

Electrical insulating materials used under severe ambient conditions - Test methods for evaluating resistance to tracking and erosion

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60587:2022 sisaldab Euroopa standardi EN IEC 60587:2022 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60587:2022 consists of the English text of the European standard EN IEC 60587:2022.
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 and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.05.2022.	Date of Availability of the European standard is 13.05.2022.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

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

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis-ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis-ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Electrical insulating materials used under severe ambient
conditions - Test methods for evaluating resistance to tracking
and erosion
(IEC 60587:2022)

Matériaux isolants électriques utilisés dans des conditions
ambiantes sévères - Méthodes d'essai pour évaluer la
résistance au cheminement et à l'érosion
(IEC 60587:2022)

Elektroisolierstoffe, die unter erschwerten Bedingungen
eingesetzt werden - Prüfverfahren zur Bestimmung der
Beständigkeit gegen Kriechwegbildung und Erosion
(IEC 60587:2022)

This European Standard was approved by CENELEC on 2022-05-04. 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, 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: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 112/561/FDIS, future edition 4 of IEC 60587, 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 60587:2022.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2023-01-04 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2025-04-04 document have to be withdrawn

This document supersedes EN 60587:2007 and all of its amendments and corrigenda (if any).

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60587:2022 was approved by CENELEC as a European Standard without any modification.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Electrical insulating materials used under severe ambient conditions –
Test methods for evaluating resistance to tracking and erosion**

**Matériaux isolants électriques utilisés dans des conditions ambiantes sévères –
Méthodes d'essai pour évaluer la résistance au cheminement et à l'érosion**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2022 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Electrical insulating materials used under severe ambient conditions –
Test methods for evaluating resistance to tracking and erosion**

**Matériaux isolants électriques utilisés dans des conditions ambiantes sévères –
Méthodes d'essai pour évaluer la résistance au cheminement et à l'érosion**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.220.99; 29.035.01

ISBN 978-2-8322-1093-8

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Test specimens	6
4.1 Dimensions	6
4.2 Preparation	6
5 Apparatus	7
5.1 General	7
5.2 Electrical apparatus	7
5.3 Specimen assembly	8
5.3.1 General	8
5.3.2 Electrodes	9
5.3.3 Filter-paper stack	10
5.3.4 Mounting of the specimen assembly	11
5.4 Contaminant	13
5.5 Timing device	13
5.6 Depth gauge	13
5.7 Ventilation	14
6 Test procedure	14
6.1 General	14
6.2 Criterion A – evaluation of the current (preferred)	14
6.3 Criterion B – evaluation of the length of the track	14
6.4 Method 1 – test at constant voltage	14
6.5 Method 2 – test at stepwise increased voltage	15
6.6 Classification of the materials tested according to method 1	16
6.7 Classification of the materials tested according to method 2	16
7 Test report	17
Bibliography	18
Figure 1 – Test specimen with boreholes for mounting of electrodes	6
Figure 2 – Schematic diagram of circuit	8
Figure 3 – Example of typical circuit for an overcurrent delay relay (ODR)	8
Figure 4 – Schematic diagram of specimen assembly	9
Figure 5 – Top electrode	10
Figure 6 – Bottom electrode	10
Figure 7 – Filter-paper	11
Figure 8 – Schematic diagram of specimen assembly	11
Figure 9 – Schematic diagram of specimen support	12
Figure 10 – Example of specimen support	13
Table 1 – Specimen preparation sequence	7
Table 2 – Test parameters	15

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL INSULATING MATERIALS USED
UNDER SEVERE AMBIENT CONDITIONS – TEST METHODS
FOR EVALUATING RESISTANCE TO TRACKING AND EROSION**

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.

IEC 60587 has been prepared by IEC technical committee 112: Evaluation and qualification of electrical insulating materials and systems. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) an improved description of the experimental methods has been implemented;
- b) an improved description of the preparation of the test specimens has been implemented;
- c) a more detailed description of the electrode material and of the electrode quality has been added;
- d) evaluation criterion B (track length) has been removed for testing according to test method 2 (stepwise tracking voltage) as it is not applicable.

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

Draft	Report on voting
112/561/FDIS	112/564/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.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

ELECTRICAL INSULATING MATERIALS USED UNDER SEVERE AMBIENT CONDITIONS – TEST METHODS FOR EVALUATING RESISTANCE TO TRACKING AND EROSION

1 Scope

This document describes two test methods for the evaluation of electrical insulating materials for use under severe ambient conditions at power frequencies (45 Hz to 65 Hz) by the evaluation of the resistance to tracking and erosion, using a liquid contaminant and inclined plane specimens. The two methods are:

- Method 1: test at constant voltage,
- Method 2: test at stepwise increased voltage.

Method 1 is the most widely used method as there is less need for continual inspection.

The test conditions are designed to accelerate the production of the effects, but do not reproduce all the conditions encountered in service.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1

track

partially conducting path created by localized deterioration on the surface of an insulating material

3.2

tracking

progressive formation of conductive paths, which are produced on the surface or within a solid insulating material, due to the combined effects of electric stress and electrolytic contamination

Note 1 to entry: Tracking usually occurs due to surface contamination.

Note 2 to entry: Remaining degraded materials need not necessarily remain conductive, especially after they have cooled.

[SOURCE: IEC 60050-212:2010, 212-11-56, modified – Note 2 to entry has been added.]

3.3

erosion

electrical loss of material by leakage current or electrical discharge