IEC 60684-3-116

Edition 3.0 2010-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Gaines isolantes souples –
Partie 3: Spécifications pour types particuliers de gaines –
Feuilles 116 à 117: Polychloroprène extrudé, utilisation générale

IEC 60684-3-116:2010

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FLEXIBLE INSULATING SLEEVING –

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

FOREWORD

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International Standard IEC 60684-3-116 has been prepared by IEC technical committee 15: Solid electrical insulating materials.

This third edition cancels and replaces the second edition published in 2003 and constitutes a technical revision. This edition includes requirements four new tests: tear propagation; circumferential extension; voltage proof and thermal shock.

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

FDIS	Report on voting
15/560/FDIS	15/583/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 60684 series, published under the general title *Flexible insulating sleeving,* 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- withdrawn,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.

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.