
Celulozni papir za elektrotehnične namene - 2. del: Preskusne metode (IEC 60554-2:2001)

Cellulosic papers for electrical purposes - Part 2: Methods of test (IEC 60554-2:2001)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 60554-2:2004](https://standards.iteh.ai/catalog/standards/sist/5788ddf6-7307-4f42-8afd-71d9b2ae44af/sist-en-60554-2-2004)
<https://standards.iteh.ai/catalog/standards/sist/5788ddf6-7307-4f42-8afd-71d9b2ae44af/sist-en-60554-2-2004>

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 60554-2:2004

<https://standards.iteh.ai/catalog/standards/sist/5788ddf6-7307-4f42-8afd-71d9b2ae44af/sist-en-60554-2-2004>

EUROPEAN STANDARD

EN 60554-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2002

ICS 17.220.99;29.035.10

English version

Cellulosic papers for electrical purposes
Part 2: Methods of test
(IEC 60554-2:2001)

Papiers cellulés
à usages électriques
Partie 2: Méthodes d'essai
(CEI 60554-2:2001)

Zellulosepapiere für elektrotechnische
Zwecke
Teil 2: Prüfverfahren
(IEC 60554-2:2001)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2002-04-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 15C/1264/FDIS, future edition 2 of IEC 60554-2, prepared by SC 15C, Specifications, of IEC TC 15, Insulating materials, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60554-2 on 2002-04-01.

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) 2003-01-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-04-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60554-2:2001 was approved by CENELEC as a European Standard without any modification.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60554-2:2004
<https://standards.iteh.ai/catalog/standards/sist/5788ddf6-7307-4f42-8afd-71d9b2ae44af/sist-en-60554-2-2004>

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60216	Series	Electrical insulating materials - Properties of thermal endurance	HD 611 EN 60216	Series Series
IEC 60243-1	- ¹⁾	Electrical strength of insulating materials - Test methods Part 1: Tests at power frequencies	EN 60243-1	1998 ²⁾
IEC 60247	1978	Measurement of relative permittivity, dielectric dissipation factor and d.c. resistivity of insulating liquids	-	-
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 60296	1982	Specification for unused mineral insulating oils for transformers and switchgear	-	-
IEC 60450	1974	Measurement of the average viscometric degree of polymerization of new and aged electrical papers	-	-
IEC 60554-3	Series	Specification for cellulosic papers for electrical purposes Part 3: Specifications for individual materials	-	-
ISO 287	1985	Paper and board - Determination of moisture content - Oven-drying method	EN 20287	1994

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 534	1988	Paper and board - Determination of thickness and apparent bulk density or apparent sheet density	EN 20534	1993
ISO 535	1991	Paper and board - Determination of water absorptiveness - Cobb method	EN 20535	1994
ISO 536	1995	Paper and board Determination of grammage	EN ISO 536	1996
ISO 1924-1	1992	Paper and board - Determination of tensile properties Part 1: Rate of loading method	-	-
ISO 1924-2	1994	Part 2: Constant rate of elongation method	EN ISO 1924-2	1995
ISO 1974	1990	Paper - Determination of tearing resistance (Elmendorf method)	EN 21974	1994
ISO 2144	1997	Paper, board and pulps - Determination of residue (ash) on ignition at 900 degrees C	-	-
ISO 2758	1983	Paper - Determination of bursting strength	-	-
ISO 9964-3	1993	Water quality - Determination of sodium and potassium Part 3: Determination of sodium and potassium by flame emission spectrometry	-	-

iTeh STANDARD PREVIEW
 (standards.iteh.ai)
 SIST EN 60554-2:2004
<https://standards.iteh.ai/catalog/standards/sist/5788dd8c-7307-442-8afd-71d9b2ae14af/sist-en-60554-2-2004>

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 60554-2:2004

<https://standards.iteh.ai/catalog/standards/sist/5788ddf6-7307-4f42-8afd-71d9b2ae44af/sist-en-60554-2-2004>

NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

60554-2

Deuxième édition
Second edition
2001-11

Papiers cellulosiques à usages électriques –

Partie 2:
Méthodes d'essai

STANDARD PREVIEW
Cellulosic papers for electrical purposes –
(standards.iteh.ai)

Part 2:
Methods of test

<https://standards.iteh.ai/catalog/standards/sist/5788ddf6-7307-4f42-8afd-71d9b2ae44af/sist-en-60554-2-2004>

© IEC 2001 Droits de reproduction réservés — Copyright - all rights reserved

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'éditeur.

