
Aeronavtika - Toplotno skrčljiva cev za utrjevanje, izolacijo in identifikacijo - 107. del: Politetrafluoretilen (PTFE) - Delovna temperatura od -65 °C do 260 °C - Standard za proizvod

Aerospace series - Sleeving, heat-shrinkable, for binding, insulation and identification - Part 107: Polytetrafluoroethylene (PTFE) - Operating temperatures - 65 °C to 260 °C - Product standard

Luft- und Raumfahrt - Wärmeschrumpfender Schlauch zur Befestigung, Isolierung und Identifizierung - Teil 107: Polytetrafluorethylen (PTFE) - Temperaturbereich - 65 °C und 260 °C - Produktnorm

Série aérospatiale - Manchons thermoretractables, de jonction, isolement et identification - Partie 107 : Polytétrafluoroéthylène (PTFE) - Températures d'utilisation - 65 °C à 260 °C - Norme de produit

Ta slovenski standard je istoveten z: EN 4708-107:2019

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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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EUROPEAN STANDARD

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English Version

**Aerospace series - Sleeving, heat-shrinkable, for binding,
insulation and identification - Part 107:
Polytetrafluoroethylene (PTFE) - Operating temperatures -
65 °C to 260 °C - Product standard**

Série aérospatiale - Manchons thermorétractables, de
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Luft- und Raumfahrt - Wärmeschrumpfender Schlauch
zur Befestigung, Isolierung und Identifizierung - Teil
107: Polytetrafluorethylen (PTFE) -
Temperaturbereich -65 °C bis 260 °C - Produktnorm

This European Standard was approved by CEN on 14 July 2019.

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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 4708-107:2019) 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 March 2020, and conflicting national standards shall be withdrawn at the latest by March 2020.

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

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

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EN 4708-107:2019 (E)**1 Scope**

This document specifies the required characteristics for a heat-shrinkable, polytetrafluoroethylene sleeving for use in aircraft electrical systems at operating temperatures between – 65 °C and 260 °C. This sleeving is basically translucent. It is semi-rigid, and suitable for use where resistance to chemicals and high temperature performance are required. It is flame resistant and available in low and high shrink ratios.

Type A Low Shrink Ratio

Type B High Shrink Ratio

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*¹⁾

EN 60684-1, *Flexible insulating sleeving — Part 1: Definitions and general requirements* (IEC 60684-1)

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

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

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

MIL-PRF-87937, *Performance specification: Cleaning compound, aerospace equipment*³⁾

AMS 1476, *Deodorant, aircraft toilet*⁴⁾

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:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

1) Published as ASD-STAN Prestandard at the date of publication of this standard by AeroSpace and Defence industries Association of Europe - Standardization (ASD-STAN), <http://www.asd-stan.org/>

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

3) Published by: Department of Defense (DoD), <http://www.defenselink.mil/>

4) Published by: SAE National (US) Society of Automotive Engineers, <http://www.sae.org/>

4 Required characteristics

4.1 Dimensions and mass

See Table 1 and Table 2.

Table 1 — Dimensional and mass requirements for Type A

Size code	Internal diameter mm		Recovered wall thickness mm	Mass per unit length Nominal g/m
	Expanded min.	Recovered max.		
01	0,85	0,4	0,23 ± 0,08	1,1
02	1,00	0,5	0,25 ± 0,08	1,4
03	1,25	0,7	0,25 ± 0,08	1,62
04	1,40	0,8	0,30 ± 0,08	2,3
05	1,50	1,0	0,30 ± 0,08	2,68
06	1,9	1,3	0,30 ± 0,18	3,19
07	2,35	1,6	0,30 ± 0,18	3,84
08	3,00	2,0	0,30 ± 0,08	4,42
09	3,80	2,3	0,30 ± 0,08	5,31
10	4,85	2,9	0,30 ± 0,08	6,51
11	6,10	3,6	0,38 ± 0,12	10,4
12	7,65	4,6	0,38 ± 0,12	12,87
13	9,4	5,7	0,38 ± 0,12	15,94
14	10,90	7,1	0,38 ± 0,12	19,54
15	11,9	8,9	0,38 ± 0,12	24,14

Table 2 — Dimensional and mass requirements for Type B

Size code	Internal diameter mm		Recovered wall thickness mm	Mass per unit length Nominal g/m
	Expanded min.	Recovered max.		
01	1,95	0,65	0,23 ± 0,08	1,6
02	3,15	0,95	0,25 ± 0,08	2,68
03	6,35	1,60	0,30 ± 0,10	4,09
04	9,50	2,45	0,30 ± 0,10	5,89
05	12,70	3,70	0,38 ± 0,12	10,61
06	15,85	4,55	0,38 ± 0,12	12,87
07	19,00	5,70	0,38 ± 0,12	15,94
08	25,40	7,10	0,38 ± 0,12	19,54
09	31,75	8,85	0,38 ± 0,12	24,14

4.2 Conditions of test iTeh STANDARD PREVIEW

Unless otherwise specified, the sleeving shall be shrunk in a forced air circulation oven for (5 ± 1) min at $330 \text{ °C} \pm 5 \text{ °C}$ prior to testing.

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4.3 Tests

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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 50 % min. 85 % min.	—
Density	4	The relative density of the material shall be initially established and declared during type testing, and shall not deviate from this value by more than $\pm 0,03$ during subsequent production routine testing	—
Heat shock	6	There shall be no signs of dripping, cracking or flowing	Heat at $400\text{ °C} \pm 10\text{ °C}$
Longitudinal change	9	$\pm 20\text{ % max.}$	Heat the expanded sleeving at $350\text{ °C} \pm 5\text{ °C}$ for $(10 \pm 1)\text{ min}$
Bending after heating	13	Not applicable	—
Bending at low temperature	14	No cracks shall be visible	Condition at $-65\text{ °C} \pm 3\text{ °C}$. For strips, the mandrel shall be no more than 10 times the wall thickness. Full section sleeving is tested unfilled and the mandrel shall be no more than 10 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	17 MPa min. 200 % min.	Use a jaw separation rate of 50 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	Not applicable	—