
Aeronavtika - Toplotno skrčljive cevke za povezovanje, izolacijo in prepoznavanje - 201. del: Poliolefinske identifikacijske cevke - Obratovalno temperaturno območje med -55 °C in 135 °C - Standard za proizvod

Aerospace series - Sleeves, heat-shrinkable, for binding, insulation and identification - Part 201: Polyolefin identification sleeves - Operating Temperature range -55 °C to 135 °C - Product standard

Luft- und Raumfahrt - Wärmeschrumpfender Schlauch zur Befestigung, Isolierung und Identifizierung - Teil 201: Kennzeichnungsschlauch aus Polyolefin, Betriebstemperaturbereich -55 °C bis 135 °C - Produktnorm

<https://standards.iteh.ai/catalog/standards/sist/d7d5c56d-c4fb-4755-bdc4-341e017692fa/sist-en-4708-201-2023>

Série aérospatiale - Manchons thermo rétractables, de jonction, isolement et identification - Partie 201 : Identification Manchons Polyoléfine - Températures d'utilisation -55 °C à 13 °C - Norme de produit

Ta slovenski standard je istoveten z: EN 4708-201:2022

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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 - Sleeves, heat-shrinkable, for binding,
insulation and identification - Part 201: Polyolefin
identification sleeves - Operating Temperature range -55
°C to 135 °C - Product standard**

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Identification Manchons Polyoléfine - Températures
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zur Befestigung, Isolierung und Identifizierung - Teil
201: Kennzeichnungsschlauch aus Polyolefin,
Betriebstemperaturbereich -55 °C bis 135 °C -
Produktnorm

This European Standard was approved by CEN on 24 July 2022.

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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.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 4708-201:2022) 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 document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, 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 June 2023, and conflicting national standards shall be withdrawn at the latest by June 2023.

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.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, Türkiye and the United Kingdom.

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EN 4708-201:2022 (E)**1 Scope**

This document specifies the required characteristics for heat-shrinkable polyolefin identification sleeving for use in aircraft electrical systems at operating temperatures between $-55\text{ }^{\circ}\text{C}$ and $135\text{ }^{\circ}\text{C}$.

This specification is for the characterisation of identification sleeves only.

This sleeving is flexible and flame retarded, and is available with 2:1 and 3:1 shrink ratios.

The product is normally supplied with internal diameters up to 57 mm.

The standard colours are white or yellow.

Sizes or colours other than those specifically listed in this standard may be available. These items are considered to comply with this document if they comply with the property requirements listed in tables 3 and 4 except for dimensions and mass.

As the sleeving to be tested is a printed article the complete system is to be recorded as part of the evaluation. The sleeve will only be considered as meeting the requirements of this document if printed with the printer, ribbon, inks, and settings referenced within the test report.

Mark adherence and print permanence are determined in this document using method EN 6059-407.

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 3909:2016, *Aerospace series — Test fluids and test methods for electrical and optical components and sub-assemblies*

EN 4708-001:2019, *Aerospace series — Sleeving, heat-shrinkable, for binding, insulation and identification — Part 001: Technical specification*

EN 6059-407:2019, *Aerospace series — Electrical cables, installation — Protection sleeves — Test methods — Part 407: Mark adherence and print permanence*

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

EN 60684-2:2011, *Flexible insulating sleeving — Part 2: Methods of test*

IEC 60757, *Code for designation of colours*

ISO 846:2019, *Plastics — Evaluation of the action of microorganisms*

ISO 1817:2022, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

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

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

AMS1428, *Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV¹*

¹ Published by SAE International (US) Society of Automotive Engineers (www.sae.org)

ASTM D740-11, Standard Specification for Methyl Ethyl Ketone²

MIL-PRF-87937, CLEANING COMPOUND, AEROSPACE EQUIPMENT³

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

4 Required characteristics

4.1 Dimensions and mass

Table 1 — Dimensional and mass requirements — 2:1 product

Size code	Internal diameter		Recovered wall thickness mm	Mass per unit length g/m max.
	Expanded min.	Recovered max.		
2,4/1,2	2,4	1,2	0,51 ± 0,08	4,8
3,2/1,6	3,2	1,6	0,51 ± 0,08	6,1
4,8/2,4	4,8	2,4	0,51 ± 0,08	8,2
6,4/3,2	6,4	3,12	0,64 ± 0,08	13,5
9,5/4,8	9,5	4,8	0,64 ± 0,08	19,5
12,7/6,4	12,7	6,4	0,64 ± 0,08	25,0
19,0/9,5	19,0	9,5	0,76 ± 0,08	43,0
38,1/19,0	38,1	19,0	0,51 ± 0,08	57,0
50,8/25,4	50,8	25,4	0,64 ± 0,08	97,0

