

Combined flexible materials for electrical insulation —

Part 3: Specifications for individual materials

ICS 29.035.01



National foreword

This British Standard is the UK implementation of EN 60626-3:2008+A1:2012. It is identical to IEC 60626-3:2008, incorporating amendment 1:2012. It supersedes BS EN 60626-3:2008, which will be withdrawn on 21 August 2015.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A1** **A1**.

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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**Combined flexible materials for electrical insulation -
Part 3: Specifications for individual materials
(IEC 60626-3:2008)**

Matériaux combinés souples
destinés à l'isolement électrique -
Partie 3: Spécifications
pour matériaux particuliers
(CEI 60626-3:2008)

Flexible Mehrschichtisolierstoffe
zur elektrischen Isolation -
Teil 3: Bestimmungen
für einzelne Materialien
(IEC 60626-3:2008)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 15/442/FDIS, future edition 3 of IEC 60626-3, prepared by IEC TC 15 "Solid electrical insulating materials", was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60626-3 on 2008-08-01.

This European Standard supersedes EN 60626-3:1996 + A1:1999.

The main changes from EN 60626-3:1996 are as follows:

- consolidation of Amendment 1 published in 1999 which was mainly describing the sheets from 340 to 459;
- revision and reordering of previous tables of EN 60626-3:1996.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2009-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2011-08-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60626-3:2008 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A1

The text of document 15/647/CDV, future edition 1 of IEC 60626-3:2008/A1, prepared by IEC TC 15 "Solid electrical insulating materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60626-3:2008/A1:2012.

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) 2013-05-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-08-21

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Endorsement notice

The text of the International Standard IEC 60626-3:2008/A1:2012 was approved by CENELEC as a European Standard without any modification.

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INTRODUCTION

This standard contains 31 sheets of Part 3, as follows:

100, 101, 102, 110, 111, 112, 113, 114, 115, 302, 303, 312, 313, 315, 320, 330, 340, 350, 351, 360, 400, 401, 402, 403, 410, 411, 420, 421, 502, 503, 505.

COMBINED FLEXIBLE MATERIALS FOR ELECTRICAL INSULATION –

Part 3: Specifications for individual materials

1 Scope

This part of IEC 60626 specifies dimensional and performance requirements for individual combined flexible materials for electrical insulation. This part is in the form of groups of sheets. Sheets are numbered in accordance with Table 1, which provides a complete list of all the specification sheets belonging to this standard.

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.

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 60554-1:1977, *Specification for cellulosic papers for electrical purposes – Part 1: Definitions and general requirements*

IEC 60554-3 (all parts), *Specification for cellulosic papers for electrical purposes – Part 3: Specifications for individual materials*

IEC 60626-1:1995, *Combined flexible materials for electrical insulation – Part 1: Definitions and general requirements*

IEC 60626-2:1995, *Combined flexible materials for electrical insulation – Part 2: Methods of test*

IEC 60641-1:2008, *Pressboard and presspaper for electrical purposes – Part 1: Definitions and general requirements*

IEC 60641-3-2:2008, *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 60674-1:1980, *Specification for plastic films for electrical purposes – Part 1: Definitions and general requirements*

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 films used for electrical insulation*

IEC 60819-1:1995, *Non-cellulosic papers for electrical purposes – Part 1: Definitions and general requirements*
Amendment 1 (1996)

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 60819-3-3:2006, *Non-cellulosic papers for electrical purposes – Part 3: Specifications for individual materials – Sheet 3: Unfilled aramid (aromatic polyamide) papers*

3 Requirements

In addition to complying with the general requirements of IEC 60626-1, each flexible combined laminate shall conform to the requirements set forth in the appropriate sheet corresponding to its type, as shown in the sheets of this standard.

