

**SLOVENSKI STANDARD**  
**SIST HD 523.3.209 S1:1998****01-junij-1998**

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**Specification for flexible insulating sleeving - Part 3: Specification requirements for individual types of sleeving - Sheet 209: Heat shrinkable sleeving, general purpose, flame retarded polyolefin shrink ratio 2 : 1 (IEC 60684-3-209:1987)**

Specification for flexible insulating sleeving -- Part 3: Specification requirements for individual types of sleeving -- Sheet 209: Heat shrinkable sleeving, general purpose, flame retarded polyolefin shrink ratio 2:1

Bestimmung für Isolierschläuche -- Teil 3: Bestimmungen für einzelne Schlauchtypen -- Blatt 209: Polyolefin-Wärmeschrumpfschläuche, flammhemmend, Schrumpfverhältnis 2:1 - Typen für allgemeine Anwendungen

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Spécification pour gaines isolantes souples -- Partie 3: Spécifications particulières aux types particuliers de gaines -- Feuille 209: Gainés thermorétractables tous usages, en polyoléfine, à flamme retardée, rapport de rétreint 2:1

**Ta slovenski standard je istoveten z: HD 523.3.209 S1:1989**

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**ICS:**

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SPECIFICATION FOR FLEXIBLE INSULATING SLEEVING  
PART 3: SPECIFICATION REQUIREMENTS FOR INDIVIDUAL  
TYPES OF SLEEVING  
SHEET 209: HEAT SHRINKABLE SLEEVING, GENERAL  
PURPOSE, FLAME RETARDED POLYOLEFIN SHRINK RATIO 2:1

Spécification pour gaines  
isolantes souples  
Troisième partie: Spécifications  
particulières aux types  
particuliers de gaines  
Feuille 209: Gainses  
thermorétractables tous usages,  
en polyoléfine, à flamme  
retardée, rapport de rétreint 2:1

Bestimmung für flexible  
Isolierschläuche  
Teil 3: Technische  
Lieferbedingungen für  
einzelne Schlauchtypen  
Blatt 209: Polyolefin-  
Wärmeschrumpfschläuche,  
flammhemmend, Schrumpfverhältnis 2:1;  
Typen für allgemeine Anwendungen

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BODY OF THE HD

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The Harmonization Document consists of:

- IEC 684-3-209 (1987) ed 1; IEC/SC 15C, not appended  
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This Harmonization Document was approved by CENELEC on 1989-06-01.

The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level by or before 1989-12-01

to publish their new harmonized national standard by or before 1990-06-01

to withdraw all conflicting national standards by or before 1990-06-01.

Harmonized national standards are listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC Central Secretariat.

The CENELEC National Committees are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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# NORME INTERNATIONALE INTERNATIONAL STANDARD



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CEI  
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First edition  
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## Spécification pour gaines isolantes souples

Troisième partie: Spécifications particulières aux types particuliers de gaines  
Feuille 209: Gaines thermorétractables tous usages, en polyoléfine,  
à flamme retardée, rapport de rétreint 2:1

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## Specification for flexible insulating sleeving

Part 3: Specification requirements for individual types of sleeving  
Sheet 209: Heat shrinkable sleeving, general purpose,  
flame retarded polyolefin shrink ratio 2:1

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## SPECIFICATION FOR FLEXIBLE INSULATING SLEEVING

## Part 3: Specification requirements for individual types of sleeving

Sheet 209: Heat shrinkable sleeving, general purpose,  
flame retarded polyolefin shrink ratio 2:1

## FOREWORD

- 1) The formal decisions or agreements of the I E C on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the I E C expresses the wish that all National Committees should adopt the text of the I E C recommendation for their national rules in so far as national conditions will permit. Any divergence between the I E C recommendations and the corresponding national rules should, as far as possible, be clearly indicated in the latter.
- 4) The I E C has not laid down any procedure concerning marking as an indication of approval and has no responsibility when an item of equipment is declared to comply with one of its recommendations.

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## PREFACE

This standard has been prepared by Sub-Committee 15C: Specifications, of I E C Technical Committee No. 15: Insulating Materials.

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

Six Months' Rule	Reports on Voting
15C(CO)193	15C(CO)210 and 210A

Further information can be found in the relevant Reports on Voting indicated in the table above.

The following I E C publications are quoted in this standard:

- Publications Nos. 684-1 (1980): Specification for Flexible Insulating Sleeving, Part 1: Definitions and General Requirements.  
684-2 (1984): Part 2: Methods of Test.  
757 (1983): Code for Designation of Colours.

Other publication quoted:

- ISO Standard 1817 (1985): Rubber, vulcanized—Determination of the effect of liquids.

## SPECIFICATION FOR FLEXIBLE INSULATING SLEEVING

### Part 3: Specification requirements for individual types of sleeving Sheet 209: Heat shrinkable sleeving, general purpose, flame retarded polyolefin shrink ratio 2:1

#### INTRODUCTION

This 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 (I E C Publication 684-1);
- Part 2: Methods of Test (I E C Publication 684-2);
- Part 3: Specification Requirements for Individual Types of Sleeving (I E C Publication 684-3).

