BS EN 60684-3-116:2011

BSI Standards Publication

Flexible insulating sleeving

Part 3: Specifications for individual types of sleeving — Sheets 116 and 117: Extruded polychloroprene, general purpose

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National foreword

This British Standard is the UK implementation of EN 60684-3-116:2011. It is identical to IEC 60684-3-116:2010. It supersedes BS EN 60684-3-116 and 117:2003, which are withdrawn.

The UK participation in its preparation was entrusted by Technical Committee GEL/15, Solid electrical insulating materials, to Subcommittee GEL/15/5, Flexible insulating sleeving for electrical purposes.

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

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Flexible insulating sleeving - Part 3: Specifications for individual types of sleeving - Sheets 116 and 117: Extruded polychloroprene, general purpose

(IEC 60684-3-116:2010)

Gaines isolantes souples - Partie 3: Spécifications pour types particuliers de gaines - Feuilles 116 à 117: Polychloroprène extrudé, utilisation générale (CEI 60684-3-116:2010)

Isolierschläuche - Teil 3: Anforderungen für einzelne Schlauchtypen - Blätter 116 bis 117: Extrudierte Polychloroprenschläuche, Standardtyp (IEC 60684-3-116:2010)

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European Committee for Electrotechnical Standardization
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Foreword

The text of document 15/560/FDIS, future edition 3 of IEC 60684-3-116, prepared by IEC TC 15 "Solid electrical insulating materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60684-3-116:2011.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2012-05-11
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2013-07-20

This document supersedes EN 60684-3-116&117:2003.

EN 60684-3-116:2011 includes requirements four new tests: tear propagation; circumferential extension; voltage proof and thermal shock.

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Endorsement notice

The text of the International Standard IEC 60684-3-116:2010 was approved by CENELEC as a European Standard without any modification.

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 60684-1	2003	Flexible insulating sleeving - Part 1: Definitions and general requirements	EN 60684-1	2003
IEC 60684-2 + A1 + A2	1997 2003 2005	Flexible insulating sleeving - Part 2: Methods of test	EN 60684-2 + A1 + A2	1997 2003 2005
IEC 60684-2	2011	Flexible insulating sleeving - Part 2: Methods of test	EN 60684-2	2011
IEC 60757	1983	Code for designation of colours	HD 457 S1	1985

CONTENTS

INTRODUCTION

This International standard is one of a series which deals with flexible insulating sleeving for electrical purposes.

The series consists of three parts:

Part 1: Definitions and general requirements (IEC 60684-1)

Part 2: Methods of test (IEC 60684-2)

Part 3: Specification requirements for individual types of sleeving (IEC 60684-3)

This standard comprises two of the sheets of Part 3, as follows:

Sheet 116: Extruded polychloroprene, general purpose: thin wall

Sheet 117: Extruded polychloroprene, general purpose: thick wall

FLEXIBLE INSULATING SLEEVING –

Part 3: Specifications for individual types of sleeving – Sheets 116 and 117: Extruded polychloroprene, general purpose

1 Scope

This part of IEC 60684 gives the requirements for non-heat-shrinkable sleeving, extruded from compounds based on polychloroprene elastomer.This sleeving has been found suitable for temperatures up to 95 ºC.

Sleeving of this type is normally available with internal diameters up to 25 mm, and in the following opaque colours: black, brown, red, orange, yellow, green, blue, violet, grey, white and pink. Sizes or colours other than those specifically listed in this standard may be available as custom items. These items shall be considered to comply with this standard if they comply with the other property requirements listed in Table 2.

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 the application and not based on the 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 60684-1:2003, *Flexible insulating sleeving – Part 1: Definitions and general requirements*

IEC 60684-2:1997, *Flexible insulating sleeving – Part 2: Methods of test*
Amendment 1 (2003)
Amendment 2 (2005)

IEC 60684-2:—, *Flexible insulating sleeving – Part 2: Methods of test* [1]

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

3 Designation

The sleeving shall be identified by the following designation:

Description	IEC publication number	IEC Part number	IEC Sheet number	Size internal diameter, in millimetres	Colour
↓	↓	↓	↓	↓	↓
Sleeving	IEC 60684	3	116	2,5	GN

[1] Third edition to be published

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

4 Requirements

In addition to the general requirements given in IEC 60684-1, the sleeving shall comply with the requirements of Tables 1 and 2.

5 Sleeving conformance

Product qualification shall normally be based on results from 10 mm internal diameter sleeving. Colour and colour fastness to light shall be qualified for all colours.

