



BSI Standards Publication

Specification for plastic films for electrical purposes

Part 2: Methods of test

National foreword

This British Standard is the UK implementation of EN 60674-2:2017+A1:2019. It is identical to IEC 60674-2:2016, incorporating corrigendum December 2017 and amendment 1:2019. It supersedes [BS EN 60674-2:2017](#), which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by IEC corrigendum December 2017 is indicated in the text by AC1 AC1.

Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment A1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee GEL/15, Solid electrical insulating materials.

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

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Amendments/corrigenda issued since publication

Date	Text affected
30 June 2018	Implementation of IEC corrigendum December 2017
31 May 2019	Implementation of IEC amendment 1:2019 with CENELEC endorsement A1:2019

English Version

Specification for plastic films for electrical purposes – Part 2: Methods of test

Spécification pour les films en matière plastique à
usages électriques – Partie 2: Méthodes d'essai

Bestimmung für Isolierfolien für elektrotechnische
Zwecke – Teil 2: Prüfverfahren

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European foreword

The text of document 15/742/CDV, future edition 2 of IEC 60674-2, prepared by IEC/TC 15 "Solid electrical insulating materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60674-2:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by (dop) 2017-09-23
publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the document have (dow) 2019-12-23
to be withdrawn

This document supersedes EN 60674-2:1998.

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The text of the International Standard IEC 60674-2:2016 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A1

The text of document 15/839/CDV, future IEC 60674-2/A1, prepared by IEC/TC 15 "Solid electrical insulating materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60674-2:2017/A1:2019.

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- latest date by which the document has to be implemented at national level by (dop) 2019-11-28
publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the document have (dow) 2022-02-28
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The text of the International Standard IEC 60674-2:2016+A1:2019 was approved by CENELEC as a European Standard without any modification.

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60212	2010	Standard conditions for use prior to and during the testing of solid electrical insulating materials	EN 60212	2011
IEC 60216	series	Electrical insulating materials - Thermal endurance properties	EN 60216	series
IEC 60243-1	2013	Electric strength of insulating materials - Test methods - Part 1: Tests at power frequencies	EN 60243-1	2013
IEC 60243-2	-	Electric strength of insulating materials - Test methods - Part 2: Additional requirements for tests using direct voltage	EN 60243-2	-
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 60343	-	Recommended test methods for determining the relative resistance of insulating materials to breakdown by surface discharges	EN 60343	-
IEC 60394-2	1972	Varnished fabrics for electrical purposes - Part 2: Methods of test		-
IEC 60426	-	Electrical insulating materials - Determination of electrolytic corrosion caused by insulating materials - Test methods	EN 60426	-
IEC 60454-2	2007	Pressure-sensitive adhesive tapes for electrical purposes - Part 2: Methods of test	EN 60454-2	2007
IEC 60589	-	Methods of test for the determination of ionic impurities in electrical insulating materials by extraction with liquids	HD 381 S1	-
IEC 60674-3	series	Specification for plastic films for electrical purposes - Part 3: Specifications for individual materials	EN 60674-3	series

IEC 62631-3-1	-	Dielectric and resistive properties of solid insulating materials - Part 3-1 Determination of resistive properties (DC methods) - Volume resistance and volume resistivity, general method	EN 62631-3-1	-
IEC 62631-3-2	-	Dielectric and resistive properties of solid insulating materials - Part 3-2 Determination of resistive properties (DC methods) - Surface resistance and surface resistivity	EN 62631-3-2	-
ISO 527-3	1995	Plastics - Determination of tensile properties - Part 3: Test conditions for films and sheets	EN ISO 527-3	1995
ISO 534	-	Paper and board - Determination of thickness, density and specific volume	EN ISO 534	-
ISO 1183-1	-	Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method	EN ISO 1183-1	-
ISO 4591	1992	Plastics - Film and sheeting - Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness)	-	-
ISO 4592	-	Plastics - Film and sheeting - Determination of length and width	-	-
ISO 4593	-	Plastics - Film and sheeting - Determination of thickness by mechanical scanning	-	-
ISO 6383-1	-	Plastics - Film and sheeting - Determination of tear resistance - Part 1: Trouser tear method	EN ISO 6383-1	-
ISO 6383-2	-	Plastics - Film and sheeting - Determination of tear resistance - Part 2: Elmendorf method	EN ISO 6383-2	-
ISO 82953	-	Plastics - Film and sheeting - Determination of the coefficients of friction	EN ISO 8295	-
ISO 11357-3	2011	Plastics - Differential scanning calorimetry (DSC) - Part 3: Determination of temperature and enthalpy of melting and crystallization	EN ISO 11357-3	2013

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FOREWORD

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International Standard IEC 60674-2 has been prepared by IEC technical committee 15: Solid electrical insulating materials.

This bilingual version (2019-01) corresponds to the monolingual English version, published in 2016-11.

