hz and 62 Hz.

This standard does not cover the testing of liquids and gases, although these are specified and used as impregnates or surrounding media for the solid insulating materials being tested.

NOTE Methods for the determination of breakdown voltages along the surfaces of solid insulating materials are included.

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 60212, *Standard conditions for use prior to and during the testing of solid electical insulating materials*

IEC 60296, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60455-2, *Specification for solventless polymerizable resinous compounds used for electrical insulation – Part 2: Methods of test*

IEC 60464-2, *Varnishes used for electrical insulation – Part 2: Methods of test*

IEC 60684-2, *Flexible insulating sleeving – Part 2: Methods of test*

IEC 60836, *Specifications for unused silicone insulating liquids for electrotechnical purposes*

IEC 61099, *Insulating liquids – Specifications for unused synthetic organic esters for electrical purposes*

ISO 293, *Plastics – Compression moulding of test specimens of thermoplastic materials*

ISO 294-1, *Plastics – Injection moulding of test specimens of thermoplastic materials – Part 1: General principles, and moulding of multipurpose and bar test specimens*

ISO 294-3, *Plastics – Injection moulding of test specimens of thermoplastic materials – Part 3: Small plates*

ISO 295, *Plastics – Compression moulding of test specimens of thermosetting materials*

ISO 10724 (all parts), *Plastics – Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs)*

3 Terms and definitions

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

3.1
electric breakdown
severe loss of the insulating properties of test specimens while exposed to electric stress, which causes the current in the test circuit to operate an appropriate circuit-breaker

Note 1 to entry: Breakdown is often caused by partial discharges in the gas or liquid medium surrounding the test specimen and the electrodes which puncture the specimen beyond the periphery of the smaller electrode (or of both electrodes, if of equal diameter).

3.2
flashover
loss of the insulating properties of the gas or liquid medium surrounding a test specimen and electrodes while exposed to electric stress, which causes the current in the test circuit to operate an appropriate circuit-breaker

Note 1 to entry: The presence of carbonized channels or punctures through the specimen distinguishes tests where breakdown occurred, from others where flashover occurred.

3.3
breakdown voltage

3.3.1
< tests with continuously rising voltage > voltage at which a specimen suffers breakdown under the prescribed test conditions

3.3.2
< step-by-step tests > highest voltage which a specimen withstands without breakdown for the duration of the time at that voltage level

3.4
electric strength
quotient of the breakdown voltage and the distance between the electrodes between which the voltage is applied under the prescribed test conditions

Note 1 to entry: The distance between the test electrodes is determined as specified in 5.5, unless otherwise specified.

4 Significance of the test

Electric strength test results obtained in accordance with this standard are useful for detecting changes or deviations from normal characteristics resulting from processing variables, ageing conditions or other manufacturing or environmental situations. However, they are not intended for use in evaluating the behaviour of insulating materials in an actual application.

Measured values of the electric strength of a material may be affected by many factors, including:

a) Condition of test specimens
   1) the thickness and homogeneity of the specimen and the presence of mechanical strain;
   2) previous conditioning of the specimens, in particular drying and impregnation procedures;