INTERNATIONAL STANDARD

IEC 60454-3-12

Second edition
2006-01

Pressure-sensitive adhesive tapes for electrical purposes –

Part 3: Specifications for individual materials – Sheet 12: Requirements for polyethylene and polypropylene film tapes with pressure sensitive adhesive



Reference number
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRESSURE-SENSITIVE ADHESIVE TAPES FOR ELECTRICAL PURPOSES –

Part 3: Specifications for individual materials – Sheet 12: Requirements for polyethylene and polypropylene film tapes with pressure sensitive adhesive

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International Standard IEC 60454-3-12 has been prepared by IEC technical committee 15: Insulating materials.

This second edition of IEC 60454-3-12 replaces the first edition, published in 1998, as well as IEC 60454-3-18, published in 2003. It constitutes a technical revision. This edition replaces the previous second edition and includes its consolidation with the texts of IEC 60454-3-18 (2003).

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

FDIS	Report on voting
15/261/FDIS	15/288/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

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- withdrawn;
- replaced by a revised edition, or
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INTRODUTION

This International Standard is one of a series, which deals with pressure-sensitive adhesive tapes, intended primarily for electrical purposes.

The series consists of three parts:

Part 1: General requirements (IEC 60454-1)

Part 2: Methods of test (IEC 60454-2)

Part 3: Specifications for individual materials (IEC 60454-3)

This standard contains one of the sheets comprising part 3 as follows:

Sheet 12:

Polyethylene and polypropylene film tapes pressure sensitive adhesives.

SAFETY WARNING

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

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PRESSURE-SENSITIVE ADHESIVE TAPES FOR ELECTRICAL PURPOSES –

Part 3: Specifications for individual materials – Sheet 12: Requirements for polyethylene and polypropylene film tapes with pressure sensitive adhesive

1 Scope

This sheet of IEC 60454-3 contains requirements for polyethylene and polypropylene film tapes with pressure sensitive adhesives

Materials which conform to this specification meet established levels of performance. However, the selection of a 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.

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.

IEC 60426:1973, *Test methods for determining electrolytic corrosion with insulating materials*

IEC 60454-1:1992, *Specifications for pressure-sensitive adhesive tapes for electrical purposes – Part 1: General requirements*

IEC 60454-2:1994, *Specifications for pressure-sensitive adhesive tapes for electrical purposes – Part 2: Methods of test*

3 Terms and definitions

For the purposes of this document, the definitions of IEC 60454-1 apply.

4 Classification and designation

4.1 Polyethylene film tapes with pressure sensitive adhesive

4.1.1 The products supplied according to this specification shall be classified as follows:

Type 1: Products having a thermal index of 90 and a minimum temperature rating of –10 °C.

Type 2: Products having a thermal index of 90 and a minimum temperature rating of –18 °C.

Type 3: Products having a thermal index of 90 and a minimum temperature rating of –33 °C.

Type 4: Products having a thermal index of 75 and a minimum temperature rating of –10 °C.

Type 5: Products having a thermal index of 75 and a minimum temperature rating of –18 °C.

Type 6: Products having a thermal index of 75 and a minimum temperature rating of –33 °C.

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4.1.2 The products shall be designated for ordering purposes as follows:

Type 1: IEC 60454-3-12-1/F-PE/90

Type 2: IEC 60454-3-12-2/F-PE/90

Type 3: IEC 60454-3-12-3/F-PE/90

Type 4: IEC 60454-3-12-4/F-PE/75

Type 5: IEC 60454-3-12-5/F-PE/75

Type 6: IEC 60454-3-12-6/F-PE/75

NOTE The nature of the adhesive is not classified, since several classes of adhesive may satisfy the performance requirements of this specification. Adhesive types may be based on agreement between purchaser and supplier.

4.2 Polypropylene film tapes with pressure sensitive adhesive

4.2.1 The products supplied according to this specification shall be classified as follows:

Type 1: Products having properties characteristic of a biaxially oriented polypropylene film with a thermal index of 105 with an acrylic crosslinked adhesive.

Type 2: Products having properties characteristic of a biaxially oriented polypropylene film with a thermal index of 105 with a rubber thermosetting adhesive.

Type 3: Products having properties characteristic of a biaxially oriented polypropylene film with a thermal index of 105 with an acrylic thermoplastic adhesive.

4.2.2 The products supplied according to this specification shall be classified as follows:

Type 1: IEC 60454-3-12-1/F-PP/105/A-Tx

Type 2: IEC 60454-3-12-2/ F-PP/105/R-Tc

Type 3: IEC 60454-3-12-3/ F-PP/105/A-Tp

5 Requirements

All applicable requirements of IEC 60454-1 shall apply to material furnished under this specification.

