

INTERNATIONAL STANDARD



**Flexible insulating sleeving –
Part 3: Specifications for individual types of sleeving –
Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking**



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

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL STANDARD



**Flexible insulating sleeving –
Part 3: Specifications for individual types of sleeving –
Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FLEXIBLE INSULATING SLEEVING –

Part 3: Specifications for individual types of sleeving – Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking

FOREWORD

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International Standard IEC 60684-3-280 has been prepared by IEC technical committee 15: Solid electrical insulating materials.

This second edition cancels and replaces the first edition published in 2010 and Amendment 1:2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) change of moulded plaque thickness for resistance to tracking and weathering tests to $(6 \pm 0,5)$ mm.

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

FDIS	Report on voting
15/891/FDIS	15/898/RVD

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

This document 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.

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- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

This document is one of a series of standards 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 document comprises one of the sheets of Part 3 as follows:

Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking

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FLEXIBLE INSULATING SLEEVING –

Part 3: Specifications for individual types of sleeving – Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking

1 Scope

This part of IEC 60684 gives the requirements for heat-shrinkable, polyolefin sleeving, anti-tracking with a nominal shrink ratio of 3:1.

This sleeving has been found suitable for use at temperatures up to 100 °C.

Typically: medium wall, internal diameter up to 110 mm.

~~These sleeveings are~~ This sleeving is normally supplied in the colours red or brown.

Since these types of sleeveings cover a significantly large range of sizes and wall thicknesses, Annex A (Table A.1) provides guidance on the range of sizes available. The actual size ~~shall~~ will be agreed between the user and the supplier.

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~~ will be based on the actual requirements necessary for adequate performance in that application and not based on this specification alone.

This sleeving is designed to be used in medium voltage cable accessories and as such electrical performance ~~must~~ will be proven as part of the assembly. Examples of this are described in HD 629.1 and IEC 60502 (all parts).

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 60296:2003/2012, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

~~IEC 60502 (all parts), Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV)~~

IEC 60684-1:2003, *Flexible insulating sleeving – Part 1: Definitions and general requirements*

IEC 60684-2:1997/2011, *Flexible insulating sleeving – Part 2: Methods of test*
~~Amendment 1 (2003)~~
~~Amendment 2 (2005)~~

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

ISO 846:1997/2019, *Plastics – Evaluation of the action of micro-organisms*

ISO 4892-3:2006/2016, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*

~~HD 629, Test requirements on accessories for use on power cables of rated voltages from 3,6/6(7,2)kV up to 20,8/36 (42)kV – Part 1: Cables with extruded insulation~~

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 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 millimetres)	Colour	Table 4 ^a code
↓	↓	↓	↓	↓	↓	↓
Sleeving	IEC 60684	- 3	-280	- 60,0/19,0	- Red	X

^a NOTE 1 The addition of "X" at the end of the designation indicates that the properties contained in Table 4 have been agreed upon between the user and supplier.

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

NOTE 2 This information is for labelling only, in accordance with IEC 60684-1.

5 Conditions of test

Unless otherwise specified, the sleeving shall be shrunk in a forced air circulation oven for (10 ± 1) min at $200 \text{ }^{\circ}\text{C} \pm 3 \text{ K}$ prior to testing.

6 Requirements

In addition to the general requirements given in IEC 60684-1, the sleeving shall comply with the requirements of Tables 1, 2, 3, and 4 where applicable.

7 Sleeving conformance

Conformance to the requirements of this specification shall normally be based on the results from typical sizes:

- Recovered ID 20 mm to 30 mm

Table 1 – Property requirements

Property	IEC 60684-2: 2011 clause or subclause	Units	Max. or min.	Requirements	Remarks
Dimensions Internal diameter Wall thickness Concentricity expanded recovered	3 3.1.2 3.3.2 3.3.3	mm mm %	Min. Min.	To be agreed between the purchaser and the supplier 60 85	
Heat shock Tensile strength Elongation at break	6 19.12 and 19.23 19.12 and 19.23	MPa %	Min. Min.	8 200	Heat at 150 °C ± 5 K Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving
Longitudinal change	9	%	Max.	+5 -10	Heat expanded sleeving at 150 °C ± 3 K for (10 ± 1) min
Bending at low temperature	14	–	–	No cracking shall be visible.	Test at – 40 °C. For strips, the mandrel shall be between 20 times and 22 times the wall thickness. Full section sleeving is tested unfilled and the mandrel shall be between 20 times and 22 times the outer diameter
Dimensional stability on storage	16	–	–	The dimensions shall remain as agreed.	See Clause 1 .
Tensile strength Elongation at break	19.12 and 19.23 19.12 and 19.23	MPa %	Min. Min.	10 300	Use a jaw separation rate of 100 mm/min. Below 6,5 mm Ø as sleeving. At 6,5 mm Ø and above as dumbbells. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving
Secant modulus at 2 % elongation	19.45	MPa MPa	Min. Max.	80 160	
Dielectric strength	See Table 2 of this document.	kV/m m	Min.	Table 2	
Breakdown voltage	21.2	kV/m m	Min.	See Table 2	
Volume resistivity at room temperature	23 23.45.2	Ω·m	Min.	10 ¹²	

