



SLOVENSKI STANDARD

SIST EN 3719:2018

01-november-2018

Nadomešča:
SIST EN 3719:2010

Aeronavtika - Vodniki za električne kable iz aluminija in aluminijevih zlitin - Standard za proizvod

Aerospace series - Aluminium or aluminium alloy conductors for electrical cables - Product standard

Luft- und Raumfahrt - Leiter aus Aluminium oder Aluminiumlegierung für elektrische Leitungen - Produktnorm

STANDARD PREVIEW
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Série aérospatiale - Conducteurs en aluminium ou en alliage d'aluminium pour câbles électriques - Norme de produit

<https://standards.iteh.ai/catalog/standards/sist/88c1bdf0-f8ab-4f16-9b0c-366c48f7f1aa/sist-en-3719-2018>

Ta slovenski standard je istoveten z: EN 3719:2018

ICS:

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

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en,fr,de

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EUROPEAN STANDARD

EN 3719

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2018

ICS 49.060

Supersedes EN 3719:2010

English Version

Aerospace series - Aluminium or aluminium alloy conductors for electrical cables - Product standard

Série aérospatiale - Conducteurs en aluminium ou en
alliage d'aluminium pour câbles électriques - Norme de
produit

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Produktnorm

This European Standard was approved by CEN on 17 December 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: Rue de la Science 23, B-1040 Brussels

Contents		Page
European foreword		3
1	Scope.....	4
2	Normative references.....	4
3	Terms, definitions and symbols.....	4
4	Conductor materials and construction	4
5	Required characteristics	6
6	Test methods	7
7	Quality assurance.....	8
8	Designation	8
9	Marking, packaging and delivery lengths	8

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European foreword

This document (EN 3719:2018) 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 February 2019, and conflicting national standards shall be withdrawn at the latest by February 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 3719:2010.

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.

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EN 3719:2018 (E)

1 Scope

This European Standard specifies the dimensions, linear resistance, mechanical characteristics, construction and mass of conductors in aluminium or aluminium alloy for electrical cables for aerospace applications.

It applies to stranded conductors with nominal cross-sections of 5 mm² to 107 mm² inclusive.

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 573-3, *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Part 3: Chemical composition and form of products*

EN 1715-2, *Aluminium and aluminium alloys — Drawing stock — Part 2: Specific requirements for electrical applications*

EN 3475-100, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General*¹⁾

EN 9133, *Aerospace series — Quality Management Systems — Qualification Procedure for Aerospace Standard Products*

3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions and symbols 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 Conductor materials and construction

4.1 Materials

The conductors in accordance with this standard shall consist of individual annealed aluminium alloy EN AW-1110 [Al 99,1], (see EN 573-3 and EN 1715-2) or aluminium alloy strands with the following composition defined in Table 1.

Table 1 — Chemical composition of aluminium alloy

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	V	B	Others		Al
											singly	together	
min.	–	0,50	–	–	0,08	–	–	–	–	–	–	–	99,1
max.	0,10	0,80	0,035	0,01	0,25	0,007	0,05	0,02	0,007	0,015	0,03	0,10	–

1) As well as all parts quoted in this standard.

4.2 Material for individual strands and code

The individual strands may be:

- aluminium alloy un-plated (code A);
- aluminium alloy with tin plating (code B);
- aluminium alloy with silver plating (code C);
- aluminium alloy with nickel plating (code D).

Plating thickness shall be at least 1,0 µm for silver and 1,0 µm for nickel.

When tin plating is authorized, the thickness shall be sufficient to comply with the tests specified in EN 3475-506 and EN 3475-507.

4.3 Aluminium or aluminium alloy

The maximum resistivity shall be: $3,0 \times 10^{-8} \Omega \cdot m$.²⁾

The elongation at rupture for each individual strand shall be $\geq 10 \%$.

The tensile strength of each individual strand shall be at least 105 MPa (105 N/mm²).

4.4 Construction of conductors

4.4.1 Lay length

Up to 9 mm² cross-section inclusive (code 090), concentric conductors are used. The lay for the strands of a concentric conductor, checked over the outside layer of a test piece 1 m long, shall be between 8 times and 16 times the maximum diameter of this conductor.

For sectional areas between 14 mm² and 107 mm² (codes 140 to 107), the conductor comprises concentric or bunched conductors twisted together. The lay of the strands for the basic concentric or bunched conductors shall not exceed 30 times the diameter of the concentric or bunched conductor in question.

The lay for concentric (or bunched) conductors, measured over the outer layer of the conductor, shall be between 8 times and 16 times the maximum conductor diameter.