4 Designation

Table 1 lists material designations and constructions appropriate to each sheet. Material conforming to this specification shall be identified by a designation containing the IEC standard number, the material designation from IEC 60626-1 and the nominal thickness. For example:

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

5 Thermal classification

Performance experience provides information about the thermal capability of combined flexible materials in electrical insulation systems. This information is given in each individual sheet. Thermal classification information on these sheets is not to be considered as a requirement.

6 Specification sheets

The presently 31 sheets listed in the Introduction are organised according to the composition of the laminates as described in the following master listing Table 1, including sections that could be offered by the market in the future; therefore classification numbering is already provided for future growth.

Table 1 – Master listing for IEC 60626-3 sheet identification

Sheet No.	Flexible laminate composition
100 to 149	Paper or presspaper containing sulphate wood pulp fibres
100 to 109	Duplex with PET film
110 to 119	Triplex with PET film
120 to 149	Others ^a
150 to 199	Paper or presspaper containing cotton fibres ^a
150 to 159	Duplex with PET film ^a
160 to 169	Triplex with PET film ^a
170 to 199	Others ^a
200 to 249	Paper or presspaper containing both cotton and wood pulp fibres ^a
200 to 209	Duplex with PET film ^a
210 to 219	Triplex with PET film ^a
220 to 249	Others ^a
250 to 299	Paper or presspaper containing other cellulosic fibres or mixtures of cellulosic and non-cellulosic fibers ^a
300 to 399	Wet-laid paper containing organic non-cellulosic fibres
300 to 309	Duplex calendered aramid with PET film
310 to 319	Triplex calendered aramid with PET film
320 to 329	Triplex uncalendered aramid with PET film
330 to 339	Triplex calendered aramid with PI film
340 to 349	Duplex hybrid organic-inorganic with PET film
350 to 359	Triplex hybrid organic-inorganic with PET film
360 to 369	Triplex hybrid organic-inorganic with filled glass paper
370 to 399	Others ^a
400 to 499	Wet-laid paper containing inorganic fibres
400 to 459	Glass
460 to 499	Others ^a
500 to 599	Dry-laid non-woven containing organic fibres
500 to 519	100 % PET-based fibres
520 to 539	100 % aramid-based fibres ^a
540 to 599	Others ^a
600 to 999	Other constructions
^a Sections provided for future development of new specification sheets at present are void.	
The specification sheets developed for the time being are: 100, 101, 102, 110, 111, 112, 113, 114, 115, 302, 303, 312, 313, 315, 320, 330, 340, 350, 351, 360, 400, 401, 402, 403, 410, 411, 420, 421, 502, 503, 505, and are given below.	

Sheet 100

Requirements for combined flexible duplex materials of two layers – F-PET/P-C (23 µm PET film with presspaper or paper)

1 Description

This sheet gives the requirements for duplex materials consisting of paper or presspaper containing sulphate wood pulp fibres (P-C) laminated on a polyethylene terephthalate film (F-PET) having a nominal thickness of 23 µm.

2 Thermal classification

Experience has shown that the combined flexible materials listed in this sheet may be suitable for use in electrical apparatus with ratings up to and including the range of 120 °C to 130 °C.

3 Single-layer requirements

Use paper which meets the requirements for classes 1.1, 1.2, 1.3 or 1.4 of IEC 60554-1 and IEC 60554-3. Alternatively, use presspaper which meets the requirements for P2, P4 or P6 of IEC 60641-1 and IEC 60641-3-2. Each of these presspapers or papers can have a different density, which will affect the nominal grammage of the laminate.

Use a PET film, which has a nominal thickness of 23 µm and meets the requirements of IEC 60674-1 and IEC 60674-3-2.

4 Breakdown voltage requirements

For all laminates listed in Clause 5, the minimum electric breakdown voltage using 6 mm diameter electrodes is

- for unfolded specimens: 6 kV;
- for folded specimens: 5 kV.

However, in accordance with IEC 60626-2, a minimum electric breakdown voltage on folded specimens is not required for laminates of nominal thickness greater than 0,5 mm.

