SLOVENSKI STANDARD
SIST EN 4708-103:2019

01-september-2019

Aeronavtika - Toplotno skrčljiva cev za utrjevanje, izolacijo in identifikacijo - 103. del: Fluoroelastomerne cevi - Delovna temperatura –55 °C do 200 °C - Standard za proizvod

Aerospace series - Sleeving, heat-shrinkable, for binding, insulation and identification - Part 103: Fluoroelastomer sleeves - Operating temperature -55 °C to 200 °C - Product standard

Luft- und Raumfahrt - Wärmeschrumpfender Schlauch zur Befestigung, Isolierung und Identifizierung - Teil 103: Fluorpolymer Schlauch - Temperaturbereich -55 °C und 200 °C - Produktnorm

Série aérospatiale - Manchons thermorétractables, de jonction, isolement et identification - Partie 103: Gaines à base de fluoroélastomère - Températures d'utilisation -55 °C à 200 °C - Norme de produit

Ta slovenski standard je istoveten z: EN 4708-103:2019

ICS:

49.025.40	Guma in polimerni materiali	Rubber and plastics
49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems

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Aerospace series - Sleeving, heat-shrinkable, for binding, insulation and identification - Part 103: Fluoroelastomer sleeves - Operating temperature -55 °C to 200 °C - Product standard

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This European Standard was approved by CEN on 6 August 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 4708-103:2019) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2019, and conflicting national standards shall be withdrawn at the latest by November 2019.

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According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document specifies the required characteristics for two types a heat-shrinkable, fluoroelastomer sleeving for use in aircraft electrical systems at operating temperatures between -55 °C and 200 °C.

Type A Thick wall

Type B Thin wall

This sleeving has good flexibility, is flame retarded and has a thick wall for mechanical protection. It is for use in areas subject to prolonged contamination by aircraft fuel and fluids with the exception of phosphate ester-based hydraulic fluids. The standard colour is black.

These sleevings are normally supplied with internal diameters up to 50 mm for shrink ratios of 2:1. They are available in black only.

Sizes other than those specifically listed in this standard may be available. These items shall be considered to comply with this standard if they comply with the property requirements listed in Tables 2, 3 and 4 except for dimensions and mass.

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.

EN 3909, *Aerospace series — Test fluids and test methods for electrical and optical components and sub-assemblies*

EN 4708-001, *Aerospace series — Sleeving, heat-shrinkable, for binding, insulation and identification — Part 001: Technical specification*

EN ISO 846, *Plastics — Evaluation of the action of microorganisms*[1)]

EN ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids* [1)]

IEC 60684-1, *Flexible insulating sleeving — Part 1: Definitions and general requirements* [2)]

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

IEC 60757, *Code for designation of colours* [2)]

1) Published by: International Organization for Standardization (ISO), http://www.iso.org/

2) Published by: International Electrotechnical Commission (IEC), http://www.iec.ch/

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60684-1 apply.

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 Required characteristics

4.1 Dimensions and mass

See Tables 1 and 2.

Table 1 — Type A – Dimensional and mass requirements

Size code	Internal diameter mm		Recovered wall thickness	Mass per unit length max.
	Expanded min.	Recovered max.	mm	g/m
3,2/1,6	3,2	1,6	0,75 ± 0,20	13,8
4,8/2,4	4,8	2,4	0,85 ± 0,20	22,2
6,4/3,2	6,4	3,2	0,90 ± 0,20	29,0
9,5/4,8	9,5	4,8	1,00 ± 0,25	44,1
12,7/6,4	12,7	6,4	1,20 ± 0,30	72,6
19,0/9,5	19,0	9,5	1,45 ± 0,35	125
25,4/12,7	25,4	12,7	1,80 ± 0,45	206
38,0/19,0	38,0	19,0	2,40 ± 0,50	389
51,0/25,4	51,0	25,4	2,80 ± 0,50	580

Table 2 — Type B – Dimensional and mass requirements

Size code	Internal diameter mm		Recovered wall thickness	Mass per unit length max.
	Expanded min.	Recovered max.	mm	g/m
3,2/1,6	3,2	1,6	0,75 ± 0,20	20,5
4,8/2,4	4,8	2,4	0,90 ± 0,20	26,6
6,4/3,2	6,4	3,2	0,90 ± 0,20	32,7
9,5/4,8	9,5	4,8	0,90 ± 0,20	44,8
12,7/6,4	12,7	6,4	0,90 ± 0,20	57,0
19,0/9,5	19,0	9,5	1,10 ± 0,20	97,0
25,4/12,7	25,4	12,7	1,20 ± 0,30	147
38,0/19,0	38,0	19,0	1,40 ± 0,40	259
51,0/25,4	51,0	25,4	1,70 ± 0,450	409
76,2 / 38,1	76,2	38,1	1,70 ± 0,40	600

4.2 Conditions of test

Unless otherwise specified, the sleeving shall be shrunk in a forced air circulation oven for (5 ± 1) min at 200 °C ± 5 °C prior to testing.

4.3 Tests

See Table 3.

Table 3 — Tests *(1 of 3)*

Designation of the test	IEC 60684-2 Clause or Subclause	Requirements	Remarks
Dimensions – internal diameter – wall thickness – concentricity • expanded • recovered	3 3.1.2 3.3.2 3.3.3	 Table 1 and Table 2 Table 1 and Table 2 65 % min. 85 % min.	See Clause 33.
Density	4	Not applicable	See Clause 38.
Heat shock Tensile strength Elongation at break	6 19.1 and 19.2 19.1 and 19.2	 8 MPa min. 150 % min.	Heat at 300 °C ± 5 °C
Longitudinal change	9	± 20	Heat the expanded sleeving at 200 °C ± 5 °C for (5 ± 1) min.
Bending after heating	13	Not applicable	See Clauses 6, 39 and 50.
Bending at low temperature	14	No cracks shall be visible	Condition at – 55 °C ± 3 °C. For strips, the mandrel shall be no more than 20 times the wall thickness. Full section sleeving is tested unfilled and the mandrel shall be no more than 20 times the outer diameter.
Dimensional stability during storage	16	The dimensions shall be as specified in Table 1 and Table 2.	—
Tensile strength Elongation at break	19.1 and 19.2 19.1 and 19.2	8 MPa min. 250 % min.	Use a jaw separation rate of 100 mm/min. Below 6,5 mm diameter test as sleeving, at 6,5 mm diameter and above test as dumb-bells.
Secant modulus at 2 % elongation	19.5	Between 30 MPa and 100 MPa	
Breakdown voltage	21	Table 3	—
Volume resistivity – at ambient temperature – after damp heat	23 23.5.2 23.5.4	 10^{10} Ω·m min. 10^{9} Ω·m min.	—