

# INTERNATIONAL STANDARD

**Flexible insulating sleeving –  
Part 3: Specifications for individual types of sleeving –  
Sheet 285: Heat-shrinkable polyolefin sleeving, for medium voltage joint  
insulation**

IECNORM.COM : Click to view the full PDF of IEC 60684-3-285:2014



**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2014 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

**About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

**About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

**IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)**

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

**IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)**

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

**IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

**IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).

IECNORM.COM : Click to view the full text of IEC 60584-3-285:2014



# INTERNATIONAL STANDARD

**Flexible insulating sleeving –  
Part 3: Specifications for individual types of sleeving –  
Sheet 285: Heat-shrinkable polyolefin sleeving, for medium voltage joint  
insulation**

IECNORM.COM : Click to view the full PDF of IEC 60684-3-285:2014

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE

**K**

ICS 29.035.20

ISBN 978-2-8322-1889-1

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references .....	6
3 Designation .....	6
4 Conditions of test .....	7
5 Requirements .....	7
6 Sleeving conformance .....	7
Bibliography.....	10
Table 1 – Property requirements.....	8
Table 2 – Requirements for breakdown voltage.....	9

IECNORM.COM : Click to view the full PDF of IEC 60684-3-285:2014

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## FLEXIBLE INSULATING SLEEVING –

**Part 3: Specifications for individual types of sleeving –  
Sheet 285: Heat-shrinkable polyolefin sleeving,  
for medium voltage joint insulation**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60684-3-285 has been prepared by IEC technical committee 15: Solid electrical insulating materials.

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

CDV	Report on voting
15/694/CDV	15/727/RVC

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 parts in the IEC 60684 series, published under the general title *Flexible insulating sleeving*, can be found on the IEC website.

A bilingual version of this publication may be issued at a later date.

IECNORM.COM : Click to view the full PDF of IEC 60684-3-285:2014

## 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: Specifications for individual types of sleeving (IEC 60684-3)

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

Sheet 285: Heat-shrinkable polyolefin sleeving, for medium voltage joint insulation.

IECNORM.COM : Click to view the full PDF of IEC 60684-3-285:2014

## FLEXIBLE INSULATING SLEEVING –

### Part 3: Specifications for individual types of sleeving – Sheet 285: Heat-shrinkable polyolefin sleeving, for medium voltage joint insulation

#### 1 Scope

This part of IEC 60684 gives the requirements for heat-shrinkable sleeving for medium voltage joint insulation, with a range of shrink ratios.

This sleeving has been found suitable up to temperatures of 100 °C.

These sleeveings are normally supplied in colour, red or brown.

Since this type of sleeveings covers a significantly large range of sizes and wall thicknesses, the actual size will be agreed between the purchaser and supplier.

Materials which conform to this standard 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 standard alone. This sleeving is designed to be used in medium voltage cable accessories and as such electrical performance will be proven as part of the assembly. Examples of this are described in HD 629 and IEC 60502.

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60684-2:2014, *Flexible insulating sleeving – Part 2: Methods of test*

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 (Expanded and recovered internal diameter in mm)	Colour
↓	↓	↓	↓	↓	↓
Sleeving	IEC 60684	- 3	- 285	- 75,0/30,0	- RD

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

NOTE This information is for packaging labelling only in accordance with IEC 60684-1.

#### **4 Conditions of test**

Unless otherwise specified, the sleeving shall be shrunk in a forced air circulation oven for  $(20 \pm 1)$  min at  $200 \text{ }^\circ\text{C} \pm 3 \text{ K}$  prior to testing.

#### **5 Requirements**

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

#### **6 Sleeving conformance**

Conformance to the requirements of this standard shall normally be based on the results from typical sizes.

Recovered ID 25 mm – 30 mm

IECNORM.COM : Click to view the full PDF of IEC 60684-3-285:2014

**Table 1 – Property requirements**

Property	IEC 60684-2:2011 Clause or Subclause	Units	Max. or Min.	Requirements	Remarks
Dimensions	3				
Internal diameter	3.1.2	mm	Min.	To be agreed between purchaser and supplier	
Wall thickness	3.3.2	mm	Min.		
Concentricity expanded	3.3.3	%		60	
recovered				85	
Heat shock	6				
Tensile strength	19.1 and 19.2	MPa	Min.	5	Heat at 200 °C ± 5 K
Elongation at break	19.1 and 19.2	%	Min.	200	
Longitudinal change	9	%	Max.	-10 + 5	Heat expanded sleeving at 200 °C ± 3 K for (20 ± 1 ) min
Bending at low temperature	14	-	-	No cracking shall be visible	Test at -20 °C For strips, the mandrel shall be between 20 and 22 times the wall thickness. Full section sleeving is tested unfilled and the mandrel shall be between 20 and 22 times the outer diameter.
Dimensional stability on storage	16	-	-	The dimensions shall remain as agreed.	See Clause 1 (Scope)
Tensile strength	19.1 and 19.2	MPa	Min.	8	Rate of jaw separation shall be 100 mm/min.
Elongation at break	19.1 and 19.2	%	Min.	400	
Secant modulus at 2 % elongation	19.5	MPa	Max.	175	
Breakdown voltage	21	kV	Min.	See Table 2.	
Volume resistivity at room temperature	23 23.5.2	Ω. m	Min.	10 <sup>12</sup>	
Heat ageing	39				
Tensile strength	19.1 and 19.2	MPa	Min.	5	Heat at 135 °C ± 3 K
Elongation at break	19.1 and 19.2	%	Min.	200	

**Table 2 – Requirements for breakdown voltage**

Expanded wall thickness (mm)	Electric strength <sup>a</sup> Min.	
	All dimensions	Expanded wall thickness/mm <u>Type B</u> < 1 1 to 1,5 > 1,5
<sup>a</sup> Measure the expanded wall thickness and calculate the electric strength by dividing the breakdown voltage by this value.		

The breakdown voltage shall be determined by the method described in 21.4 of IEC 60684-2:2011. The central value shall comply with the minimum value in the above Table 2.

The sleeving shall be tested in the expanded condition.

The rate of application of the voltage shall be 500 V/s.

Care should be taken on selection of sizes based on these values. Refer to the manufacturer for actual values on installed conditions.

IECNORM.COM : Click to view the full PDF of IEC 60684-3-285:2014