In all cases the lay of the outer layer shall be left-hand.

4.4.2 Joints

The distance between two (2) joints in individual strands shall exceed 3 m, measured between different strands. Only butt joints shall be used.

2) Or $30 \Omega \cdot m^2/km$.

EN 3719:2018 (E)

4.4.3 Compaction

Plated aluminium alloy:

Compaction of the conductor, causing deformation of the strands with damage to the plating, is not permitted for aluminium alloy using plating (codes B, C or D) (see 4.2).

Un-plated aluminium alloy:

Compaction of the conductor is permitted except if causing deformation of the strands or surface damage for aluminium alloy (code A) (see 4.2).

A minimum compaction rate of 95 % is acceptable.

NOTE The minimum compaction rate (%) is defined by: the diameter of the compacted conductor by the diameter of the un-compacted conductor (x 100).

5 Required characteristics

See Table 2 or Table 3.

Table 2 — Conductor constructions with strand \varnothing 0,51 mm

Cross-section Code	Nominal cross-section mm ²	Number of strands	Nominal diameter of strands mm	Diameter of conductor mm		Resistance at 20 °C ^{a, b} Ω/km max.	Mass kg/km max. ^b	AWG ^c	Number of missing single strands
				min.	max.				
050	5	27	0,51	2,70	3,10	5,80	15,4	10	0
090	9	41	0,51	3,50	3,90	3,80	25,4	8	0
140	14	7 × 10	0,51	4,70	5,20	2,20	45,0	6	0
220	22	7 × 15	0,51	5,80	6,40	1,50	67,6	4	0
280	28	7 × 19	0,51	6,50	7,10	1,18	77,0	3	0
340	34	7 × 24	0,51	7,40	8,00	0,94	108,1	2	2
420	42	7 × 30	0,51	8,30	8,90	0,75	135,3	1	2
530	53	19 × 14	0,51	9,70	10,30	0,60	171,3	0	3
680	68	19 × 18	0,51	11,10	11,70	0,43	220,3	00	3
850	85	19 × 22	0,51	12,40	13,00	0,36	269,2	000	4
107	107	27 × 20	0,51						
		or							
		Layer 1: 7 × 15	0,51						
107	107	Layer 2: 12 × 15	0,51	14,10	14,80	0,29	347,5	0000	5
		Layer 3: 15 × 14	0,51						
		+ 3 × 15	0,51						

^a For other temperatures this may be calculated using the formula shown in EN 3475-301.

^b Not taking into consideration metal platings, assuming that their effect is minimal.

^c AWG = closest American Wire Gauge.

Table 3 — Conductor constructions with strand \varnothing 0,37 mm

Cross-section code	Nominal cross-section mm ²	Number of strands	Conductor construction	Nominal diameter of strands mm	Diameter of conductor mm		Resistance at 20 °C ^{a b} Ω/km max.	Mass kg/km max. ^b	AWG ^c	Number of missing single strands
					min.	max.				
140	14,30	133	19x7	0,37	4,70	5,20	2,20	45,00	6	0
220	22,50	209	19x11	0,37	5,80	6,40	1,50	67,60	4	0
280	28,60	266	19x14	0,37	6,50	7,10	1,18	77,00	3	0
340	34,70	323	19x17	0,37	7,40	8,00	0,94	108,10	2	2
420	42,90	399	19x21	0,37	8,30	8,90	0,75	135,30	1	2
530	55,20	513	19x27	0,37	9,70	10,30	0,60	171,30	0	3
680	73,50	684	19x36	0,37	11,10	11,70	0,43	220,30	00	3
850	89,90	836	19x44	0,37	12,40	13,00	0,36	269,20	000	4

a For other temperatures this may be calculated using the formula shown in EN 3475-301.

b Not taking into consideration metal platings, assuming that their effect is minimal.

c AWG = closest American Wire Gauge.

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6 Test methods

According to EN 3475-100.

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See Table 4.

Table 4 — Test methods

EN 3475-	Designation of the test	Details
201	Visual examination	Applicable
202	Mass	Applicable, see Table 2 or 3.
203	Dimensions	Applicable, see Table 2 or 3 and 4.1.
301	Electrical resistance per unit length	Applicable, see Table 2 or 3.
418	Conductor thermal endurance	Not applicable Applicable only on finished product according to cable product standard.
505	Tensile test on conductors and strands	Applicable, see 4.3.
506	Plating continuity	Applicable to codes B, C and D
507	Adherence of plating	Applicable to codes B, C and D
508	Plating thickness	Applicable to codes B, C and D, see 4.2.
509	Solderability	Applicable to codes B and C