This sheet is one of the sheets comprising Part 3.

#### 1. Scope

This sheet gives requirements for general purpose, flexible, flame retarded, heat shrinkable polyolefin sleeving with a nominal minimum shrink ratio of 2:1.

It is normally available in bore sizes up to 100 mm as supplied and in the following colours: black, white, red, yellow, blue and yellow/green.

*Note.* — The sleeving has a minimum recovery temperature of 120 °C.

#### 2. Designation

The sleeving shall be identified by one of the following means:

- a) in words and numbers;
- b) by the designation which follows;
- c) by both the above.

IEC 684-3-209—size code—colour.

For example: IEC 684-3-209-12/6-red.

Any abbreviation used for colour shall comply with I E C Publication 757: Code for Designation of Colours.

#### 3. Conditions of test

Unless otherwise specified, sleeving shall be shrunk in a forced air circulation oven for 5 min at  $175 \pm 3$  °C before being tested.

#### 4. Property requirements

When tested by the method specified, the sleeving shall comply with the requirements given in Table II.

#### 5. General requirements

In addition to the general requirements given in I E C Publication 684-1, the sleeving shall comply with the dimensional requirements in Table I when tested by the method given in Clause 3 of I E C Publication 684-2.

TABLE I

*Dimensional requirements*

Size code	Bore (mm)		Wall thickness (mm)
	Expanded (min.)	Recovered (max.)	
1/0.5	1.0	0.5	0.45 ± 0.10
1.5/0.8	1.5	0.8	0.45 ± 0.10
2.5/1.2	2.5	1.2	0.50 ± 0.10
3.0/1.5	3.0	1.5	0.50 ± 0.10
5/2.5	5.0	2.5	0.50 ± 0.10
6/3	6.0	3.0	0.65 ± 0.15
10/5	10.0	5.0	0.65 ± 0.15
12/6	12.0	6.0	0.65 ± 0.15
20/10	20.0	10.0	0.75 ± 0.15
25/12	25.0	12.0	0.90 ± 0.15
40/20	40.0	20.0	1.00 ± 0.20
50/25	50.0	25.0	1.15 ± 0.25
80/40	80.0	40.0	1.25 ± 0.25
100/50	100.0	50.0	1.40 ± 0.25

TABLE II

*Property requirements*

Property	Publication 684-2 Clause	Units	Max. or min.	Requirements	Remarks
Density	4	g/cm <sup>3</sup>	max. 1.35		
Resistance to heat	6	—	—	There shall be no signs of dripping, cracking or flowing	The heating temperature shall be 250 ± 5 °C
Longitudinal change	9	%	max.	+5 to -10	The heating shall be for 5 min at 175 ± 3 °C in an oven with forced air circulation. The test shall be carried out on unrecovered (as supplied) sleeving
Bending at low temperature	14	—	—	No cracking shall be visible	The test shall be carried out at -55 ± 3 °C and the mandrel diameter shall be as given in Table IV. Specimens of bore code sizes up to and including 12/6 shall be tested unfilled
Dimensional stability on storage	16	—	—	The minimum expanded diameter shall be not less than the expanded diameter given in Table I	

(Table continued on page 9)



TABLE II (continued)

## Property requirements

Property	Publication 684-2 Clause	Units	Max. or min.	Requirements	Remarks
Tensile strength	19.1 and 19.2	MPa	min.	10	The rate of jaw separation shall be 100 mm/min. For bore code sizes up to and including 12/6 the test shall be carried out on full section sleeving (Sub-clause 19.1) and on larger size sleeving on dumbbell specimens (Sub-clause 19.2)
Elongation at break	19.1 and 19.2	%	min.	200	
Secant modulus	19.4	MPa	max.	175	The rate of jaw separation shall be $0.1 \pm 0.02$ mm/min for each millimetre between jaws. Use specimens to give 100 mm to 250 mm between jaws
Breakdown voltage	21	kV	min.	See Table III	
Volume resistivity at room temp.	23 23.4.2	$\Omega$ cm	min.	$10^{14}$	
Flame propagation - Method A	26	s	max.	60 In addition, the indicator flag on any one of the three tests shall not be burned, nor shall flaming or glowing particles or flaming drops ignite the cotton	
Corrosion resistance (tensile and elongation method)	32	%	min.	150 There shall be no sign of chemical interaction between the mandrel and the sleeving	
Presence of corrosive volatiles (copper mirror method)	33	%	max.	No corrosion above 8% is permissible	The temperature and time of test shall be 16 h at $175 \pm 3$ °C
Resistance to selected fluids	36	—	—	Tensile strength - 7 MPa Breakdown voltage - not less than 75% of the value given in Table III Elongation - 200% min.	Carry out the tests using the immersion fluids given in Table V

(Table continued on page 11)