5 Additional requirements

Additional requirements are given in the table below:

Property	Clause in IEC 60626-2	Units Tolerance	
Laminate nominal thickness	2	mm	0,10 0,13 0,15 0,18 0,20 0,30 0,35 0,40 0,45 0,50 0,60
Laminate thickness tolerance	2	± %	15 15 15 15 15 15 10 10 10 10 10
Laminate nominal grammage	3	g/m ² ±12 %	115 155 190 215 250 300 370 430 490 610 730
Tensile strength unfolded	4	N/10 mm min. MD CMD	90 100 135 150 180 220 270 300 360 450 540 60 70 90 100 120 140 180 200 240 300 360
Tensile strength folded, film inside	4	N/10 mm min. MD CMD	70 80 100 110 140 170 210 240 280 350 420 40 50 60 70 80 100 120 140 160 200 240
Elongation, unfolded	4	% min. MD CMD	3 3 3 3 5 5 5 5 5 5 5 10 10 10 10 13 13 13 13 13 13 13
NOTES MD = machine direction CMD = cross machine direction min. = minimum			

Sheet 101

Requirements for combined flexible duplex materials of two layers – F-PET/P-C (36 µm PET film with presspaper or paper)

1 Description

This sheet gives the requirements for duplex materials consisting of paper or presspaper containing sulphate wood pulp fibres (P-C) laminated on a polyethylene terephthalate film (F-PET) having a nominal thickness of 36 µm.

2 Thermal classification

Experience has shown that the combined flexible materials listed in this sheet may be suitable for use in electrical apparatus with ratings up to and including the range of 120 °C to 130 °C.

3 Single-layer requirements

Use paper which meets the requirements for classes 1.1, 1.2, 1.3, or 1.4 of IEC 60554-1 and IEC 60554-3. Alternatively, use presspaper which meets the requirements for P2, P4 or P6 of IEC 60641-1 and IEC 60641-3-2. Each of these presspapers or papers can have a different density, which will affect the nominal grammage of the laminate.

Use a PET film which has a nominal thickness of 36 µm and meets the requirements of IEC 60674-1 and IEC 60674-3-2.

4 Breakdown voltage requirements

For all laminates listed in Clause 5, the minimum electric breakdown voltage using 6 mm diameter electrodes is

- for unfolded specimens: 7 kV;
- for folded specimens: 6 kV.

However, in accordance with IEC 60626-2, a minimum electric breakdown voltage on folded specimens is not required for laminates of nominal thickness greater than 0,5 mm.

5 Additional requirements

Additional requirements are given in the table below.

Property	Clause in IEC 60626-2	Units Tolerance	
Laminate nominal thickness	2	mm	0,10 0,15 0,20 0,25 0,30 0,35 0,40 0,45 0,50 0,60
Laminate thickness tolerance	2	± %	15 15 15 15 10 10 10 10 10 10
Laminate nominal grammage	3	g/m ² ±12 %	120 190 250 280 370 395 490 510 610 730
Tensile strength unfolded	4	N/10 mm min. MD CMD	90 135 180 190 270 280 360 380 450 540 60 90 120 130 180 190 240 250 300 360
Tensile strength folded, film inside	4	N/10 mm min. MD CMD	70 100 130 150 200 230 270 300 340 410 40 60 80 90 120 130 160 170 200 240
Elongation, unfolded	4	% min. MD CMD	3 3 5 5 5 5 5 5 5 5 10 10 13 13 13 13 13 13 13 13
NOTES MD = machine direction CMD = cross machine direction min. = minimum			

Sheet 102

Requirements for combined flexible duplex materials of two layers – F-PET/P-C (50 µm PET film with presspaper or paper)

1 Description

This sheet gives the requirements for duplex materials consisting of paper or presspaper containing sulphate wood pulp fibres (P-C) laminated on a polyethylene terephthalate film (F-PET) having a nominal thickness of 50 µm.

