



SLOVENSKI STANDARD SIST EN 4708-001:2019

01-september-2019

Nadomešča:

SIST EN 4708-001:2014

**Aeronavtika - Toplotno skrčljiva cev za utrjevanje, izolacijo in identifikacijo - 001.
del: Tehnična specifikacija**

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

Luft- und Raumfahrt - Wärmeschrumpfender Schlauch zur Befestigung, Isolierung und Identifizierung - Teil 001: Technische Lieferbedingungen

Série aérospatiale - Manchons thermorétractables, de jonction, isolement et identification - Partie 001 : Spécification technique

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Ta slovenski standard je istoveten z: EN 4708-001:2019

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

SIST EN 4708-001:2019

en,fr,de

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EUROPEAN STANDARD

EN 4708-001

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2019

ICS 49.060

Supersedes EN 4708-001:2014

English Version

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

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This European Standard was approved by CEN on 8 July 2018.

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.

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

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European foreword

This document (EN 4708-001:2019) 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 December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.

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.

This document supersedes EN 4708-001:2014.

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, 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 4708-001:2019 (E)**1 Scope**

This document specifies the required characteristics, test methods, qualification and production routine testing of Heat shrinkable sleeving for binding, insulation and identification.

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 3475-100, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General*

EN 6059-403, *Aerospace series — Electrical cables, installation — Protection sleeves — Test methods — Part 403: Scrape abrasion*

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

EN ISO 846, *Plastics — Evaluation of the action of microorganisms*

EN ISO 4892-2, *Aerospace series — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

IEC 60304, *Standard colours for insulation for low-frequency cables and wires* ¹⁾

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 3475-100 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 Materials and characteristics

Sleeving shall be made from materials that ensure the finished sleeveings conform to the product standard.

4.1 Material types

See product standards.

4.2 Finish

The sleeving, both before and after unrestricted shrinkage, shall be free from bubbles, pinholes, creases and other defects that may affect performance.

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

4.3 Dimensions

See product standard.

4.4 Shrink ratio

See product standard.

4.5 Temperature range

See product standard.

4.6 Shelf life

The use by date is the shelf life when stored under the conditions recommended in Annex A.

The use by date shall be the guaranteed minimum storage time for which the sleeving retains the “as supplied” internal diameter. Following unrestricted shrinkage in accordance with the product standard, the sleeving shall conform to the internal diameter and wall thickness requirements as specified in the product standard.

In the event that the shelf life specimens fail the requirements of the product standard, delivery of any product still held by the manufacturer or distributors shall be halted until samples of each batch in storage are tested to confirm that they satisfy the original recovery qualification requirements, after which release can be resumed. In the event of failure the Approval Authority is to be notified.

4.7 Colours

See product standards for available colours. The colours shall be a reasonable match to one of those specified in IEC 60304.

4.8 Standard cutting tolerances for cut lengths of sleeving

See Table 1.

Table 1 — Standard cutting tolerances for cut lengths of sleeving

Cut length mm	Standard cutting tolerances
0 to 9,9	± 0,5
10 to 24,9	± 1,0
25 to 49,9	± 1,5
50 to 100	± 3,0
101 to 150	± 4,0
151 to 250	± 5,0
251 to 1 200	± 12,0
1 201 and over	± 1 %

EN 4708-001:2019 (E)**5 Required properties**

The properties of the sleeveings, tested according to the methods described hereafter shall comply with the values given in the product standards.

6 Test methods

For each product standard, tests shall be as given in Table 2.

6.1 Shelf life tests

Sufficient quantities of each of the sleeves used for qualification shall be retained to provide the test samples for the conducting of the shelf life test for 60 months. Shorter if specified in the product standard Tests shall be conducted at 12 monthly intervals. The sleeves shall be stored at a temperature of (23 ± 3) °C and a relative humidity between 45 % and 75 %. Measure the as supplied internal diameter and then fully recover the sleeves in accordance with the product standard. Measure the recovered internal diameter and wall thickness. The measurements shall be made in accordance with IEC 60684-2, Clause 3.

6.2 Scrape abrasion**6.2.1 Apparatus**

Shall be in accordance with EN 6059-403 except that the test mandrels shall be a smooth metal mandrel.

6.2.2 Preparation of specimens (standards.iteh.ai)

Two (2) sleeves 200 mm in length shall be recovered onto test mandrels of diameter as follows:

Specimen A: 10 % greater than the minimum internal diameter of the fully recovered sleeving as specified in the product standard.

Specimen B: 10 % smaller than the maximum internal diameter of the as supplied sleeving as specified in the product standard.

6.2.3 Method

The test shall be conducted at ambient temperature with the size and load as specified in the product standard.

The test shall be conducted without the electrical contact between the needle and the test mandrel. Each cycle shall consist of the forward and backward movement of needle. The action should continue until the needle rubs through the sleeve making contact with the mandrel or the number of cycles exceeds 10 times the required average number of cycles specified in the product standard. The number of cycles shall be recorded.

Four (4) tests shall be carried out on each specimen whereby for each test the specimen is moved forward approximately 30 mm and rotated through 90 degrees.

Calculate the arithmetic mean of the eight (8) measurements from the two (2) specimens. Recalculate the arithmetic mean by ignoring all the values greater than the original mean. This shall be recorded as the result.

6.2.4 Requirement

A specimens shall withstand $\geq 1\ 000$ cycles and B specimens shall withstand ≥ 250 cycles.

Table 2 — Tests: methods, frequency, requirements (1 of 2)

Description	Test method IEC 60684-2 Clause	Qualification 8.1	Periodic 8.3	Routine		Requirements
				Compound	Sleeving	
Test conditions	2	X	X	X	X	-
Measurements of bore, wall thickness and concentricity	3	X	X	X	X	Product standard
Density ^a	4	X	X	X	-	Product standard
Heat shock (resistance to heat)	6	X	X	X	-	Product standard
Longitudinal change	9	X	X	X	X	Product standard
Bending after heating	13	X	X	-	-	Product standard
Bending at low temperature	14	X	X	-	-	Product standard
Dimensional stability on storage	16	X	X	-	-	Product standard
Tensile strength, tensile stress at 100 % elongation, elongation at break and secant modulus at 2 % elongation	19	X	X	X	-	Product standard
Breakdown voltage	21	X	X	X	-	Product standard
Volume resistivity	23	X	X	-	-	Product standard
Flame propagation tests ^a	26	X	X	-	-	Product standard
Oxygen index ^a	27	X	X	-	-	Product standard
Transparency ^b	28	X	X	-	-	Product standard
Corrosion resistance (tensile and elongation)	32	X	X	-	-	Product standard
Copper corrosion (presence of corrosive volatiles) ^a	33	X	X	-	-	Product standard
Colour fastness to light ^{a c}	34	X	X	-	-	Product standard
Resistance to selected fluids ^a	36	X	X	-	-	Product standard
Thermal endurance ^a	37	X	-	-	-	Product standard
Mass per unit length	38	X	X	-	X	Product standard
Heat ageing	39	X	X	-	-	Product standard
Water absorption ^a	40	X	X	-	-	Product standard
Restricted shrinkage	41	X	X	-	-	Product standard
Colour stability to heat ^c	42	X	X	-	-	Product standard
Smoke index ^a	43	X	X	-	-	Product standard
Toxicity index ^a	44	X	X	-	-	Product standard
Halogen content ^a	45	X	X	-	-	Product standard