SLOVENSKI STANDARD
SIST EN 4708-101:2017

01-maj-2017

Aeronavtika - Toplotno skrčljiva cev za utrjevanje, izolacijo in identifikacijo - 101. del: Poliolefinske cevi - Delovne temperature od –55 °C do 135 °C - Standard za proizvod

Aerospace series - Sleeving, heat-shrinkable, for binding, insulation and identification - Part 101: Polyolefin sleeving - Operating temperatures -55 °C to 135 °C - Product standard

Luft- und Raumfahrt - Wärmeschrumpfender Schlauch zur Befestigung, Isolierung und Identifizierung - Teil 101: Polyolefin Schlauch - Temperaturbereich -55 °C bis 135 °C - Produktnorm

Série aérospatiale - Manchons thermorétractables, de jonction, isolement et identification - Partie 101: Gaine polyoléfine - Températures d'utilisation -55 °C à 135 °C - Norme de produit

Ta slovenski standard je istoveten z: EN 4708-101:2017

ICS:

49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems

SIST EN 4708-101:2017 en,fr,de

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 4708-101

March 2017

ICS 49.060

English Version

Aerospace series - Sleeving, heat-shrinkable, for binding, insulation and identification - Part 101: Polyolefin sleeving - Operating temperatures -55 °C to 135 °C - Product standard

Série aérospatiale - Manchons thermorétractables, de jonction, isolement et identification - Partie 101: Gaine polyoléfine - Températures d'utilisation -55 °C à 135 °C - Norme de produit

Luft- und Raumfahrt - Wärmeschrumpfender Schlauch zur Befestigung, Isolierung und Identifizierung - Teil 101: Polyolefin Schlauch - Temperaturbereich -55 °C bis 135 °C - Produktnorm

This European Standard was approved by CEN on 9 January 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 4708-101:2017 E

Contents

Page

European foreword

This document (EN 4708-101:2017) 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 September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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 European Standard specifies the required characteristics for four types of heat-shrinkable polyolefin sleevings for use in aircraft electrical systems at operating temperatures between − 55 °C and 135 °C.

Type A**:** **Very flexible, flame retarded, shrink ratio 2:1**

This sleeving has very good flexibility, is flame retarded and will shrink at low temperatures. It is suitable where sensitive components and delicate wiring need protection from excessive heat during shrinking.

Type B: **Flexible, flame retarded, shrink ratio 2:1, 3:1 and 4:1**

This sleeving is flexible and flame retarded. It is suitable for general purposes and is available with high shrink ratios.

Type C**:** **Flexible, not flame retarded, shrink ratio 2:1 and 3:1**

This sleeving is flexible and not flame retarded and is available in two shrink ratios.

Type D: **Semi-rigid, flame retarded, shrink ratio 2:1**

This sleeving is semi-rigid and flame retarded. It is suitable where strain relief and mechanical support are required

These sleevings are normally supplied with internal diameters up to 102 mm for shrink ratios of 2:1 and 4:1 and up to 39 mm for shrink ratios of 3:1 and in the following colours for type B, black, brown, red, yellow, green, blue, orange, violet, grey, white and green/yellow. Types A and D are black only. Type C is transparent, is not flame retarded and does not meet the flammability requirements of EN 4708-001.

Sizes or colours 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 5, 6 and 7 except for dimensions and mass.

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.

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*

IEC 60684-1:2011, *Specification for flexible insulating sleeving — Part 1: Definitions and general requirements* [1)]

1) Published by: IEC International Electrotechnical Commission. http://www.iec.ch/

IEC 60684-2:2005, *Flexible insulating sleeving — Part 2: Methods of test* [1)]

IEC 60757:1983, *Code for designation of colours* [1)]

ISO 846:1997, *Plastics — Evaluation of the action of micro-organisms*

ISO 1817:2005, *Rubber, vulcanized — Determination of the effect of liquids*

ISO 11075:2007, *Aircraft — De-icing/anti-icing fluids — ISO type I*

ISO 11078:2007, *Aircraft — De-icing/anti-icing fluids — ISO types II, III and IV*

MIL-PRF-87937, *Performance specification: cleaning compound, aerospace equipment* [2)]

AMS 1428:2013, *Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV* [3)]

ASTM D740, *Standard Specification for Methyl Ethyl Ketone* [4)]

3 Terms and definitions

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

4 Required characteristics

4.1 Dimensions and mass

See Tables 1, 2, 3 and 4.

