

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Heat-shrinkable moulded shapes –
Part 3: Specification requirements for shape dimensions, material requirements
and compatibility performance – Sheet 101: Heat-shrinkable moulded shapes,
polyolefin, semi-rigid, limited fire hazard, material requirements and system
performance**

<https://standards.iteh.ai/catalog/standards/sist/44af3f77-ec2c-4f82-a6b3-cda9e492fbfd/iec-62329-3-101-2010>

Profilés thermorétractables –

**Partie 3: Exigences relatives aux dimensions des profilés, exigences de
matériaux et performances de compatibilité – Feuille 101: Profilés
thermorétractables, exigences relatives aux matériaux semi-rigides en
polyoléfine, à risque de feu limité, et performances du système**



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CONTENTS

| | |
|---|----|
| FOREWORD..... | 3 |
| INTRODUCTION..... | 5 |
| 1 Scope..... | 6 |
| 2 Normative references..... | 6 |
| 3 Designation | 7 |
| 4 Conditions of test for the moulded shapes..... | 7 |
| 5 Requirements | 7 |
| 6 Moulded shapes material conformance | 7 |
| 7 Moulded shapes compatibility | 7 |
| Annex A (informative) Adhesive compatibility guide for sheet 101 moulded shapes | 11 |
| Bibliography..... | 12 |
| | |
| Table 1 – Property requirements | 8 |
| Table 2 – Resistance to selected fluids..... | 10 |

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HEAT-SHRINKABLE MOULDED SHAPES –

**Part 3: Specification requirements for shape dimensions,
material requirements and compatibility performance –
Sheet 101: Heat-shrinkable moulded shapes, polyolefin, semi-rigid,
limited fire hazard, material requirements and system performance**

FOREWORD

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International Standard IEC 62329-3-101 has been prepared by IEC technical committee 15: Solid electrical insulating materials.

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

| FDIS | Report on voting |
|-------------|------------------|
| 15/569/FDIS | 15/589/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.

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

A list of all the parts in the IEC 62329 series, under the general title *Heat-shrinkable moulded shapes*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

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INTRODUCTION

This International Standard is one of a series that deals with heat-shrinkable moulded shapes for electrical purposes.

The series consists of three parts:

Part 1: Definitions and general requirements (IEC 62329-1)

Part 2: Methods of test (IEC 62329-2)

Part 3: Specification requirements for moulded shape dimensions, material requirements and compatibility performance (IEC 62329-3)

This standard gives one of the sheets comprising Part 3 as follows:

Sheet 101: Heat-shrinkable moulded shapes, polyolefin, semi-rigid, limited fire hazard, material requirements and system performance

NOTE See IEC 62329-3-100 for moulded shape dimensions.

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HEAT-SHRINKABLE MOULDED SHAPES –

Part 3: Specification requirements for shape dimensions, material requirements and compatibility performance – Sheet 101: Heat-shrinkable moulded shapes, polyolefin, semi-rigid, limited fire hazard, material requirements and system performance

1 Scope

This sheet of IEC 62329-3 gives the requirements for heat-shrinkable moulded shapes, polyolefin, semi-rigid, limited fire hazard, material requirements and system performance.

Experience of product performance indicates that this moulded shape material is suitable for inclusion in systems for operation in the following temperature range: –30 °C to + 105 °C.

The moulded shapes may be supplied with a pre-coated adhesive. Refer to the manufacturers/suppliers for options. A guide to adhesive compatibility is given in Annex A.

These moulded shapes are normally supplied in the styles and dimensions given in IEC 62329-3-100. The colour is normally black.

Styles and dimensions other than those specifically listed in IEC 62329-3-100 may be available as custom items. These items shall be considered to comply with this standard if they comply with the property requirements listed in Table 1 with the exception of dimensions.

