# INTERNATIONAL STANDARD

# IEC 60454-3-2

Third edition
2006-01

## Pressure-sensitive adhesive tapes for electrical purposes –

## Part 3: Specifications for individual materials – Sheet 2: Requirements for polyester film tapes with rubber thermosetting, rubber thermoplastic or acrylic crosslinked adhesives



Reference number
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

# PRESSURE-SENSITIVE ADHESIVE TAPES FOR ELECTRICAL PURPOSES –

## Part 3: Specifications for individual materials – Sheet 2: Requirements for polyester film tapes with rubber thermosetting, rubber thermoplastic or acrylic crosslinked adhesives

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International Standard IEC 60454-3-2 has been prepared by IEC technical committee 15: Insulating materials.

This third edition of IEC 60454-3-2 replaces the second edition, published in 1998, and includes its consolidation with the text of IEC 60464-3-3 (1998). It constitutes a technical revision.

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

| FDIS | Report on voting |
|---|---|
| 15/251/FDIS | 15/278/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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# INTRODUCTION

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 2:

Requirements for polyester film tapes with rubber thermosetting, rubber thermoplastic or acrylic crosslinked 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 2: Requirements for polyester film tapes with rubber thermosetting, rubber thermoplastic or acrylic crosslinked adhesives

## 1 Scope

This sheet of IEC 60454-3 contains the requirements for:

Polyester film tapes with rubber thermosetting, rubber thermoplastic or acrylic crosslinked 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, *Specification for pressure-sensitive adhesive tapes for electrical purposes – Part 1: General requirements*

IEC 60454-2:1994, *Specification 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 Polyester film tapes with rubber thermosetting, rubber thermoplastic or acrylic crosslinked adhesives

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

Type 1: Products having properties characteristic of a polyester film of nominal thickness 0,020 mm – 0,030 mm preferably 0,023 mm (23 μm) with a rubber thermosetting adhesive.

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Type 2: Products having properties characteristic of a polyester film of nominal thickness 0,020 mm – 0,030 mm preferably 0,023 mm (23 μm) with an acrylic crosslinked adhesive.

Type 3: Products having properties characteristic of a polyester film of nominal thickness 0,020 mm – 0,030 mm preferably 0,023 mm (23 μm) with a flame retardant acrylic crosslinked adhesive.

Type 4: Products having properties characteristic of a polyester film of nominal thickness 0,045 mm – 0,055 mm preferably 0,050 mm (50 μm) with a rubber thermosetting adhesive.

Type 5: Products having properties characteristic of a polyester film of nominal thickness 0,045 mm – 0,055 mm preferably 0,050 mm (50 μm) with an acrylic crosslinked adhesive.

Type 6: Products having properties characteristic of a polyester film of nominal thickness 0,045 mm – 0,055 mm preferably 0,050 mm (50 μm) with a flame retardant acrylic crosslinked adhesive.

Type 7: Products having properties characteristic of a polyester film of nominal thickness 0,020 mm – 0,030 mm preferably 0,023 mm (23 μm) with a rubber thermoplastic adhesive.

Type 8: Products having properties characteristic of a polyester film of nominal thickness 0,045 mm – 0,055 mm preferably 0,050 mm (50 μm) with a rubber thermoplastic adhesive.

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

Type 1: IEC 60454-3-2-1/F-PET/130/R-Tc

Type 2: IEC 60454-3-2-2/F-PET/130/A-Tx

Type 3: IEC 60454-3-2-3/F-PET/130/A-Tx

Type 4: IEC 60454-3-2-4/F-PET/130/R-Tc

Type 5: IEC 60454-3-2-5/F-PET/130/A-Tx

Type 6: IEC 60454-3-2-6/F-PET/130/A-Tx

Type 7: IEC 60454-3-2-7/F-PET/130/R-Tp

Type 8: IEC 60454-3-2-8/F-PET/130/R-Tp

## 5 Requirements

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

**5.1** The physical and electrical 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.

### 5.2 Thermal endurance

Polyester film tapes with rubber thermosetting, rubber thermoplastic or acrylic crosslinked 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 130 °C . The exposure temperatures are 150 °C, 160 °C and 180 °C .

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The end-point criterion used shall be:

– breakdown voltage: 2,2 kV for types 1,2,3 and 7 (metal foil electrode).
– breakdown voltage: 3,5 kV for types 4,5,6 and 8 (metal foil electrode).

## 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**

Sheet 2: Polyester film tapes with rubber thermosetting, thermoplastic or acrylic crosslinked adhesives

| Property | Clause or subclause of IEC 60454-2 | Units | Requirements |
|---|---|---|---|
| Thickness | 4 | mm | Nominal value per manufacturer ±0,01 mm or ± 15 %, whichever is greater |
| Width | 5 | mm | 7.2.1 of IEC 60454-1 |
| Length | 6 | m | 7.3 of IEC 60454-1 |
| Electrolytic corrosion<br>– insulation resistance after 24 h at (23±2) °C and (93±2) % relative humidity; or | 7.5 | Ω/25 mm width | $1 \times 10^{11}$ minimum |
| – visual method | 7.6 | None | Grade shall be at least as good as A 1,4 (see Table 1 of IEC 60426) |
| Elongation at break | 8 | % | 50 minimum |
| Flagging test | 15<br>Condition per 15.5.2 | mm | 2 maximum |
| Thermal endurance | 21 | | See 5.3 |

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**Table 2 – Requirements for various types**

Sheet 2: Polyester film tapes with rubber thermosetting, thermoplastic or acrylic crosslinked adhesives

| Property | Clause or subclause of IEC 60454-2 | Units | Type 1 | Type 2 | Type 3 | Type 4 | Type 5 | Type 6 | Type 7 | Type 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| Tensile strength | 8 | N/10mm width | 35 minimum | 35 minimum | 35 minimum | 70 minimum | 70 minimum | 70 minimum | 35 minimum | 70 minimum |
| Adhesion to steel | 11 | N/10mm width | 2,0 minimum | 2,0 minimum | 2,0 minimum | 3,0 minimum | 3,0 minimum | 3,0 minimum | 2,0 minimum | 3,0 minimum |
| Bond separation during thermal treatment | 14.1 except use (200+5) g mass and test at 130 °C | | --- | 3 passes | 3 passes | --- | 3 passes | 3 passes | n.a | n.a |
| Bond separation after thermal treatment | 14.2 | | 3 passes | --- | --- | 3 passes | --- | --- | n.a | n.a |
| Breakdown voltage | | | | | | | | | | |
| - at room temperature | 17 | kV | 4,0 minimum | 4,0 minimum | 4,0 minimum | 6,5 minimum | 6,5 minimum | 6,5 minimum | 4,0 minimum | 6,5 minimum |
| - after humid conditioning | 18 | kV | 4,0 minimum | 4,0 minimum | 4,0 minimum | 6,5 minimum | 6,5 minimum | 6,5 minimum | 4,0 minimum | 6,5 minimum |
| Flame test | 20 | | --- | --- | Flame Retardant (see Note) | --- | --- | Flame Retardant (see Note) | | |
| NOTE The criteria for flame retardant is described in 20.1 of IEC 60454-2. | | | | | | | | | | |

## Bibliography

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*

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