Property	IEC 60684-2: 2011 clause or subclause	Units	Max. or min.	Requirements	Remarks
Resistance to tracking	25	–	Min.	Class 2A 2,5 kV – 1 h 2,75 kV – 1 h 3,0 kV – 1 h 3,25 kV – 20 min	Specimens shall be prepared from cross-linked moulded plaques of thickness $(6 \pm 0,5)$ mm Specimens should not be abraded but cleaned with an appropriate solvent. The method of cleaning shall be recorded.
Resistance to selected fluids Tensile strength Elongation at break	36 19.12 and 19.23 19.12 and 19.23	MPa %	Min. Min.	8 200	Use the fluids and test temperatures specified in Table 3. Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving Immersion (24 ± 1) h
Heat ageing Tensile strength Elongation at break	39 19.12 and 19.23 19.12 and 19.23	MPa %	Min. Min.	8 200	Heat at $150 \text{ }^{\circ}\text{C} \pm 3 \text{ K}$ Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving
Long term ageing Elongation at break	50 19.2 and 19.3	%	Min.	150	The ageing temperature shall be $100 \text{ }^{\circ}\text{C} \pm 3 \text{ K}$ Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving

Table 2 – Requirements for dielectric strength

Expanded wall thickness mm	Dielectric strength ^a Min.	
All dimensions	Expanded ID	Dielectric strength kV/mm
	10 to 25	14
	26 to 59	12
	60 to 120	10
^a Measure the expanded wall thickness and calculate the dielectric 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.

The sleeving shall be tested in the expanded condition.

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

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

Table 3 – Resistance to selected fluids

Test fluid No.	Fluids	Type	Standard or symbol	Immersion temperature °C ± 2 K
1	Insulating oil	Mineral based	IEC 60296	23
2			Isopropyl alcohol	23
3	-	Water	De-ionized	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 the customer.

Table 4 – Additional property requirements

Property	IEC 60684-2:2011 clause or subclause	Units	Max. or min.	Requirements	Remarks
Fungus resistance Tensile strength Elongation	19.42 and 19.23	MPa %	Min. Min.	8 250	The test method shall be ISO 846, Method B. 56 days exposure Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving

Resistance to weathering	ISO 4892-3:2016 Method 4 C After 5 000 3 000 h Test to 19.1 19.2 and 19.3 19.2 and 19.3 25	MPa %	Min. Min. Min.	8 200 Class 2A 2,5 kV – 1 h	Test method to ISO 4892-3. Samples for test 19.12 and 19.23 should be taken from recovered sleeving which is flattened. Use a jaw separation rate of 100 mm/min Samples for Test 25 should be taken from specially prepared test sheets ($6 \pm 0,1$ 0,5) mm thick. All samples should be cut to the appropriate size to fit the sample holders Intermediate tests may also be done at 1 000 h intervals as an intermediate check on performance
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Annex A (informative)

Guidance on the available sizes and wall thicknesses

Table A.1 – Guidance on the available sizes and wall thicknesses

Internal diameter		Wall
Expanded Min. mm	Recovered Max. mm	Recovered wall thickness Min. mm
16,0	8,0	1,4
20,0	10,0	1,4
26,0	12,0	2,4
30,0	15,0	2,6
33,0	9,0	3,0
35,0	12,0	3,0
45,0	20,0	3,0
60,0	19,0	3,1
65,0	30,0	3,1
80,0	26,0	3,2
90,0	30,0	3,3
95,0	45,0	3,5
110,0	37,0	3,5

Bibliography

IEC 60502 (all parts), *Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV)*

IEC 60684-3 (all sheets), *Flexible insulating sleeving – Part 3: Specifications for individual types of sleeving*

HD 629.1, *Test requirements on accessories for use on power cables of rated voltages from 3,6/6(7,2)kV up to 20,8/36 (42)kV – Part 1: Cables with extruded insulation*

