BS EN 3719:2010

BSI Standards Publication

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

National foreword

This British Standard is the UK implementation of EN 3719:2010. It supersedes BS EN 3719:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/6, Aerospace avionic electrical and fibre optic technology.

A list of organizations represented on this committee can be obtained on request to its secretary.

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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

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

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EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 3719:2010) 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of an identical text or by endorsement, at the latest by January 2011, and conflicting national standards shall be withdrawn at the latest by January 2011.

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1 Scope

This 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 mm^2 to 107 mm^2 inclusive.

2 Normative references

The following referenced documents are indispensable for the application 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 3475-100:2010 [1)], *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General*

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

3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions and symbols given in EN 3475-100:2010 apply.

4 Conductor materials and construction

4.1 Materials

The conductors in accordance with this standard shall consist of individual annealed aluminium (EC grade 99,7 % AL) or aluminium alloy strands with the following composition defined in Table 1.

Table 1

%	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	–

4.2 Material for individual strands and code

The individual strands may be:

— pure aluminium (code E);

— aluminium alloy (code A);

— aluminium alloy with tin plating (code B);

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

— 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 ≥ 10 %.

The tensile strength of each individual strand shall be at least 105 MPa (105 N/mm^2).

4.4 Construction of conductors

4.4.1 Lay length

Up to 9 mm^2 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 eight times and 16 times the maximum diameter of this conductor.

For sectional areas between 14 mm^2 and 107 mm^2 (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 eight 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 conductors shall be free from any joints. Each strand comprising the conductors may, however, include soldered or brazed joints. For strands with a diameter of 0,25 mm or greater, butt joints shall be used.

The distance between two joints in individual strands shall exceed 3 m, measured between different strands.

4.4.3 Compaction

Compaction of the conductor, causing deformation of the strands with damage to the plating, is not permitted.

5 Required characteristics

See Table 2.

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

Table 2

Code	Nominal cross-section	Number of strands	Nominal diameter of strands	Diameter of conductor		Resistance at 20 °C [a] [b]	Mass	AWG [c]	Number of missing single strands
				mm		Ω/km	max. [b]		
	mm^2		mm	min.	max.	max.	kg/km		
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	4,75	5,25	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 Gage.

6 Test methods

According to EN 3475-100.

See Table 3.

Table 3

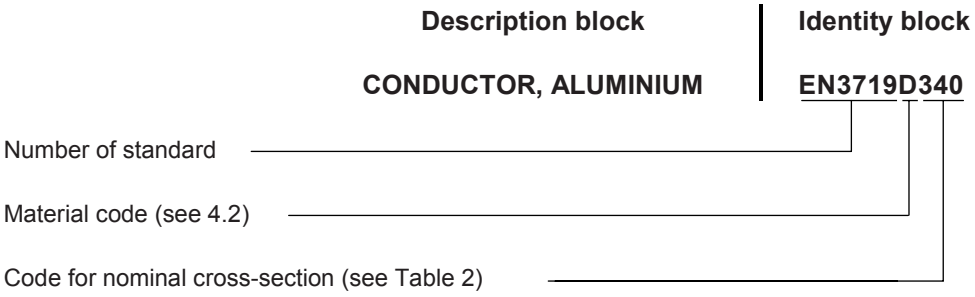
EN 3475-	Designation of the test	Details
201	Visual examination	Applicable
202	Mass	Applicable; see Table 2.
203	Dimensions	Applicable; see Table 2 and 4.1.
301	Electrical resistance per unit length	Applicable; see Table 2.
418	Conductor thermal endurance	Not applicable Applicable only on finished product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

7 Quality assurance

See EN 9133.

8 Designation

EXAMPLE



NOTE If necessary, the code I9005 shall be placed between the description block and the identity block.

9 Marking, packaging and delivery lengths

On delivery the identification reference shall be completed by the length, date and inspection mark.

The conductors shall be delivered on spools or reels.

They shall be wound in a regular and uniform manner and require an appropriate protection, not affecting the product delivered.

Each unit delivered may contain one or several lengths as specified by the purchaser.

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389 Chiswick High Road London W4 4AL UK

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Fax +44 (0)20 8996 7001
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