The electric and other physical properties of products supplied according to this specification shall be within the limits listed in Tables 1 and 2 when tested in accordance with the test methods listed therein.

5.1 Thermal endurance

5.1.1 Polyethylene film tapes with pressure sensitive adhesives

When required by the purchaser, the manufacturer shall provide evidence that when tested in accordance with Clause 21 of IEC 60454-2, the product has a temperature index of not less than 90 for Types 1, 2, and 3; and not less than 75 for Types 4, 5, and 6. The exposure temperatures shall be 100 °C, 110 °C and 120 °C for Types 1, 2, and 3; and 90 °C, 100 °C and 110 °C for Types 4, 5, and 6.

The end-point criterion used shall be:

– for breakdown voltage: 2,5 kV (metal foil electrode).

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5.1.2 Polypropylene film tapes with pressure sensitive adhesives

When required by the purchaser, the manufacturer shall provide evidence that when tested in accordance with Clause 21 of IEC 60454-2, the product has a temperature index of not less than 105. The exposure temperatures shall be 120 °C, 140 °C and 160 °C.

The end-point criterion used shall be:

– for breakdown voltage: 1,0 kV (metal foil electrode).

5.2 Low temperature performance

5.2.1 Polyethylene film tapes with pressure sensitive adhesives

When required by the purchaser, the manufacturer shall provide evidence of the low temperature performance when tested in accordance with the conditions specified in Table 3; the tape shall have a minimum temperature rating as follows:

Types 1, 4: –10 °C

Types 2, 5: –18 °C

Types 3, 6: –33 °C

6 Test methods

All tests shall be conducted in accordance with the appropriate clauses and subclauses of IEC 60454-2.

7 Marking, labelling and packaging

Unless otherwise specified, all marking, labelling and packaging shall be in accordance with the requirements of IEC 60454-1.

Table 1 – Requirements for all types

Property	Clause or subclause of IEC 60454-2	Units	Requirements
Thickness	4	mm	Nominal value per manufacturer ±0,025 mm or ±20 % whichever is greater
Width	5	mm	7.2.1 of IEC 60454-1
Length	6	m	7.3 of IEC 60454-1
Electrolytic corrosion -Insulation resistance after 24 h at (23±2) °C and (93±2) % relative humidity	7.5	Ω/25 mm width	1 x 10^{10} minimum
or -Visual method	7.6	None	Grade shall be at least as good as A 1,4 (see Table 1 of IEC 60426)
Thermal endurance	21		See 5.3

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Table 2 – Requirements for various types

Property	Clause or subclause of IEC 60454-2	Units	Polyethylene						Polypropylene		
			Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 1	Type 2	Type 3
Tensile strength	8	N/10 mm width	100 min. per mm of tape thickness	100 min. per mm of tape thickness	100 min. per mm of tape thickness	100 min. per mm of tape thickness	100 min. per mm of tape thickness	100 min. per mm of tape thickness	500 min. per mm of tape thickness	500 min. per mm of tape thickness	500 min. per mm of tape thickness
Elongation at break	8	%	150 min.	150 min.	150 min.	150 min.	150 min.	150 min.	50 min.	50 min.	50 min.
Adhesion to steel	11	N/10 mm width	1,5 min.	1,5 min.	1,5 min.	1,5 min.	1,5 min.	1,5 min.	2,2 min.	2,6 min.	1,8 min.
Flagging test	15										
- at curing temperature	As per 15.5.2	mm	---	---	---	---	---	---	2 maximum	2 maximum	2 maximum
- at room temperature	As per 15.5.1	mm	---	---	---	---	---	---	---	---	---
Adhesion to backing	11	N/10mm width	1,0 min.	1,0 min.	1,0 min.	1,0 min.	1,0 min.	1,0 min.	–	–	–
Breakdown voltage											
- at room temperature	17	kV/ mm	40 min.	40 min.	40 min.	40 min.	40 min.	40 min.	45 min.	45 min.	40 min.
- after humid conditioning	18	kV/ mm	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.	45 min.	45 min.	40 min.
Adhesion to backing at low temperature (see Table 3 for test temperatures)	12	N/10mm width	1,5 min.	1,5 min.	1,5 min.	1,5 min.	1,5 min.	1,5 min.	–	–	–
Shear adhesion to backing after water immersion	13	N	10 min.	10 min.	10 min.	10 min.	10 min.	10 min.	–	–	–

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Table 3 – Low temperature performance

Low temperature rating	Temperature for Clause 9 of IEC 60454-2	Temperature for clause 12 of IEC 60454-2
–10 °C	(–18 ± 1) °C	(–10 ± 1) °C
–18 °C	(–26 ± 1) °C	(–18 ± 1) °C
–33 °C	(–40 ± 1) °C	(–18 ± 1) °C

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