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**Flexible insulating sleeving –
Part 3: Specifications for individual types of sleeving –
Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking**

**Gaines isolantes souples –
Partie 3: Spécifications pour types particuliers de gaines –
Feuille 280: Gaines thermorétractables, en polyoléfine, anticheminement**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FLEXIBLE INSULATING SLEEVING –

**Part 3: Specifications for individual types of sleeving –
Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking**

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This edition includes the following significant technical changes with respect to the previous edition:

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INTRODUCTION

This document is one of a series of standards 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 document comprises one of the sheets of Part 3 as follows:

Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking

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FLEXIBLE INSULATING SLEEVING –

Part 3: Specifications for individual types of sleeving – Sheet 280: Heat-shrinkable, polyolefin sleeving, anti-tracking

1 Scope

This part of IEC 60684 gives the requirements for heat-shrinkable, polyolefin sleeving, anti-tracking with a nominal shrink ratio of 3:1.

This sleeving has been found suitable for use at temperatures up to 100 °C.

Typically: medium wall, internal diameter up to 110 mm.

This sleeving is normally supplied in the colours red or brown.

Since these types of sleeving cover a significantly large range of sizes and wall thicknesses, Annex A (Table A.1) provides guidance on the range of sizes available. The actual size will be agreed between the user and the supplier.

Materials which conform to this specification 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 not based on this specification 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 629.1 and IEC 60502 (all parts).

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 60296:2012, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60684-1:2003, *Flexible insulating sleeving – Part 1: Definitions and general requirements*

IEC 60684-2:2011, *Flexible insulating sleeving – Part 2: Methods of test*

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

ISO 846:2019, *Plastics – Evaluation of the action of micro-organisms*

ISO 4892-3:2016, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*

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 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 millimetres)	Colour	Table 4 code
↓	↓	↓	↓	↓	↓	↓
Sleeving	IEC 60684	- 3	-280	- 60,0/19,0	- Red	X

NOTE 1 The addition of "X" at the end of the designation indicates that the properties contained in Table 4 have been agreed upon between the user and supplier.

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

NOTE 2 This information is for labelling only, in accordance with IEC 60684-1.

5 Conditions of test

Unless otherwise specified, the sleeving shall be shrunk in a forced air circulation oven for (10 ± 1) min at $200 \text{ }^{\circ}\text{C} \pm 3 \text{ K}$ prior to testing.

6 Requirements

In addition to the general requirements given in IEC 60684-1, the sleeving shall comply with the requirements of Tables 1, 2, 3, and 4 where applicable.

7 Sleeving conformance

Conformance to the requirements of this specification shall normally be based on the results from typical sizes:

- Recovered ID 20 mm to 30 mm

Table 1 – Property requirements

Property	IEC 60684-2: 2011 clause or subclause	Units	Max. or min.	Requirements	Remarks
Dimensions Internal diameter Wall thickness Concentricity expanded recovered	3 3.1.2 3.3.2 3.3.3	mm mm %	Min. Min.	To be agreed between the purchaser and the supplier 60 85	
Heat shock Tensile strength Elongation at break	6 19.2 and 19.3 19.2 and 19.3	MPa %	Min. Min.	8 200	Heat at 150 °C ± 5 K Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving
Longitudinal change	9	%	Max.	+5 -10	Heat expanded sleeving at 150 °C ± 3 K for (10 ± 1) min
Bending at low temperature	14	–	–	No cracking shall be visible.	Test at – 40 °C. For strips, the mandrel shall be between 20 times and 22 times the wall thickness. Full section sleeving is tested unfilled and the mandrel shall be between 20 times and 22 times the outer diameter
Dimensional stability on storage	16	–	–	The dimensions shall remain as agreed.	See Clause 1 .
Tensile strength Elongation at break	19.2 and 19.3 19.2 and 19.3	MPa %	Min. Min.	10 300	Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving
Secant modulus at 2 % elongation	19.5	MPa MPa	Min. Max.	80 160	
Breakdown voltage	21.2	kV/mm	Min.	See Table 2	
Volume resistivity at room temperature	23 23.5.2	Ω·m	Min.	10 ¹²	
Resistance to tracking	25	–	Min.	Class 2A 2,5 kV – 1 h 2,75 kV – 1h 3,0 kV – 1 h 3,25 kV – 20 min	Specimens shall be prepared from cross- linked moulded plaques of thickness (6 ± 0,5) mm Specimens should not be abraded but cleaned with an appropriate solvent. The method of cleaning shall be recorded.

