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## Flexible insulating sleeving - Part 2: Methods of test

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN IEC 60684-2:2025 sisaldab Euroopa standardi EN IEC 60684-2:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 20.06.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN IEC 60684-2:2025 consists of the English text of the European standard EN IEC 60684-2:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 20.06.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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English Version

## Flexible insulating sleeving - Part 2: Methods of test (IEC 60684-2:2025)

Gaines isolantes souples - Partie 2: Méthodes d'essai  
(IEC 60684-2:2025)

Isolierschläuche - Teil 2: Prüfverfahren  
(IEC 60684-2:2025)

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## European foreword

The text of document 15/1046/FDIS, future edition 4 of IEC 60684-2, prepared by TC 15 "Solid electrical insulating materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60684-2:2025.

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IEC 60304:1982	NOTE	Approved as HD 402 S2:1984 (not modified)

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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**Flexible insulating sleeving –  
Part 2: Methods of test**

**Gaines isolantes souples –  
Partie 2: Méthodes d'essai**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FLEXIBLE INSULATING SLEEVING –****Part 2: Methods of test****FOREWORD**

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IEC 60684-2 has been prepared by IEC technical committee 15: Solid electrical insulating materials. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2011. This edition constitutes a technical revision.

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

- a) major update of normative references;
- b) revision of Clause 5, with amendment of methods for measurements of bore and wall thickness;
- c) revision of Clause 11, to clarify that the longitudinal change test is done on expanded sleeving;

- d) revision of Clause 28, additional method D for flame propagation testing;
- e) revision of Clause 56, additional method for preparation of samples for adhesive peel test;
- f) addition of Clause 63, abrasion test method;
- g) addition of Clause 64, volume resistivity for semi-conducting materials;
- h) addition of Clause 65, outgassing;
- i) addition of Clause 66, resistance to weathering.

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

Draft	Report on voting
15/1046/FDIS	15/1058/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all the parts in the IEC 60684 series, under the general title *Flexible insulating sleeving*, 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 [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

## INTRODUCTION

This International Standard is one of a series which deals with flexible insulating sleeving. The series consists of three parts:

IEC 60684-1: *Definitions and general requirements*

IEC 60684-2: *Methods of test*

IEC 60684-3: *Specifications for individual types of sleeving*

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## FLEXIBLE INSULATING SLEEVING –

### Part 2: Methods of test

#### 1 Scope

This part of IEC 60684 gives methods of test for flexible insulating sleeving, including heat-shrinkable sleeving, intended primarily for insulating electrical conductors and connections of electrical apparatus, although they can be used for other purposes.

The tests specified are designed to control the quality of the sleeving but it is recognized that they do not completely establish the suitability of sleeving for impregnation or encapsulation processes or for other specialized applications. Where necessary, the test methods in this document will be supplemented by appropriate impregnation or compatibility tests to suit the individual circumstances.

#### 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, *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 60216-4-1, *Electrical insulating materials – Thermal endurance properties – Part 4-1: Ageing ovens – Single-chamber ovens*

IEC 60216-4-2, *Electrical insulating materials – Thermal endurance properties – Part 4-2: Ageing ovens – Precision ovens for use up to 300 °C*

IEC 60243-1, *Electrical strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60426, *Electrical insulating materials – Determination of electrolytic corrosion caused by insulating materials – Test methods*

IEC 60587, *Electrical insulating materials used under severe ambient conditions – Test methods for evaluating resistance to tracking and erosion*

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

IEC 60684-3 (all parts), *Flexible insulating sleeving – Part 3: Specifications for individual types of sleeving*

IEC 60695-6-1, *Fire hazard testing – Part 6-1: Smoke obscuration – General Guidance*

IEC TS 60695-11-21, *Fire hazard testing – Part 11-21: Test flames – 500 W vertical flame test method for tubular polymeric materials*

IEC 60754-1, *Test on gases evolved during combustion of materials from cables – Part 1: Determination of the amount of halogen acid gas content*

IEC 60754-2, *Test on gases evolved during combustion of materials from cables – Part 2: Determination of acidity (by pH measurement) and conductivity*

IEC 62631-2-1, *Dielectric and resistive properties of solid insulating materials – Part 2-1: Relative permittivity and dissipation factor – Technical Frequencies (0,1 Hz – 10 MHz) – AC Methods*

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*

ISO 5-1, *Photography and graphic technology – Density measurements – Part 1: Geometry and functional notation*

ISO 5-2, *Photography and graphic technology – Density measurements – Part 2: Geometric conditions for transmittance density*

ISO 5-3, *Photography and graphic technology – Density measurements – Part 3: Spectral conditions*

ISO 5-4, *Photography and graphic technology – Density measurements – Part 4: Geometric conditions for reflection density*

ISO 37, *Rubber, vulcanized or thermoplastic – determination of tensile stress-strain properties*

ISO 62, *Plastics – Determination of water absorption*

ISO 105-A02, *Textiles – Tests for colour fastness – Part A02: Grey scale for assessing change in colour*

ISO 105-B01, *Textiles – Tests for colour fastness – Part B01: Colour fastness to light: Daylight*

ISO 182-1, *Plastics – Determination of the tendency of compounds and products based on vinyl chloride homopolymers and copolymers to evolve hydrogen chloride and any other acidic products at elevated temperatures – Part 1: Congo red method*

ISO 182-2, *Plastics – Determination of the tendency of compounds and products based on vinyl chloride homopolymers and copolymers to evolve hydrogen chloride and any other acidic products at elevated temperatures – Part 2: pH method*

ISO 974, *Plastics – Determination of the brittleness temperature by impact*

ISO 1431-1, *Rubber, vulcanized or thermoplastic – Resistance to ozone cracking – Part 1: Static and dynamic strain testing*

ISO 13943, *Fire safety – Vocabulary*

ISO 4589-2, *Plastics – Determination of burning behaviour by oxygen index – Part 2: Ambient-temperature test*

ISO 4589-3, *Plastics – Determination of burning behaviour by oxygen index – Part 3: Elevated-temperature test*

ISO 4892-3, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*

ASTM E595 15-2021, *Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment*

### 3 Terms and definitions

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

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

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

#### 3.1

##### **smoke index**

numerical summation of the rates of change in specific optical density of smoke produced from the start of the test to 70 %, 40 %, 10 % and to the minimum light transmittance values as applicable

#### 3.2

##### **toxicity index**

numerical summation of the toxicity factors of selected gases produced by complete combustion of the material in air under the conditions specified

### 4 Test conditions

#### 4.1 Standard test conditions

Unless otherwise specified, all tests shall be made under standard ambient conditions according to IEC 60212; i.e., at a temperature between 15 °C and 35 °C and at ambient relative humidity.

In cases of dispute, the tests shall be carried out at a temperature of 23 °C ± 2 K and at (50 ± 5) % relative humidity.

#### 4.2 Elevated temperature test conditions

When heating at elevated temperature is specified for a test procedure, the specimen shall be maintained for the prescribed period in a uniformly heated oven complying with IEC 60216-4-1.

#### 4.3 Low temperature test conditions

Where a test at low temperature is specified, the specification sheets of IEC 60684-3 may require it to be carried out at  $-t$  °C or lower. In such cases the operator may carry out the test at the specified temperature or any lower temperature which is convenient. If, however, at a temperature below that specified the specimen fails to meet the requirements, the test shall be repeated at the specified temperature, subject to a tolerance of ± 3 K as specified in IEC 60212. If the specimen then passes, it shall be considered to have met the requirements.