BS EN 62329-3-101:2010

BSI Standards Publication

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

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National foreword

This British Standard is the UK implementation of EN 62329-3-101:2010. It is identical to IEC 62329-3-101:2010.

The UK participation in its preparation was entrusted to Technical Committee GEL/15, Solid electrical insulating materials.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 58368 1

ICS 29.035.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2011.

Amendments issued since publication

Amd. No.	Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62329-3-101

September 2010

ICS 29.035.01

English version

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

(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
(CEI 62329-3-101:2010)

Wärmeschrumpfende Formteile -
Teil 3: Anforderungen für Formteilmaße,
Materialeigenschaften
und Kompatibilitätsverhalten -
Blatt 101: Wärmeschrumpfende Formteile
aus Polyolefin, halbsteif, flammwidrig,
Materialanforderungen
und Systemeigenschaften
(IEC 62329-3-101:2010)

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Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN 62329-3-101:2010 E

Foreword

The text of document 15/569/FDIS, future edition 1 of IEC 62329-3-101, prepared by IEC TC 15, Solid electrical insulating materials, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62329-3-101 on 2010-09-01.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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)	2011-06-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-09-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62329-3-101:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60684-3-216 NOTE Harmonized as EN 60684-3-216.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60695-11-10	-	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	-
IEC 60757	1983	Code for designation of colours	HD 457 S1	1985
IEC 62329-1	-	Heat shrinkable moulded shapes - Part 1: Definitions and general requirements	EN 62329-1	-
IEC 62329-2	2006	Heat shrinkable moulded shapes - Part 2: Methods of test	EN 62329-2	2006
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	EN 62329-3-100	2010
ISO 1817	2005	Rubber, vulcanized - Determination of the effect of liquids	-	-

CONTENTS

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.

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.

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.

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.

6 Moulded shapes material conformance

Conformance with the requirements of this specification shall be based on the results form test sheets, (2 ± 0,15) mm thick, unless otherwise specified[1], 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.

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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 $^{+1}_{-0}$ 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				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 Elongation at break	21 10	%	Min.	100	Heat for (3000 ± 5) h at 105° C ± 3 K
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	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.

Table 2 – Resistance to selected fluids

Fluids	Type	Standard or symbol	Immersion temperature °C ± 2K
Fuels	Gasoline	ISO 1817 Liquid B	23
	Kerosene	ISO 1817 Liquid F	23
Hydraulic fluids	Phosphate base	ISO 1817 Liquid 103	23
	Silicone base	S-1714 [a]	23
	Mineral base	H-520 [a]	23
Oils	Synthetic base	ISO 1817 Liquid 101	23
	Mineral base	ISO 1817 Oil No. 2	23
	Mineral base	O-1176 [a]	23
	Mineral base	O-142 [a]	23
Cleaning fluids	Solvent	Isopropyl alcohol	23
		Propanol 25% White spirit 75%	23
		Methylethylketone	23
De-icing fluids	Runway de-icers	Inhibited potassium acetate in water, 50%	23
	Aircraft de-icers	Ethylene glycol 80% Water 20%	23

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

[a] These are commercially available fluids which can be identified in aviation fluid guides.

Annex A
(informative)

Adhesive compatibility guide for sheet 101 moulded shapes

Bonding adhesives Type code	Description	Properties	Guide to temperature range ° C	Guide to storage life (if applicable)	Compatible sleevings, IEC 60684 Part 3 sheet numbers
R	Curable single component	Thermosetting flexible fluid resistant	–75 to +150	2 years at below 25 °C	216
S	Curable hot melt	Thermosetting flexible	–75 to +150	2 years at below 25 °C	216
U	Epoxy resin with polyamine/amide hardener	Thermosetting more flexible than type Z	–75 to +150	2 years at below 25 °C	216
W1	Hot melt wide temperature range	Thermoplastic flexible	–55 to +105	Not applicable	216
W2	Hot melt limited temperature range	Thermoplastic flexible	–40 to +70	Not applicable	216
Z	Epoxy resin with polyamide hardener	Thermosetting fluid resistant	–55 to + 135	1 year at below 25 °C	216

Bibliography

IEC 60684-3-216, *Flexible insulating sleeving – Part 3: Specifications for individual types of sleeving – Sheet 216: Heat-shrinkable, flame- retarded, limited-fire-hazard sleeving*

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