2 Thermal classification

Experience has shown that the combined flexible materials listed in this sheet may be suitable for use in electrical apparatus with ratings up to and including the range of 120 °C to 130 °C.

3 Single-layer requirements

Use paper which meets the requirements for classes 1.1, 1.2, 1.3, or 1.4 of IEC 60554-1 and IEC 60554-3. Alternatively, use presspaper which meets the requirements for P2 or P4 of IEC 60641-1 and IEC 60641-3-2. Each of these presspapers or papers can have a different density, which will affect the nominal grammage of the laminate.

Use a PET film which has a nominal thickness of 50 µm and meets the requirements of IEC 60674-1 and IEC 60674-3-2.

4 Breakdown voltage requirements

For all laminates listed in Clause 5, the minimum electric breakdown voltage using 6 mm diameter electrodes is

- for unfolded specimens: 8 kV;
- for folded specimens: 6 kV.

However, in accordance with IEC 60626-2, a minimum electric breakdown voltage on folded specimens is not required for laminates of nominal thickness greater than 0,5 mm.

5 Additional requirements

Additional requirements are given in the table below.

Property	Clause in IEC 60626-2	Units Tolerance	
Laminate nominal thickness	2	mm	0,15 0,20 0,25 0,30 0,35 0,40 0,45 0,50 0,60
Laminate thickness tolerance	2	± %	15 15 15 15 10 10 10 10 10
Laminate nominal grammage	3	g/m ² ±12 %	190 245 305 360 420 480 535 590 700
Tensile strength unfolded	4	N/10 mm min. MD CMD	100 120 150 190 240 300 360 380 400 80 90 95 105 120 150 180 190 200
Tensile strength folded, film inside	4	N/10 mm min. MD CMD	70 80 95 130 180 230 275 300 320 40 50 60 90 115 145 175 180 190
Elongation, unfolded	4	% min. MD CMD	3 3 3 3 5 5 5 5 5 10 10 10 10 13 13 13 13 13
NOTES MD = machine direction CMD = cross machine direction min. = minimum			

Sheet 110

Requirements for combined flexible triplex materials of three layers – P-C/F-PET/P-C (23 µm PET film with presspaper or paper)

1 Description

This sheet gives the requirements for triplex materials consisting of paper or presspaper containing sulphate wood pulp fibres (P-C) laminated on both sides of a polyethylene terephthalate film (F-PET) having a nominal thickness of 23 µm.

2 Thermal classification

Experience has shown that the combined flexible materials listed in this sheet may be suitable for use in electrical apparatus with ratings up to and including the range of 120 °C to 130 °C.

3 Single-layer requirements

Use paper which meets the requirements for classes 1.1, 1.2, 1.3, or 1.4 of IEC 60554-1 and IEC 60554-3. Alternatively, use presspaper which meets the requirements for P2 or P4 of IEC 60641-1 and IEC 60641-3-2. Each of these presspapers or papers can have a different density, which will affect the nominal grammage of the laminate.

Use a PET film which has a nominal thickness of 23 µm and meets the requirements of IEC 60674-1 and IEC 60674-3-2.

4 Breakdown voltage requirements

For all laminates listed in Clause 5, the minimum electric breakdown voltage using 6 mm diameter electrodes is

- for unfolded specimens: 6 kV;
- for folded specimens: 5 kV.

However, in accordance with IEC 60626-2, a minimum electric breakdown voltage on folded specimens is not required for laminates of nominal thickness greater than 0,5 mm.

5 Additional requirements

Additional requirements are given in the table below.