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 the publisher.

International Electrotechnical Commission
Telefax: +41 22 919 0300

3, rue de Varembé Geneva, Switzerland
e-mail: inmail@iec.ch IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE

V

Pour prix, voir catalogue en vigueur
For price, see current catalogue

CONTENTS

FOREWORD.....	9
INTRODUCTION.....	11
1 Scope.....	13
2 Normative references.....	13
3 Definitions	15
4 General notes on tests.....	15
5 Thickness.....	17
5.1 Determination of the thickness of single sheets of paper (ISO 534)	17
5.2 Determination of mean thickness of paper	17
6 Substance (mass per square metre, basic weight or grammage)	17
7 Apparent density.....	19
8 Tensile strength and elongation	19
9 Internal tearing resistance.....	19
10 Edge-tearing resistance	21
10.1 Test apparatus	21
10.2 Test pieces.....	21
10.3 Procedure.....	21
10.4 Results.....	23
11 Bursting strength	23
12 Folding endurance.....	23
12.1 Test apparatus	23
12.2 Test pieces.....	23
12.3 Procedure.....	23
12.4 Results.....	23
13 Moisture content	23
14 Ash content	25
15 Conductivity of aqueous extract	25
15.1 Test apparatus	25
15.2 Procedure.....	25
15.3 Results.....	27
16 pH of aqueous extract.....	27
16.1 Test apparatus	27
16.2 Procedure.....	27
16.3 Results.....	27
17 Chloride content of aqueous extract.....	29
17.1 Method 1	29
17.2 Method 2	31
18 Sulphate content.....	33

19	Conductivity of organic extract	33
19.1	Test apparatus	33
19.2	Procedure.....	35
19.3	Results	35
20	Determination of sodium and potassium content; flame atomic absorption spectrometric method.....	37
21	Air permeability	37
21.1	Test apparatus	37
21.2	Test pieces.....	39
21.3	Procedure.....	39
21.4	Results	39
22	Rate of water absorption (wicking)	39
22.1	Principle	39
22.2	Reagent	39
22.3	Apparatus.....	39
22.4	Conditioning	41
22.5	Test pieces.....	41
22.6	Procedure.....	41
22.7	Results	43
22.8	Test report.....	43
23	Oil absorption (modified Cobb method)	43
23.1	Test apparatus	43
23.2	Test pieces.....	45
23.3	Procedure.....	45
23.4	Results	45
24	Electric strength.....	47
24.1	Test apparatus	47
24.2	Test pieces.....	47
24.3	Procedure.....	47
24.4	Results	47
24.5	Test method using d.c. voltage	47
25	Dissipation factor and permittivity of unimpregnated paper	51
25.1	Test apparatus	51
25.2	Test pieces.....	53
25.3	Procedure.....	53
25.4	Results	55
26	Conducting paths.....	55
26.1	Method 1	55
26.2	Method 2	57
27	Heat stability.....	61
27.1	Internal tearing resistance.....	61
27.2	Bursting strength	61
27.3	Degree of polymerization	61

Figure 1 – Edge tear stirrup	63
Figure 2a – Overview	65
Figure 2b – Details (modifications required to Cobb absorbency tester)	65
Figure 2 – Test apparatus for oil absorbency	65
Figure 3 – Diagrammatic arrangement of test apparatus for conducting particles	67
Figure 4 – Test apparatus	67
Figure 5 – Water absorbency apparatus	69

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

SIST EN 60554-2:2004

<https://standards.iteh.ai/catalog/standards/sist/5788ddf6-7307-4f42-8afd-71d9b2ae44af/sist-en-60554-2-2004>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

CELLULOSIC PAPERS FOR ELECTRICAL PURPOSES –

Part 2: Methods of test

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60554-2 has been prepared by subcommittee 15C: Specifications, of IEC technical committee 15: Insulating materials.

This second edition cancels and replaces the first edition published in 1977, amendment 1 (1982), amendment 2 (1984), and amendment 3 (1995) and constitutes a technical revision.

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

FDIS	Report on voting
15C/1264/FDIS	15C/1311/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 3.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next revision.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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

INTRODUCTION

IEC 60554 consists of the following parts, under the general title: *Cellulosic papers for electrical purposes*.

- Part 1: Definition and general requirements
- Part 2: Methods of test
- Part 3: Specifications for individual materials

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60554-2:2004

<https://standards.iteh.ai/catalog/standards/sist/5788ddf6-7307-4f42-8afd-71d9b2ae44af/sist-en-60554-2-2004>