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REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Combined flexible materials for electrical insulation – Part 1: Definitions and general requirements



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Combined flexible materials for electrical insulation – Part 1: Definitions and general requirements

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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COMBINED FLEXIBLE MATERIALS FOR ELECTRICAL INSULATION –

Part 1: Definitions and general requirements

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60626-1:2009. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 60626-1 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 2009. This edition constitutes a technical revision.

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

a) the materials available for use within this series of standards have been updated;
b) a framework has been created to allow test methods beyond those used for quality control specifications to allow for testing for qualification purposes.

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

Draft	Report on voting
15/1009/FDIS	15/1016/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.

A list of all parts in the IEC 60626 series, published under the general title *Combined flexible materials for electrical insulation*, 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 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.

INTRODUCTION

This document is one of a series which deals with combined flexible materials consisting of two or more different insulating materials laminated together. The components of the combined materials are plastic films and/or fibrous materials such as papers, woven or non-woven fabrics, impregnated or not impregnated. This document does not include mica papers used as primary component, which are covered by the IEC 60371 series, but insulation materials based on mica can be used as component of a combined flexible material.

This series consist of three parts describing:

Part 1: Definitions and general requirements (IEC 60626-1);

Part 2: Methods of test (IEC 60626-2);

Part 3: Specifications for individual materials (IEC 60626-3).

COMBINED FLEXIBLE MATERIALS FOR ELECTRICAL INSULATION –

Part 1: Definitions and general requirements

1 Scope

This part of IEC 60626 contains the definitions related to and the general requirements to be fulfilled by combined flexible materials for electrical insulation. This document does not include mica papers used as a primary component, which are covered by the IEC 60371 series, but insulation materials based on mica paper ~~may~~ can be used as ~~complementary~~ component of a combined flexible material. Materials which conform to this specification meet established levels of performance. However, the selection of material by a user for a specific application ~~should be~~ is based on the actual requirements necessary for adequate performance in that application and not based on this specification alone.

~~SAFETY WARNING~~

~~It is the responsibility of the user of the methods contained or referred to in this document to ensure that they are used in a safe manner.~~

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.

~~NOTE The list of normative references is extensive because, in order to obtain a combination of two or more materials for electrical insulation, it is necessary that those base materials (paper, film, etc) shall conform to the requirements set forth, in the appropriate specification of the base material alone, for that purpose. This rule shall be applied also in the development of new possible combinations; to this end, specifications of materials not actually used, but referenced, may be eligible for future developments.~~

IEC 60371-3-2, *Insulating materials based on mica – Part 3: Specifications for individual materials – Sheet 2: Mica paper*

IEC 60371-3-4, *Specification for insulating materials based on mica – Part 3: Specifications for individual materials – Sheet 4: Polyester film-backed mica paper with B-stage epoxy resin binder*

IEC 60371-3-5, *Insulating materials based on mica – Part 3: Specifications for individual materials – Sheet 5: Glass-backed mica paper with and epoxy resin binder for post-impregnation (VPI)*

IEC 60371-3-6, *Specification for insulating materials based on mica – Part 3: Specifications for individual materials – Sheet 6: Glass-backed mica paper with B-stage epoxy resin binder*

IEC 60554-3-1~~:1979~~, *Specification for cellulosic papers for electrical purposes – Part 3-1: Specifications for individual materials – General purpose electrical paper*

IEC 60626-3~~:2008~~, *Combined flexible materials for electrical insulation – Part 3: Specifications for individual materials*

IEC 60641-3-2:2007, *Pressboard and presspaper for electrical purposes – Part 3: Specifications for individual materials – Sheet 2: Requirements for presspaper types P.2.1, P4.1, P4.2, P4.3 and P6.1*

IEC 60674-3-2~~:1992~~, *Specification for plastic films for electrical purposes – Part 3: Specifications for individual materials – Sheet 2: Requirements for balanced biaxially oriented Polyethylene Terephthalate (PET) films used for electrical insulation*

IEC 60674-3-4~~:1993, *Specification for*~~ *Plastic films for electrical purposes – Part 3: Specifications for individual materials – Sheets 4:* ~~*Requirements for polyimide (PI)*~~ *Polyimide films used for electrical insulation*

IEC 60674-3-8~~: —~~, ~~*Specification for*~~ *Plastic films for electrical purposes – Part 3: Specifications for individual materials – Sheet 8:* ~~*Requirements for*~~ *Balanced biaxially oriented polyethylene naphthalate (PEN) films used for electrical insulation*~~[1]~~

IEC 60819-3-1~~:2001~~, *Non-cellulosic papers for electrical purposes – Part 3: Specifications for individual materials – Sheet 1: Filled glass paper*

IEC 60819-3-2~~:2001~~, *Non-cellulosic papers for electrical purposes – Part 3: Specifications for individual materials – Sheet 2: Hybrid inorganic- organic paper*

IEC 60819-3-3~~:2008~~, *Non-cellulosic papers for electrical purposes – Part 3: Specifications for individual materials – Sheet 3: Unfilled aramid (aromatic polyamide) papers*

IEC 60819-3-4: ~~2001~~2011, *Non-cellulosic papers for electrical purposes – Part 3: Specifications for individual materials – Sheet 4: Aramid fibre paper containing not more than 50 % of mica particles*

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
full width material
material of production width, for example about 1 m, as ordered

3.2
slit material ~~**(tape)**~~
tape
material cut from full width material

3.3
duplex material
laminate consisting of two layers of insulating materials

~~[1] To be published.~~

3.4
triplex material
laminate consisting of three layers of insulating materials

3.5
quadruplex material
laminate consisting of four layers of insulating materials

4 Designations

4.1 Designation – Product

Particular types of combined flexible insulating materials ~~may~~ can be designated by using the relevant combinations of code letters for the form and nature of the main components, separated by a hyphen.

EXAMPLES: F - PI,

C - G.

The more commonly used materials are listed in Table 1, with their corresponding specifications that shall be used when available. Other combinations of combined flexible materials for use as electrical insulation are possible.

Specific characteristics of a particular combined material (duplex, triplex or quadraplex), particular characteristics of the basic material, impregnating material, bonding agent, etc.) are described by additional data following the designation in Table 1.

Example for designation:

P-C/F-PET, is a layer of paper consisting of cellulose, laminated with a film consisting of polyethylene terephthalate.

In some cases, the identification of specific characteristics such as the following ~~may~~ can be useful:

– Absorbent - porous	Calendered type
– Lengthwise oriented	Lengthwise reinforced
– Creped	Embossed
– Varnished	Impregnated

NOTE This list is for guidance only and is not limiting. Code designations are in accordance with ISO standards such as ISO 1043-1.

Detailed specifics regarding commonly used combined flexible materials are provided in IEC 60626-3. For these constructions, the following nomenclature shall be used:

IEC 60626-3, sheet number, layer descriptions, total thickness

For example, from Sheet 112, the following is a description of one such product:

IEC 60626-3, Sheet 112, P-C/F-PET/P-C, 0,15 mm

For constructions for which there is no detail provided in IEC 60626-3, the following nomenclature shall be used:

IEC 60626-1, layer descriptions, thickness (micrometers) or grammage (g/m^2) of each layer. For simplicity, the micrometers will be represented by µ and the g/m^2 will be represented by g.