Property	Clause in IEC 60626-2	Units Tolerance	
Laminate nominal thickness	2	mm	0,12 0,15 0,20 0,25 0,30 0,35 0,40 0,45 0,50 0,60
Laminate thickness tolerance	2	± %	15 15 10 10 10 10 10 10 10 10
Laminate nominal grammage	3	g/m ² ±12 %	140 170 230 270 370 430 490 550 610 730
Tensile strength unfolded	4	N/10 mm min. MD CMD	100 135 160 190 270 300 360 400 450 540 70 90 120 130 160 200 240 270 300 360
Tensile strength folded	4	N/10 mm min. MD CMD	60 105 140 150 210 240 260 310 350 420 40 60 80 90 120 135 160 175 200 240
Elongation, unfolded	4	% min. MD CMD	3 3 5 5 5 5 5 5 5 5 10 10 10 10 10 10 10 10 10 10
NOTES MD = machine direction CMD = cross machine direction min. = minimum			

Sheet 111

Requirements for combined flexible triplex materials of three layers – P-C/F-PET/P-C (36 µm PET film with presspaper or paper)

1 Description

This sheet gives the requirements for triplex materials consisting of paper or presspaper containing sulphate wood pulp fibres (P-C) laminated on both sides of a polyethylene terephthalate film (F-PET) having a nominal thickness of 36 µm.

2 Thermal classification

Experience has shown that the combined flexible materials listed in this sheet may be suitable for use in electrical apparatus with ratings up to and including the range of 120 °C to 130 °C.

3 Single-layer requirements

Use paper which meets the requirements for classes 1.1, 1.2, 1.3, or 1.4 of IEC 60554-1 and IEC 60554-3. Alternatively, use presspaper which meets the requirements for P2 or P4 of IEC 60641-1 and IEC 60641-3-2. Each of these presspapers or papers can have a different density, which will affect the nominal grammage of the laminate.

Use a PET film which has a nominal thickness of 36 µm and meets the requirements of IEC 60674-1 and IEC 60674-3-2.

4 Breakdown voltage requirements

For all laminates listed in Clause 5, the minimum electric breakdown voltage using 6 mm diameter electrodes is

- for unfolded specimens: 7 kV;
- for folded specimens: 6 kV.

However, in accordance with IEC 60626-2, a minimum electric breakdown voltage on folded specimens is not required for laminates of nominal thickness greater than 0,5 mm.

5 Additional requirements

Additional requirements are given in the table below.

Property	Clause in IEC 60626-2	Units Tolerance	
Laminate nominal thickness	2	mm	0,12 0,15 0,20 0,25 0,30 0,35 0,40 0,45 0,50 0,60
Laminate thickness tolerance	2	± %	15 15 15 10 10 10 10 10 10 10
Laminate nominal grammage	3	g/m ² ±12 %	150 180 240 300 370 430 490 550 610 730
Tensile strength unfolded	4	N/10 mm min. MD CMD	100 135 180 200 270 300 360 400 450 540 75 100 120 130 180 200 240 255 300 360
Tensile strength folded	4	N/10 mm min. MD CMD	85 100 140 160 210 230 280 300 350 420 50 60 80 90 120 130 160 175 200 240
Elongation, unfolded	4	% min. MD CMD	5 5 5 5 5 5 5 5 5 5 10 10 10 10 10 10 10 10 10 10
NOTES MD = machine direction CMD = cross machine direction min. = minimum			

Sheet 112

Requirements for combined flexible triplex materials of three layers – P-C/F-PET/P-C (50 µm PET film with presspaper or paper)

1 Description

This sheet gives the requirements for triplex materials consisting of paper or presspaper containing sulphate wood pulp fibres (P-C) laminated on both sides of a polyethylene terephthalate film (F-PET) having a nominal thickness of 50 µm.

2 Thermal classification

Experience has shown that the combined flexible materials listed in this sheet may be suitable for use in electrical apparatus with ratings up to and including the range of 120 °C to 130 °C.

3 Single-layer requirements

Use paper which meets the requirements for classes 1.1, 1.2, 1.3, or 1.4 of IEC 60554-1 and IEC 60554-3. Alternatively, use presspaper which meets the requirements for P2 or P4 of IEC 60641-1 and IEC 60641-3-2. Each of these presspapers or papers can have a different density, which will affect the nominal grammage of the laminate.