Table 1 – Dimensional requirements[a]

Internal diameter [b] mm			**Wall thickness** mm			
Nominal			**Sheet 116: Thin wall**		**Sheet 117: Thick wall**	
	Min.	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**
0,5	0,4	0,7	0,4	0,6	0,6	0,8
0,8	0,6	0,9	0,4	0,6	0,6	0,8
1,0	0,9	1,2	0,4	0,6	0,6	0,8
1,2	1,0	1,4	0,4	0,6	0,6	0,8
1,5	1,3	1,8	0,5	0,7	0,7	0,9
2,0	1,7	2,3	0,5	0,7	0,7	0,9
2,5	2,1	2,9	0,5	0,7	0,7	0,9
3,0	2,5	3,5	0,5	0,7	0,7	0,9
4,0	3,3	4,6	0,5	0,9	0,9	1,2
5,0	4,2	5,8	0,5	0,9	0,9	1,2
8,0	6,8	9,2	0,5	1,1	1,1	1,5
10,0	8,6	11,4	0,5	1,2	1,2	1,8
12,0	10,4	13,6	0,5	1,2	1,2	1,8
16,0	14,0	18,0	0,5	1,4	1,4	2,0
20,0	17,5	22,5	0,7	1,5	1,5	2,4
25,0	21,5	28,5	0,7	1,5	1,5	2,4

[a] Measurements shall be made to the nearest 0,05 mm.

[b] Sleeving with a non-standard nominal internal diameter shall have a wall thickness at least as large as the next larger standard size. Sleeving with a non-standard internal diameter greater than 25,0 mm shall have a wall thickness that meets the requirements of the 25,0 mm internal diameter sleeving.

Table 2 – Property requirements

Property	IEC 60684-2, clause or subclause	Units	Max. or min.	Requirements	Remarks
Dimensions	3	mm		Table 1	
Bending after heating	13	–	–	There shall be no sign of cracking and the original colour shall be clearly recognizable.	Oven temperature 95 °C ± 2 K. For nominal internal diameters of 8 mm or less, the mandrel diameters shall be between four and five times the nominal internal diameter of the sleeving. Above 8 mm nominal internal diameter, strips 6 mm wide cut from the sleeving shall be bent around a mandrel 6 mm ± 1 mm in diameter.
Bending at low temperature	14	–	–	There shall be no sign of cracking.	Test temperature –35 °C Sleeving shall be tested unfilled and the mandrel diameter shall be between 15 and 20 times the specified maximum wall thickness. For strips cut from sleeving the mandrel diameter shall be between eight and ten times the specified maximum wall thickness.
Elongation at break	19.1	%	Min.	400	Dumbbell specimens shall be cut from sleeving of 8 mm or greater diameter.
Breakdown voltage	21	kV	Min.	Sheet 116: 2,0 Sheet 117: 4,0	The voltage shall be applied at a rate of 500 V/s or such that the required breakdown value is reached between 10 s and 20 s.
Volume resistivity - at room temperature - after damp heat	23 23.4.2 23.4.4	Ω.m	Min.	 5×10^9 4×10^8	
Flame propagation	26 Method A	s	Max.	30	In addition, the indicator flag shall not be burned, nor shall flaming or glowing particles or drops ignite the cotton in any of the three tests.
Silver staining	30	–	–	Any stain shall not be darker than the standard shade.	
Colour fastness	34	–	–	The colour contrast between the exposed parts of the specimens shall be equal to or less than that of the fastness standard.	Light fastness standard 3 shall be used.
Ozone resistance	35	–	–	There shall be no sign of cracking.	The ozone concentration shall be (1 ± 0,2) ml/m^3 and the temperature shall be 30 °C to 40 °C. The mandrel shall be twice the nominal diameter of the sleeving. The duration of the exposure shall be (20 ± 0,5) h.
Tension test	48	%	Max.	25	The test shall be carried out at a

Property	IEC 60684-2, clause or subclause	Units	Max. or min.	Requirements	Remarks
					temperature of 23 °C ± 2 K.
Tear propagation	50.3[2]	–	–	There shall be no splitting.	Oven temperature 95 °C ± 2 K. The mandrel diameter shall be 3D, where D is the nominal bore of the sleeves. NOTE Test not applicable to sleeves with less than 2 mm internal diameter.
Circumferential extension	59[3]	–	–	There shall be no splitting.	Oven temperature 70 °C ± 2 K. The mandrel diameter shall be 3,5D, where D is the nominal bore of the sleeves. NOTE Test not applicable to sleeves with less than 2 mm internal diameter.
Voltage proof	60[4]	kV	Min.	There shall be no breakdown.	Applied test voltage: up to and including 0,5 mm wall shall be 2 kV, over 0,5 mm wall shall be 4 kV.
Thermal shock	61.4.1[5]	–	–	The sleeves shall show no signs of cracking, splitting or change of colour. The sleeves shall not slip off the mandrel under their own weight. Any printing shall remain legible.	Oven temperature 95 °C ± 2 K

2 This subclause refers to the 3rd edition of IEC 60684-2, which is to be published.

3 This subclause refers to the 3rd edition of IEC 60684-2, which is to be published.

4 This subclause refers to the 3rd edition of IEC 60684-2, which is to be published.

5 This subclause refers to the 3rd edition of IEC 60684-2, which is to be published.

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