IEC 60626-1

Edition 3.0 2009-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Matériaux combinés souples destinés à l'isolement électrique – Partie 1: Définitions et exigences générales

IEC 60626-1:2009

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: 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 corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

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 It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:
Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) 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 CEI

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

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,…). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:
Email: csc@iec.ch
Tél.: +41 22 919 02 11
Fax: +41 22 919 03 00

IEC 60626-1

Edition 3.0 2009-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Matériaux combinés souples destinés à l'isolement électrique – Partie 1: Définitions et exigences générales

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX H

ICS 29.035.01

ISBN 978-2-88910-236-5

INTERNATIONAL ELECTROTECHNICAL COMMISSION

____

COMBINED FLEXIBLE MATERIALS FOR ELECTRICAL INSULATION –

Part 1: Definitions and general requirements

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
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.

International Standard IEC 60626-1 has been prepared by IEC technical committee 15: Solid electrical insulating materials.

This third edition cancels and replaces the second edition published in 1995 and its amendment 1 (1996), of which it constitutes a technical revision. The main changes from the previous edition are as follows:

The Scope was revised specifying treatment of mica paper, and Table 1 was revised cancelling materials no longer in use and introducing newer materials.

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

CDV	Report on voting
15/469/CDV	15/511/RVC

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 2.

A list of all the parts in the IEC 60626 series, 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 publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

INTRODUCTION

This International standard 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 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 standard does not include mica paper, as primary component, covered by IEC 60371, but mica paper may be used as complementary 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 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 referenced documents are indispensable for the application 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 60554-3-1:1979, *Specification for cellulosic papers for electrical purposes – Part 3: Specifications for individual materials – Sheet 1: 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, P.4.1, P.4.2, P.4.3 and P.6.1*

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 – Sheet 4: Requirements for polyimide (PI) 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, *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 purpose of this document, the following terms and definitions apply:

3.1
full width material
material of production width, for example about 1 m, as ordered

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

3.3
duplex material
laminate consisting of two layers of insulating materials

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 Designation

Particular types of combined flexible insulating materials may 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.

---

1 To be published.

Specific characteristics of a particular combined material (duplex or triplex, 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 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.

Table 1 – Commonly used flexible materials

Form of component	Code designation	Nature of the component	Code designation	IEC normative reference
Film	F	Polyethylene terephthalate	PET	60674-3-2
		Polyethylene naphtalate	PEN	60674-3-8
		Polyimide	PI	60674-3-4
Paper and non-woven fabric and mats	P	Cellulose paper	C	60554-3-1; 60641-3-2
		Aramid paper (Aromatic Polyamide)	PAa	60819-3-3; 60819-3-4
		Polyethylene terephthalate non woven	PET	n. a.
		Filled glass paper	FG	60819-3-1
		Hybrid inorganic/organic paper	H	60819-3-2
Woven fabrics	C	Cellulose Glass Polyethylene terephthalate	C G PET	n. a.
Adhesive	A	Thermoplastic Thermosetting	Tp Ts	n. a.
n.a. = not available				

5 General requirements

5.1 The material may be delivered in sheets cut to length or in rolls.

5.2 All materials in any one consignment shall be consistent and have properties within the limits of this standard throughout the whole sheet or throughout the whole length of each roll. The surface shall be uniform, reasonably smooth and reasonably free from defects such as bubbles, pin holes, creases and flaws.

5.3 When delivered in rolls, it shall be capable of being unrolled without damage.

5.4 The combined materials shall be free of conducting particles and other undesirable inclusions.

5.5 Materials delivered in sheets cut to length shall be reasonably free from warp.

NOTE After bonding, materials produced in roll form often assume a "roll set" which depends upon time and temperature of storage. Sheets made from such rolls may require appreciable time before warp is relieved.

6 Dimensions

Thickness and thickness tolerances are dealt with in IEC 60626-3. Other dimensions and tolerances shall be agreed by the purchaser and the supplier.

7 Joins

For material in roll form, the allowable frequency of joins, the details of their construction, and identification shall be agreed by the purchaser and the supplier.

8 Conditions of supply

Material in roll form shall be supplied on cardboard roll or other suitable core. The inner diameter of the core shall be agreed by purchaser and supplier, and it should preferably be 55 mm, 76 mm or 150 mm.

Material in sheet form shall be supplied in stacks.

The material shall be placed in a packing which ensures adequate protection during transport, handling and storage.

Each unit pack, and each package containing a number of unit packs, shall have the following information clearly and indelibly marked on it:

a) the reference to this standard;

b) the designation of the type, in accordance with Clause 3;

c) for materials delivered in rolls: the width and the length or weight of each roll;

d) for materials delivered in sheets: the dimensions of the sheets and the number of sheets in a stack or the mass of the stack;

e) the nominal thickness of the material;

f) the number of rolls or stacks in a larger package;

g) the date of manufacturing;

h) information about joins as required by IEC 60626-3.

Any special conditions of supply, such as requirements regarding shelf life, shall be agreed by the purchaser and the supplier.

_____