Use a PET film which has a nominal thickness of 50 µm and meets the requirements of IEC 60674-1 and IEC 60674-3-2.

4 Breakdown voltage requirements

For all laminates listed in Clause 5, the minimum electric breakdown voltage using 6 mm diameter electrodes is

- for unfolded specimens: 8 kV;
- for folded specimens: 6 kV.

However, in accordance with IEC 60626-2, a minimum electric breakdown voltage on folded specimens is not required for laminates of nominal thickness greater than 0,5 mm.

5 Additional requirements

Additional requirements are given in the table below.

Property	Clause in IEC 60626-2	Units Tolerance	
Laminate nominal thickness	2	mm	0,15 0,25 0,30 0,35 0,40 0,45 0,50 0,55
Laminate thickness tolerance	2	± %	15 15 10 10 10 10 10 10
Laminate nominal grammage	3	g/m ² ±12 %	200 320 380 440 490 550 620 700
Tensile strength unfolded	4	N/10 mm min. MD CMD	135 200 270 310 360 400 450 540 100 130 180 200 240 255 300 360
Tensile strength folded	4	N/10 mm min. MD CMD	100 160 210 235 280 300 350 420 60 80 120 130 160 175 200 240
Elongation, unfolded	4	% min. MD CMD	3 3 3 3 5 5 5 5 10 10 10 10 10 10 10 10
NOTES MD = machine direction CMD = cross machine direction min. = minimum			

Sheet 113

Requirements for combined flexible triplex materials of three layers – P-C/F-PET/P-C (75 µm PET film with presspaper or paper)

1 Description

This sheet gives the requirements for triplex materials consisting of paper or presspaper containing sulphate wood pulp fibres (P-C) laminated on both sides of a polyethylene terephthalate film (F-PET) having a nominal thickness of 75 µm.

2 Thermal classification

Experience has shown that the combined flexible materials listed in this sheet may be suitable for use in electrical apparatus with ratings up to and including the range of 120 °C to 130 °C.

3 Single-layer requirements

Use paper which meets the requirements for classes 1.1, 1.2, 1.3, or 1.4 of IEC 60554-1 and IEC 60554-3. Alternatively, use presspaper which meets the requirements for P2 or P4 of IEC 60641-1 and IEC 60641-3-2. Each of these presspapers or papers can have a different density, which will affect the nominal grammage of the laminate.

Use a PET film which has a nominal thickness of 75 µm and meets the requirements of IEC 60674-1 and IEC 60674-3-2.

4 Breakdown voltage requirements

For all laminates listed in Clause 5, the minimum electric breakdown voltage using 6 mm diameter electrodes is

- for unfolded specimens: 10 kV;
- for folded specimens: 9 kV.

However, in accordance with IEC 60626-2, a minimum electric breakdown voltage on folded specimens is not required for laminates of nominal thickness greater than 0,5 mm.

5 Additional requirements

Additional requirements are given in the table below.

Property	Clause in IEC 60626-2	Units Tolerance	
Laminate nominal thickness	2	mm	0,15 0,20 0,25 0,30 0,35 0,40 0,45 0,50 0,60
Laminate thickness tolerance	2	± %	15 15 10 10 10 10 10 10 10
Laminate nominal grammage	3	g/m ² ±12 %	190 240 310 380 430 510 560 620 740
Tensile strength unfolded	4	N/10 mm min. MD CMD	140 190 230 280 330 380 420 470 570 105 140 170 210 240 280 310 350 420
Tensile strength folded	4	N/10 mm min. MD CMD	100 130 160 200 230 270 300 340 410 65 90 110 120 130 180 200 220 270
Elongation, unfolded	4	% min. MD CMD	5 5 5 5 5 5 5 5 5 10 10 10 10 10 10 10 10 10
NOTES MD = machine direction CMD = cross machine direction min. = minimum			