2) Published by: Department of Defense (DoD). http://www.defenselink.mil/

3) Published by: SAE National (US) Society of Automotive Engineers. http://www.sae.org/

4) Published by: ASTM National (US) American Society for Testing and Materials. http://www.astm.org/

Table 1 — Dimensional and mass requirements for Types A, B and C, shrink ratio 2:1

Size code	Internal diameter mm		Recovered wall thickness mm	Mass per unit length g/m max.		
	Expanded min.	Recovered max.		Type A	Type B	Type C
1,2/0,6	1,2	0,6	0,45 ± 0,10	2,8	2,7	2,0
1,6/0,8	1,6	0,8	0,45 ± 0,10	3,3	3,2	2,3
2,4/1,2	2,4	1,2	0,50 ± 0,10	4,7	4,6	3,4
3,2/1,6	3,2	1,6	0,50 ± 0,10	5,8	5,6	4,1
4,8/2,4	4,8	2,4	0,50 ± 0,10	7,8	7,6	5,7
6,4/3,2	6,4	3,2	0,65 ± 0,15	14,0	13,6	10,0
9,5/4,8	9,5	4,8	0,65 ± 0,15	19,6	19,0	14,1
12,7/6,4	12,7	6,4	0,65 ± 0,15	25,0	24,4	18,1
19,0/9,5	19,0	9,5	0,75 ± 0,15	40,1	39,4	29,4
25,4/12,7	25,4	12,7	0,90 ± 0,15	63,0	61,2	45,3
38,0/19,0	38,0	19,0	1,00 ± 0,20	106	103	76,1
51,0/25,4	51,0	25,4	1,15 ± 0,25	164	159	118
76,0/38,0	76,0	38,0	1,25 ± 0,25	259	252	186
102,0/51,0	102,0	51,0	1,40 ± 0,25	380	369	273

Table 2 — Dimensional and mass requirements for Types B and C, shrink ratio 3:1

Size code	Internal diameter mm		Recovered wall thickness mm	Mass per unit length g/m max.	
	Expanded min.	Recovered max.		Type B	Type C
1,5/0,5	1,5	0,5	0,45 ± 0,10	2,5	1,8
3,0/1,0	3,0	1,0	0,55 ± 0,10	4,6	3,4
6,0/2,0	6,0	2,0	0,65 ± 0,10	8,8	6,5
9,0/3,0	9,0	3,0	0,75 ± 0,15	14,9	11,0
12,0/4,0	12,0	4,0	0,75 ± 0,15	18,7	13,9
18,0/6,0	18,0	6,0	0,85 ± 0,20	31,4	23,2
24,0/8,0	24,0	8,0	1,00 ± 0,20	46,8	34,7
39,0/13,0	39,0	13,0	1,10 ± 0,20	82,1	60,8

Table 3 — Dimensional and mass requirements for Type B, shrink ratio 4:1

Size code	Internal diameter mm		Recovered wall thickness mm	Mass per unit length g/m max.
	Expanded min.	Recovered max.		
25,4/6,6	25,4	6,6	1,52 ± 0,20	47,8
38,1/9,5	38,1	9,5	1,52 ± 0,20	67,8
50,4/12,7	50,4	12,7	1,52 ± 0,20	87,9
76,2/19,1	76,2	19,1	1,52 ± 0,20	128
101,6/25,4	101,6	25,4	1,52 ± 0,20	163
Repair sleeves				
25,4/7,0	25,4	7,0	1,14 ± 0,18	47,8
39,0/13,0	39,0	13,0	1,14 ± 0,18	87,9
76,2/20,6	76,2	20,6	1,14 ± 0,18	128
101,6/26,7	101,6	26,7	1,14 ± 0,18	163

Table 4 — Dimensions and mass requirements for Type D, shrink ratio 2:1

Size code	Internal diameter mm		Recovered wall thickness mm	Mass per unit length g/m max.
	Expanded min.	Recovered max.		
3,2/1,6	3,2	1,6	0,80 ± 0,15	4,2
4,8/2,4	4,8	2,4	0,80 ± 0,20	7,4
6,4/3,2	6,4	3,2	0,90 ± 0,30	9,5
9,5/4,8	9,5	4,8	1,00 ± 0,30	16,5
12,7/6,4	12,7	6,4	1,20 ± 0,40	20,9

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 5.