² Published by ASTM International American Society for Testing and Materials (www.astm.org)

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

Table 2 — Dimensional and mass requirements — 3:1 product

Size code	Internal diameter		Recovered wall thickness	Mass per unit length g/m
	mm			
	Expanded min.	Recovered max.	mm	max.
2,4/0,8	2,4	0,8	$0,58 \pm 0,08$	4,5
3,2/1,1	3,2	1,1	$0,58 \pm 0,08$	5,5
4,8/1,6	4,8	1,6	$0,58 \pm 0,08$	7,0
6,4/2,1	6,4	2,1	$0,58 \pm 0,08$	8,6
9,6/3,2	9,5	3,2	$0,61 \pm 0,08$	12,5
12,7/4,2	12,7	4,2	$0,61 \pm 0,08$	15,9
19,0/6,4	19,0	6,4	$0,61 \pm 0,08$	26,0
25,4/8,4	25,4	8,4	$0,64 \pm 0,08$	33,0
57,2/19,0	57,2	19,0	$0,76 \pm 0,08$	86,0

4.2 Conditions of test

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

The sleeving shall be tested as a printed article the complete system is to be recorded as part of the evaluation. The sleeve will only be considered as meeting the requirements of this specification if printed with the printer, ribbon, inks, and settings referenced within the test report and recorded upon the approval certificate. All test specimens shall have a series of alphanumeric characters along 75% of the test specimen on one surface in the sizes listed in Table 3.

Table 3 — Ident character sizes for Qualification Testing

Tube Size Supplied Inside Diameter.	Text Size Printed	Typical Printed Text	Text Size Fully Recovered
mm (inches)	mm (inches)		mm (inches)
3,20 (0,126)	14pt ≈ 3,55 (0,140)	ABC	≈ 2,50 (0,100)
4,80 (0,189)	14pt ≈ 4,00 (0,160)	ABC	≈ 2,50 (0,100)
6,40 (0,252)	24pt ≈ 6,00 (0,240)	ABC	≈ 3,80 (0,150)
7,90 (0,312)	28pt ≈ 7,10 (0,280)	ABC	≈ 4,00 (0,160)
9,50 (0,375)	36pt ≈ 9,10 (0,360)	ABC	≈ 5,60 (0,220)
12,70 (0,500)	48pt ≈ 12,20 (0,480)	ABC	≈ 6,10 (0,240)
19,10 (0,750)	72pt ≈ 18,47 (0,720)	ABC	≈ 8,12 (0,320)
25,40 (1,000)	72pt ≈ 18,47 (0,720)	ABC	≈ 8,12 (0,320)

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4.3 Tests

Table 4 — Tests

EN 60684-2:2011 Clause or subclause	Designation of the test	Requirements	Remarks
3 3.1.2 3.3.2 3.3.3	Dimensions — internal diameter — wall thickness — concentricity — expanded — recovered	Tables 1 & 2 Tables 1 & 2 65 % min 85 % min	—
—	Initial mark adherence	Mark adherence 20 rubs, 1 kg, method A	EN 6059-407:2019, method A
6 13	Heat shock	Bend test Print permance 20 rubs, 1kg, method B	Heat at 200 °C ± 5 °C for 4 h EN 6059-407:2019, method B
9	Longitudinal change	± 20 %	Heat the expanded sleeving at 200 °C ± 5 °C for (5 ± 1) min
14	Bending at low temperature	No cracks shall be visible	Condition at – 55 °C ± 3 °C For strips, the mandrel shall be between 20 and 22 times the wall thickness. Full section sleeving is tested unfilled, and the mandrel shall be between 20 and 22 times the outer diameter.
16	Dimensional stability during storage	The dimensions shall be as specified in Table 1	2 weeks at 40 °C