Property	IEC 60684-2: 2011 clause or subclause	Units	Max. or min.	Requirements	Remarks
Resistance to selected fluids Tensile strength Elongation at break	36 19.2 and 19.3 19.2 and 19.3	MPa %	Min. Min.	8 200	Use the fluids and test temperatures specified in Table 3. Use a jaw separation rate of 100 mm/min. For internal diameters <6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving Immersion (24 ± 1) h
Heat ageing Tensile strength Elongation at break	39 19.2 and 19.3 19.2 and 19.3	MPa %	Min. Min.	8 200	Heat at 150 °C ± 3 K Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving
Long term ageing Elongation at break	50 19.2 and 19.3	%	Min.	150	The ageing temperature shall be 100 °C ± 3 K Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving

Table 2 – Requirements for dielectric strength

Expanded wall thickness mm	Dielectric strength ^a Min.	
	Expanded ID	Dielectric strength kV/mm
All dimensions	10 to 25	14
	26 to 59	12
	60 to 120	10
^a Measure the expanded wall thickness and calculate the dielectric strength by dividing the breakdown voltage by this value.		

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 condition.

Table 3 – Resistance to selected fluids

Test fluid No.	Fluids	Type	Standard or symbol	Immersion temperature °C ± 2 K
1	Insulating oil	Mineral based	IEC 60296	23
2			Isopropyl alcohol	23
3	-	Water	De-ionized	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 the customer.

Table 4 – Additional property requirements

Property	IEC 60684-2:2011 clause or subclause	Units	Max. or min.	Requirements	Remarks
Fungus resistance Tensile strength Elongation	19.2 and 19.3	MPa %	Min. Min.	8 250	The test method shall be ISO 846, Method B. 56 days exposure Use a jaw separation rate of 100 mm/min. For internal diameters < 6,5 mm, use sleeving samples for testing. On 6,5 mm and larger diameter sleeving, use dumb-bell samples cut from the sleeving
Resistance to weathering	ISO 4892-3:2016 Method C After 3 000 h Test to 19.2 and 19.3 19.2 and 19.3 25	MPa %	Min. Min. Min.	8 200 Class 2A 2,5 kV – 1 h	Test method to ISO 4892-3. Samples for test 19.2 and 19.3 should be taken from recovered sleeving which is flattened. Use a jaw separation rate of 100 mm/min Samples for Test 25 should be taken from specially prepared test sheets (6 ± 0,5) mm thick. All samples should be cut to the appropriate size to fit the sample holders Intermediate tests may also be done at 1 000 h intervals as an intermediate check on performance

Annex A

(informative)

Guidance on the available sizes and wall thicknesses

Table A.1 – Guidance on the available sizes and wall thicknesses

Internal diameter		Wall
Expanded Min. mm	Recovered Max. mm	Recovered wall thickness Min. mm
16,0	8,0	1,4
20,0	10,0	1,4
26,0	12,0	2,4
30,0	15,0	2,6
33,0	9,0	3,0
35,0	12,0	3,0
45,0	20,0	3,0
60,0	19,0	3,1
65,0	30,0	3,1
80,0	26,0	3,2
90,0	30,0	3,3
95,0	45,0	3,5
110,0	37,0	3,5

Bibliography

IEC 60502 (all parts), *Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV)*

IEC 60684-3 (all sheets), *Flexible insulating sleeving – Part 3: Specifications for individual types of sleeving*

HD 629.1, *Test requirements on accessories for use on power cables of rated voltages from 3,6/6(7,2)kV up to 20,8/36 (42)kV – Part 1: Cables with extruded insulation*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

GAINES ISOLANTES SOUPLES –

**Partie 3: Spécifications pour types particuliers de gaines –
Feuille 280: Gaines thermorétractables, en polyoléfine, anticheminement**

AVANT-PROPOS

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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La Norme internationale IEC 60684-3-280 a été établie par le comité d'études 15 de l'IEC: Matériaux isolants électriques solides.

Cette deuxième édition annule et remplace la première édition parue en 2010 et l'Amendement 1:2013. Cette édition constitue une révision technique.

La présente édition inclut la modification technique majeure suivante par rapport à l'édition précédente:

- a) modification de l'épaisseur des plaques moulées pour les essais de résistance aux courants de cheminement et les essais de résistance aux intempéries qui devient $(6 \pm 0,5)$ mm.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
15/891/FDIS	15/898/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60684, publiées sous le titre général *Gaines isolantes souples*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "<http://webstore.iec.ch>" dans les données relatives au document recherché. A cette date, le document sera

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INTRODUCTION

Le présent document fait partie d'une série de normes traitant des gaines isolantes souples à usages électriques.