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Materials that 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 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 62329-1, *Heat-shrinkable moulded shapes – Part 1: Definitions and general requirements*

IEC 62329-2:2006, *Heat-shrinkable moulded shapes – Part 2: Methods of test*

IEC 62329-3-100:2010, *Heat-shrinkable moulded shapes – Part 3: Specification requirements for shape dimensions, material requirements and compatibility performance – Sheet 100: Heat-shrinkable moulded shape dimensions*

IEC 60757:1983, *Code for designation of colours*

ISO 1817: 2005, *Rubber, vulcanized - Determination of the effect of liquids*

3 Designation

The moulded shapes shall be designated as shown by the following example:

| Description | IEC publication number | IEC Part number | IEC Sheet number | IEC Style/size code | Colour | Adhesive code (see NOTE) a | Drain holes b |
|----------------|------------------------|-----------------|------------------|---------------------|--------|-------------------------------|------------------|
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Moulded shapes | IEC 62329 | 3 | 101 | B/01 | BK | W1 | D |

^a Insert UN if uncoated.

^b Insert N if no drain holes.

NOTE For compatible adhesives and codes, see Annex A.

Any abbreviation for colour shall comply with IEC 60757. Where no abbreviation is given, the colour shall be written in full.

4 Conditions of test for the moulded shapes

The moulded shapes shall be shrunk in a forced air circulation oven for (10 ± 1) min at the temperature specified in Table 1.

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5 Requirements

In addition to the general requirements given in IEC 62329-1, the heat-shrinkable moulded shapes shall comply with the dimensional requirements given in IEC 62329-3-100 and Table 1.

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6 Moulded shapes material conformance

Conformance with the requirements of this specification shall be based on the results from test sheets, $(2 \pm 0,15)$ mm thick, unless otherwise specified¹, which shall be prepared from the same cross-linked heat-shrinkable material that is used to manufacture the heat-shrinkable moulded shapes.

7 Moulded shapes compatibility

Conformance with the compatibility requirements of this specification shall be based on the results from the assembly configuration as shown in Figure 3 of IEC 62329-2.

¹ A suitable size has been found to be 150 mm × 150 mm.

Table 1 – Property requirements

| Property | IEC 62329-2 clause or subclause | Units | Max. or Min. | Requirements | Remarks |
|------------------------------------|---------------------------------|-------|--------------|--|---|
| Heat shock | 7 | | | | Heat at 175°C ± 3 K |
| Tensile strength | 10 | MPa | Min. | 5 | |
| Elongation at break | 10 | % | Min. | 100 | |
| Bending at low temperature | 8 | – | – | No cracks shall be visible | Condition at -30° C ± 2 K. Mandrel diameter shall be 20 mm $\begin{matrix} +1 \\ -0 \end{matrix}$ mm. |
| Dimensional stability on storage | 9 | – | – | The dimensions shall be as specified in Tables 1 to 22 IEC 62329-3-100 | Recovery conditions as Clause 4 for dimensions |
| Tensile strength | 10 | MPa | Min. | 7 | Use a jaw separation rate of 100 mm/min. |
| Elongation at break | 10 | % | Min. | 200 | |
| Secant modulus at 2 % elongation | 11 | MPa | – | 50 to 130 | |
| Electric strength | 12 | MV/m | Min. | 8 | |
| Volume resistivity after damp heat | 13 | Ω·m | Min. | 10 ¹⁰ | |
| Flammability | 16 | s | Max. | 30 | Test in accordance with method A of IEC 60695-11-10 |
| Copper corrosion | 18 | % | Max. | None above the allowable 8 | Heat for (16 ± 0,5) h at 150 °C ± 3K |
| Resistance to selected fluids | 20 | | | IEC 62329-3-101:2010 | Use the fluids and test temperatures specified in Table 2. |
| Tensile strength | 10 | MPa | Min. | 4 | |
| Elongation at break | 10 | % | Min. | 100 | |
| Heat ageing | 23 | | | | Heat at 150 °C ± 3K |
| Tensile strength | 10 | MPa | Min. | 5 | |
| Elongation at break | 10 | % | Min. | 100 | |
| Water absorption | 24 | % | Max. | 0,5 | |
| Mould growth | 30 | | | | Method B 56 days exposure |
| Tensile strength | 10 | MPa | Min. | 7 | |
| Elongation at break | 10 | % | Min. | 200 | |
| Long term heat ageing | 21 | % | Min. | 100 | Heat for (3000 ± 5) h at 105° C ± 3 K |
| Elongation at break | 10 | | | | |
| Oxygen index | 17.1 | – | Min. | 29 | |
| Temperature index | 17.2 | °C | Min. | 250 | |
| Smoke index | 26 | – | Max. | 20 | |
| Toxicity index | 27 | – | Max. | 5 | |
| Halogen content | 28 | | | | Expressed as chlorine |
| | 28.1 | % | Max. | 0,2 | |
| | 28.2 | % | Max. | 0,1 | |
| Acid gas generation | 29 | pH | Min. | 3,5 | |
| Conductivity | 29.2 | pH | Max. | 10,5 | |
| | | µS/mm | Max. | 10,0 | |