This second edition cancels and replaces the first edition published in 1988 and Amendment 1 (2001). This edition constitutes a technical revision.

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

- a) this document was completely revised editorially and technically and included in the IEC 60674 series of standards;
- b) the test methods are updated to reflect today's state of the art;

c) a method to obtain DC electric strength is now specified according to [IEC 60243-2](#).

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

CDV	Report on voting
15/742/CDV	15/760/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

The French version of this standard has not been voted upon.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60674 series, published under the general title *Specification for plastic films for electrical purposes*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirm ed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of December 2017 have been included in this copy.

INTRODUCTION

This document is one of a series which deals with plastic films for electrical purposes. The series consists of three parts:

Part 1: Definitions and general requirements ([IEC 60674-1](#))

Part 2: Methods of test (IEC 60674-2)

Part 3: Specifications for individual materials (IEC 60674-3 (all parts))

Specification for plastic films for electrical purposes —

Part 2: Methods of test

1 Scope

This part of IEC 60674 is applicable to plastic films used for electrical purposes. This part of IEC 60674 gives methods of test.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

[IEC 60212:2010](#), *Standard conditions for use prior to and during the testing of solid electrical insulating materials*

IEC 60216 (all parts), *Electrical insulating materials – Thermal endurance properties*

[IEC 60243-1:2013](#), *Electric strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

[IEC 60243-2](#), *Electric strength of insulating materials – Test methods – Part 2: Additional requirements for tests using direct voltage*

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 60343](#), *Recommended test methods for determining the relative resistance of insulating materials to breakdown by surface discharges*

[IEC 60394-2:1972](#), *Varnished fabrics for electrical purposes – Part 2: Methods of test*

[IEC 60426](#), *Electrical insulating materials – Determination of electrolytic corrosion caused by insulating materials – Test methods*

[IEC 60454-2:2007](#), *Pressure-sensitive adhesive tapes for electrical purposes – Part 2: Methods of test*

[IEC 60589](#), *Methods of test for the determination of ionic impurities in electrical insulating materials by extraction with liquids*

 Text deleted 

IEC 60674-3 (all parts), *Specification for plastic films for electrical purposes – Part 3: Specifications for individual materials*

[IEC 62631-3-1](#), *Dielectric and resistive properties of solid insulating materials – Part 3-1: Determination of resistive properties (DC methods) – Volume resistance and volume resistivity – General method*

[IEC 62631-3-2](#), *Dielectric and resistive properties of solid insulating materials – Part 3-2: Determination of resistive properties (DC methods) – Surface resistance and surface resistivity*

[ISO 527-3:1995](#), *Plastics – Determination of tensile properties – Part 3: Test conditions for films and sheets*

[ISO 534](#), *Paper and board – Determination of thickness, density and specific volume*

ISO 1183, *Plastics – Methods for determining the density of non-cellular plastics – Part 1: Immersion method, liquid pycnometer method and titration method*

[ISO 4591:1992](#), *Plastics – Film and sheeting – Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness)*

[ISO 4592](#), *Plastics – Film and sheeting – Determination of length and width*

[ISO 4593](#), *Plastics – Film and sheeting – Determination of thickness by mechanical scanning*

[ISO 6383-1](#), *Plastics – Film and sheeting – Determination of tear resistance – Part 1: Trouser tear method*

[ISO 6383-2](#), *Plastics – Film and sheeting – Determination of tear resistance – Part 2: Elmendorf method*

[A1](#) [ISO 8295](#), *Plastics – Film and sheeting – Determination of the coefficients of friction* [A1](#)

[ISO 11357-3:2011](#), *Plastics – Differential scanning calorimetry (DSC) – Part 3: Determination of temperature and enthalpy of melting and crystallization*

3 General notes on tests

3.1 Discard at least the first three layers of film from the roll to be tested before removing test specimens.

3.2 Sample rolls shall be exposed for at least 24 h to the standard atmosphere $23\text{ °C} \pm 2\text{ K}$ and $50\% \pm 5\% \text{ RH}$ before test specimens are removed for test. Unless otherwise specified, all individual test specimens shall be conditioned for 1 h and tested in the same standard atmosphere.

4 Thickness

4.1 General

Thickness shall be measured by any one or more of the methods given below as required by IEC 60674-3 (all parts).

4.2 Determination of thickness by mechanical scanning

4.2.1 General

Two methods, the first using a single sheet and the second using a stack of sheets, are given individually as follows.

4.2.2 Measurement by a single sheet

4.2.2.1 Principle

The method is based on [ISO 4593](#) using a precision micrometre to measure the thickness of a single sheet test specimen.

4.2.2.2 Test specimens and measuring points

Cut three strips about 100 mm wide across the width of the sample. The test strips shall not contain creases or other defects.

Determine the thickness of the test strips in accordance with the requirements of [ISO 4593](#) using a micrometre having plane or radiused measuring surfaces.