Cette série est constituée de trois parties:

Partie 1: Définitions et exigences générales (IEC 60684-1)

Partie 2: Méthodes d'essai (IEC 60684-2)

Partie 3: Spécifications pour types particuliers de gaines (IEC 60684-3)

Le présent document contient l'une des feuilles qui composent la Partie 3, comme suit:

Feuille 280: Gains thermorétractables, en polyoléfine, anticheminement

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GAINES ISOLANTES SOUPLES –

Partie 3: Spécifications pour types particuliers de gaines – Feuille 280: Gains thermorétractables, en polyoléfine, anticheminement

1 Domaine d'application

La présente partie de l'IEC 60684 donne les exigences relatives aux gaines thermorétractables, en polyoléfine, anticheminement, présentant un rapport de rétreint nominal de 3:1.

Ces gaines se sont avérées appropriées pour une utilisation à des températures allant jusqu'à 100 °C.

Généralement: paroi moyenne, diamètre intérieur jusqu'à 110 mm.

Ces gaines sont normalement disponibles en rouge ou en brun.

Comme ces types de gaines couvrent une plage très étendue de tailles et d'épaisseurs de paroi, l'Annexe A (Tableau A.1) donne des recommandations sur la plage des tailles disponibles. La taille réelle fait l'objet d'un accord entre l'utilisateur et le fournisseur.

Les matériaux conformes à la présente spécification satisfont à des niveaux de performances établis. Cependant, le choix d'un matériau par un utilisateur, pour une application spécifique, est fondé sur les exigences réelles nécessaires pour obtenir des performances adéquates pour l'application concernée, et n'est pas fondé sur cette seule spécification.

Cette gaine est conçue pour être utilisée dans des accessoires de câbles moyenne tension, et, en conséquence, les performances électriques sont prouvées dans le cadre de l'assemblage. Des exemples sont décrits dans le HD 629.1 et dans l'IEC 60502 (toutes les parties).

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60296:2012, *Fluides pour applications électrotechniques – Huiles minérales isolantes neuves pour transformateurs et appareillages de connexion*

IEC 60684-1:2003, *Gaines isolantes souples – Partie 1: Définitions et exigences générales.*

IEC 60684-2:2011, *Gaines isolantes souples – Partie 2: Méthodes d'essai*

IEC 60757:1983, *Code de désignation de couleurs*

ISO 846:2019, *Plastiques – Évaluation de l'action des micro-organismes*

ISO 4892-3:2016, *Plastiques – Méthodes d'exposition à des sources lumineuses de laboratoire – Partie 3: Lampes fluorescentes UV*

3 Termes et définitions

Aucun terme n'est défini dans le présent document.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation,

consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse <http://www.electropedia.org/>
- ISO Online browsing platform: disponible à l'adresse <http://www.iso.org/obp>

4 Désignation

Les gaines doivent être identifiées par la désignation suivante:

Description	Numéro de la publication IEC	Numéro de partie IEC	Numéro de la feuille IEC	Taille (diamètre intérieur à l'état expansé et rétreint, en mm)	Couleur	Tableau 4 ^a code
↓	↓	↓	↓	↓	↓	↓
Gaine	IEC 60684	- 3	-280	- 60,0/19,0	- Rouge	X

NOTE 1 L'ajout de "X" à la fin de la désignation indique que les propriétés contenues dans le Tableau 4 ont fait l'objet d'un accord entre l'utilisateur et le fournisseur.

Toutes les abréviations relatives aux couleurs doivent être conformes à l'IEC 60757, lorsque cela est applicable. Les couleurs non normalisées doivent être indiquées en toutes lettres.

NOTE 2 Cette information est réservée uniquement à l'étiquetage, conformément à l'IEC 60684-1.

5 Conditions d'essai

Sauf spécification contraire, les gaines doivent être rétreintes dans une étuve à circulation d'air forcée pendant (10 ± 1) mm à $200\text{ °C} \pm 3\text{ K}$, avant l'essai.

6 Exigences

Outre les exigences générales données dans l'IEC 60684-1, les gaines doivent être conformes aux exigences données dans les Tableaux 1, 2, 3 et 4, lorsque cela est applicable.

7 Conformité des gaines

La conformité aux exigences de la présente spécification doit normalement être fondée sur les résultats de tailles typiques:

- Diamètre intérieur rétreint de 20 mm à 30 mm