| Property | IEC 62329-2 clause or subclause | Units | Max. or Min. | Requirements | Remarks | | | | | | | | | | | | | | | |
|--------------------------------------|---------------------------------|------------------------------------|--------------|-----------------|--|------------|--------------------|------------------------------------|---------------|-----|----|--------|-------|----|-----|-------|----|-------|--|----|
| Compatibility Adhesive type | 31 | | | W1 ^a | Test at °C ± 3K | | | | | | | | | | | | | | | |
| Dynamic shear At room temperature | 31.1 | N | Min. | 300 | 23 | | | | | | | | | | | | | | | |
| At elevated temperature | 31.1.7 | N | Min. | 30 | 105 | | | | | | | | | | | | | | | |
| Static load | 31.2 | kg | Min. | 10 | 23 | | | | | | | | | | | | | | | |
| At elevated temperature | 31.1 | N | | 0,5 | 105 | | | | | | | | | | | | | | | |
| Dynamic shear | | | Min. | 300 | 23 | | | | | | | | | | | | | | | |
| Fluid resistance | 31.3 | N | Min. | 150 | <table border="1"> <thead> <tr> <th>Fluid type</th> <th>Standard or symbol</th> <th>(24 ± 0,5) h immersion at ° C ± 2K</th> </tr> </thead> <tbody> <tr> <td>Kerosene fuel</td> <td>F34</td> <td>23</td> </tr> <tr> <td>Grease</td> <td>G 354</td> <td>23</td> </tr> <tr> <td>Oil</td> <td>0-156</td> <td>23</td> </tr> <tr> <td>Water</td> <td></td> <td>23</td> </tr> </tbody> </table> | Fluid type | Standard or symbol | (24 ± 0,5) h immersion at ° C ± 2K | Kerosene fuel | F34 | 23 | Grease | G 354 | 23 | Oil | 0-156 | 23 | Water | | 23 |
| Fluid type | Standard or symbol | (24 ± 0,5) h immersion at ° C ± 2K | | | | | | | | | | | | | | | | | | |
| Kerosene fuel | F34 | 23 | | | | | | | | | | | | | | | | | | |
| Grease | G 354 | 23 | | | | | | | | | | | | | | | | | | |
| Oil | 0-156 | 23 | | | | | | | | | | | | | | | | | | |
| Water | | 23 | | | | | | | | | | | | | | | | | | |
| Thermal ageing | 31.4 | N | Min. | 300 | Heat for (168 ± 1) h at 100° C ± 3 K | | | | | | | | | | | | | | | |
| Peel adhesion | 31.5 | N/25mm | Min. | 60 | | | | | | | | | | | | | | | | |
| Altitude immersion | 31.6 | Ω | Min. | 10 ⁹ | | | | | | | | | | | | | | | | |

^a These system performance requirements are based on using W1 adhesive (see Annex A). When using other adhesives the performance may be different. Refer to the supplier/manufacturer.