

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Heat-shrinkable low and medium voltage moulded shapes –
Part 3: Specification for individual materials – Sheet 101: Heat-shrinkable,
polyolefin moulded shapes for low voltage applications

IEC 62677-3-101:2018
Profils thermorétractables basse et moyenne tensions –
Partie 3: Spécification pour matériaux particuliers – Feuille 101: Profils
thermorétractables en polyoléfine pour applications basse tension





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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HEAT-SHRINKABLE LOW AND MEDIUM
VOLTAGE MOULDED SHAPES –**
**Part 3: Specification for individual materials –
Sheet 101: Heat-shrinkable, polyolefin moulded shapes
for low voltage applications**

FOREWORD

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International Standard IEC 62677-3-101 has been prepared by IEC technical committee 15: Solid electrical insulating materials.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
15/814/FDIS	15/820/RVD

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

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

A list of all parts in the IEC 62677 series, published under the general title *Heat-shrinkable low and medium voltage moulded shapes*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
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INTRODUCTION

This part of IEC 62677 is one of a series that deals with heat shrinkable low and medium voltage moulded shapes. The series consists of three parts:

Part 1: General requirements (IEC 62677-1);

Part 2: Methods of test (IEC 62677-2);

Part 3: Specification for individual materials (IEC 62677-3).

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

Sheet 101: Heat-shrinkable, polyolefin moulded shapes for low voltage applications

Sheet 102: Heat-shrinkable, polyolefin, anti-tracking moulded shapes for medium voltage applications

Sheet 103: Heat-shrinkable, polyolefin, semi-conductive moulded shapes for 8 medium voltage applications

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HEAT-SHRINKABLE LOW AND MEDIUM VOLTAGE MOULDED SHAPES –

Part 3: Specification for individual materials – Sheet 101: Heat-shrinkable, polyolefin moulded shapes for low voltage applications

1 Scope

This part of IEC 62677 is applicable to heat shrinkable low voltage moulded shapes in a range of configurations suitable for insulation, environmental sealing, mechanical protection, strain relief for power cable terminations, joints and stop ends. These moulded shapes have been found suitable for use for temperatures between –40 °C and 100 °C.

The moulded shapes can be supplied with a pre-coated adhesive. A guide to adhesive compatibility and temperature performance is given in Annex A. The manufacturers/suppliers can be consulted for options.

The material is available in two types:

Type A – Flame retardant

Type B – Not flame retardant

Materials which conform to this document meet established levels of performance. However, the selection of a material by a user for a specific application will be based on the actual requirements necessary for adequate performance in that application and will not be based on this document alone.

The tests specified are designed to control the quality of the moulded shapes but it is recognized that they are designed to be used in low and medium voltage cable accessories and, as such, electrical performance will be proven as part of the assembly. Examples of this are described in EN 50393, HD 629 and IEC 60502-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60296, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60757, *Code for designation of colours*

IEC 62677-1, *Heat shrinkable low and medium voltage moulded shapes – Part 1: General requirements*

IEC 62677-2, *Heat shrinkable low and medium voltage moulded shapes – Part 2: Methods of test*

ISO 846, *Plastics: Evaluation of the action of microorganisms*

ISO 868, *Plastics and ebonite – Determination of indentation hardness by means of a durometer (Shore hardness)*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Designation

The moulded shapes shall be identified by the following designation:

Description	IEC publication number	IEC part number	IEC sheet number	Type	Adhesive	Colour	Table 3 code
↓	↓	↓	↓	↓	↓	↓	↓
Suppliers part number	IEC 62677	- 3	- 101	-A	-U	- BK	X

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Any colour abbreviation shall comply with IEC 60757, where applicable. Non-standard colours shall be written out in full.

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See Annex A for adhesive nomenclature.

The addition of "X" at the end of the designation indicates that the properties contained in Table 3 have been agreed upon between the user and supplier.

NOTE This information is for packaging labelling only, in accordance with IEC 62677-1.

5 Conditions of test for dimensions

The moulded shapes shall be shrunk in a forced air circulation oven at 200 °C ± 5 K for (10 ± 1) min.

6 Requirements

In addition to the general requirements given in IEC 62677-1, the heat-shrinkable moulded shapes shall comply with the requirements in Table 1 and, where applicable, Table 3.

7 Moulded shapes material conformance

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

Table 1 – Property requirements

Property	IEC 62677-2:2017 clause or subclause	Units	Max. or Min.	Requirements	Remarks
Dimensions	6	mm	Min. Min.	To be agreed between purchaser and supplier	See Clause 5
Heat shock	7				Heat at 175 °C ± 5 K
Tensile strength	10.1 and 10.2	MPa	Min.	8	
Elongation at break	10.1 and 10.2	%	Min.	200	
Bending at low temperature	8	-	-	No cracking shall be visible	Test at –40 °C The mandrel shall be between 20 and 22 times the sample thickness.
Dimensional stability on storage	9	-	-	The dimensions shall remain as agreed between purchaser and supplier	See Clause 5
Tensile strength	10.1 and 10.2	MPa	Min.	10	Use a jaw separation rate of 100 mm/min.
Elongation at break	10.1 and 10.2	%	Min.	300	
Secant modulus at 2% elongation	11	MPa	Min. Max.	80 150	
Electric strength	12	kV/mm	Min.	10	
Volume resistivity at room temperature	13	$\Omega \cdot m$	Min.	10^{12}	
Flammability	16		Min.	HB	Type A only – Flame out time not applicable
Carbon black content	17	%	Min.	2,5	
Resistance to selected fluids	18				Use the fluids and test temperatures specified in Table 2
Tensile strength	10.1 and 10.2	MPa	Min.	8	
Elongation at break	10.1 and 10.2	%	Min.	200	
Heat ageing	20				Heat at 150 °C ± 3 K
Tensile strength	10.1 and 10.2	MPa	Min.	8	
Elongation at break	10.1 and 10.2	%	Min.	200	
Long term ageing	19				The ageing temperature shall be
Elongation at break	10.2	%	Min.	150	100 °C ± 3 K
Hardness	ISO 868	Shore D	Min.	40	
Water absorption	21	%	Max.	0.5	
Peel adhesion	23	N/25 mm	Min.	60	For Type W lined product only. Recover at 200 °C ± 5 K for (10 ± 1) min. Use compatible sleeving (Annex A)

Property	IEC 62677-2:2017 clause or subclause	Units	Max. or Min.	Requirements	Remarks
Copper corrosion	24	%	Max.	None above the allowable 8	Heat for (16 ± 0,5) h for 150 °C ± 3 K
Adhesive temperature resistance	26	°C	Min.	85	For Type W adhesive lined products only.

Table 2 – Resistance to selected fluids

Test fluid no.	Fluids	Type	Standard or symbol	Immersion temperature °C ± 2 K
1	Insulating oil	Mineral Based	IEC 60296 transformer oil	23
2	Cleaning fluids		Isopropyl alcohol	23
3	-	Water	Deionized	85

Other fluids and/or temperatures may be specified for customers with specific needs. These additional fluids and/or temperatures shall be applicable when incorporated into agreements between the supplier and customer.

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Table 3 – Additional property requirements

Property	IEC 62677-2:2017 clause or subclause	Units	Max. or Min.	Requirement	Remarks
Fungus resistance	22				The test method shall be ISO 846 method B, 56 days exposure
Tensile strength	10.1 and 10.2	MPa	Min.	8	
Elongation		%	Min.	200	