

BS EN 60819-3-4:2014



BSI Standards Publication

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

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National foreword

This British Standard is the UK implementation of EN 60819-3-4:2014. It is identical to IEC 60819-3-4:2013. It supersedes BS EN 60819-3-4:2002, which will be withdrawn on 16 January 2017.

The UK participation in its preparation was entrusted by Technical Committee GEL/15, Solid electrical insulating materials, to Subcommittee GEL/15/10, Combined flexible 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
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English version

**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
 (IEC 60819-3-4:2013)**

Papiers non cellulosiques pour usages
 électriques -
 Partie 3: Spécifications pour matériaux
 particuliers -
 Feuille 4: Papiers en fibres aramide ne
 contenant pas plus de 50 % de particules
 de mica
 (CEI 60819-3-4:2013)

Zellulosefreie Papiere für
 elektrotechnische Zwecke -
 Teil 3: Bestimmungen für einzelne
 Materialien -
 Blatt 4: Papier aus Aramidfaser mit einem
 Glimmeranteil von nicht mehr als 50 %
 (IEC 60819-3-4:2013)

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CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 15/689/CDV, future edition 2 of IEC 60819-3-4, prepared by IEC/TC 15 "Solid electrical insulating materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60819-3-4:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-10-16
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-01-16

This document supersedes EN 60819-3-4:2001.

EN 60819-3-4:2014 includes the following significant technical changes with respect to EN 60819-3-4:2001:

The document was updated including new thicknesses and relevant values as from Table 1.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60819-3-4:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60819-3 (all sheets) NOTE Harmonized as EN 60819-3 (all sheets) (not modified).

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 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 60819-1	-	Non-cellulosic papers for electrical purposes - Part 1: Definitions and general requirements	EN 60819-1	-
IEC 60819-2	2001	Non-cellulosic papers for electrical purposes - Part 2: Methods of test	EN 60819-2	2001

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INTRODUCTION

This International Standard is one of a series which deals with non-cellulosic papers for electrical purposes.

The series consists of three parts:

Part 1: Definitions and general requirements (IEC 60819-1).

Part 2: Methods of test (IEC 60819-2).

Part 3: Specifications for individual materials (IEC 60819-3).

This standard is one of the sheets comprising Part 3:

Sheet 4: Aramid fibre paper containing not more than 50 % of mica particles.

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

1 Scope

This sheet of IEC 60819-3 specifies requirements for two types of aramid fibre paper containing mica particles and designated as PAaM.

- type 1: calendered aramid paper containing mica particles;
- type 2: uncalendered aramid paper containing mica particles.

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 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.

IEC 60819-1, *Non-cellulosic papers for electrical purposes – Part 1: Definitions and general requirements*

IEC 60819-2:2001, *Non-cellulosic papers for electrical purposes – Part 2: Methods of test*

3 Requirements

In addition to complying with the general requirements in IEC 60819-1, papers shall comply with the specific requirements appropriate to their type as given in the following list and in Table 1.

- The mica content of either type of paper shall be up to 50 % by mass.
- Thermal classification: based on long-term thermal ageing tests and the resulting Arrhenius graph, experience has shown that non-cellulose papers listed in this sheet may be suitable for use in electrical apparatus and shall have a relative temperature index (RTI) of at least 220.
- The moisture content of type 1 paper shall not exceed 10,0 %.
- The moisture content of type 2 paper shall not exceed 14,0 %.
- The dissipation factor measured in accordance with Clause 6 of IEC 60819-2:2001 shall not exceed 0,1. The permittivity for type 1 shall be $4,5 \pm 0,5$. The permittivity for type 2 shall be $3,0 \pm 0,5$.
- Apparent density shall be for the two types described:
 - type 1: $1,10 \text{ g/cm}^3 \pm 15 \%$
 - type 2: $0,4 \text{ g/cm}^3 \pm 15 \%$

Table 1 – Physical and electrical requirements

Property	Clause of IEC 60819-2:2001	Units	Nominal Thickness mm	Type 1		Type 2	
				Minimum	Maximum	Minimum	Maximum
Thickness	4	mm	0,080	0,073	0,097	–	–
			0,130	0,118	0,151	–	–
			0,150	0,132	0,168	–	–
			0,200	0,188	0,229	0,175	0,242
			0,250	0,241	0,295	–	–
			0,350	0,321	0,390	0,259	0,407
Grammage	5	g/m ²	0,080	74	105	–	–
			0,130	130	168	–	–
			0,150	160	196	–	–
			0,200	218	256	82	94
			0,250	271	322	–	–
			0,350	363	431	142	170
Apparent density	–	g/cm ³	0,080	0,93	1,17	–	–
			0,130	0,98	1,22	–	–
			0,150	1,05	1,26	–	–
			0,200	1,05	1,22	0,35	0,44
			0,250	1,05	1,21	–	–
			0,350	1,04	1,20	0,36	0,48
Electric strength	10	kV/mm	0,080	20	NR	–	–
			0,130	23	NR	–	–
			0,150	28	NR	–	–
			0,200	29	NR	11	NR
			0,250	30	NR	–	–
			0,350	28	NR	11	NR
Minimum edge tearing resistance Machine direction	8	N	0,080	14	NR	–	–
			0,130	24	NR	–	–
			0,150	34	NR	–	–
			0,200	48	NR	19	NR
			0,250	48	NR	–	–
			0,350	90	NR	38	NR
Minimum edge tearing resistance Cross Machine direction	8	N	0,080	11	NR	–	–
			0,130	14	NR	–	–
			0,150	22	NR	–	–
			0,200	40	NR	11	NR
			0,250	47	NR	–	–
			0,350	69	NR	22	NR

Property	Clause of IEC 60819-2:2001	Units	Nominal Thickness mm	Type 1		Type 2	
				Minimum	Maximum	Minimum	Maximum
Tensile strength Machine direction	7	N/cm	0,080	19	NR	–	–
			0,130	38	NR	–	–
			0,150	42	NR	–	–
			0,200	76	NR	13	NR
			0,250	78	NR	–	–
			0,350	102	NR	21	NR
Tensile strength Cross machine direction	7	N/cm	0,080	12	NR	–	–
			0,130	24	NR	–	–
			0,150	29	NR	–	–
			0,200	52	NR	8	NR
			0,250	53	NR	–	–
			0,350	71	NR	16	NR
Elongation at break Machine direction	7	%	0,080	1,0	NR	–	–
			0,130	1,3	NR	–	–
			0,150	1,3	NR	–	–
			0,200	1,3	NR	1,0	NR
			0,250	1,3	NR	–	–
			0,350	1,3	NR	1,2	NR
Elongation at break Cross machine direction	7	%	0,080	1,0	NR	–	–
			0,130	1,3	NR	–	–
			0,150	1,3	NR	–	–
			0,200	1,3	NR	1,5	NR
			0,250	1,3	NR	–	–
			0,350	1,3	NR	1,5	NR
Tensile strength and elongation at break requirements apply to test pieces having 25 mm width with jaw separation of 125 mm and separation speed of 0,85 mm/s.							
NOTE NR: no requirement							

Bibliography

IEC 60819-3 (all sheets), *Non-cellulosic papers for electrical purposes – Part 3: Specifications for individual materials*

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