SLOVENSKI STANDARD
SIST EN 4681-001:2020

01-februar-2020

Nadomešča:
SIST EN 4681-001:2017

Aeronavtika - Kabli, električni, za splošne namene, z vodniki iz aluminija ali pobakrenega aluminija - 001. del: Tehnična specifikacija

Aerospace series - Cables, electric, general purpose, with conductors in aluminium or copper-clad aluminium - Part 001: Technical Specification

Luft- und Raumfahrt - Elektrische Leitungen, zur allgemeinen Verwendung, mit Leitern aus kupferbeschichtetem Aluminium - Teil 001: Technische Lieferbedingungen

Série aérospatiale - Câbles électriques, d'usage général, avec conducteurs en aluminium ou en aluminium chemisé cuivre - Partie 001 : Spécification technique

Ta slovenski standard je istoveten z: **EN 4681-001:2019**

ICS:

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

SIST EN 4681-001:2020 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 4681-001

December 2019

ICS 49.060

Supersedes EN 4681-001:2017

English Version

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This European Standard was approved by CEN on 13 October 2019.

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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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 4681-001:2019) 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 document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2020, and conflicting national standards shall be withdrawn at the latest by June 2020.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.

This document supersedes EN 4681-001:2017.

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.

1 Scope

This document specifies the characteristics, test methods, qualification and acceptance conditions of single and multicore electric cables for general purpose with conductors in aluminium or copper-clad aluminium, intended for installation in aircraft electrical systems.

The insulation of these cables is designed to withstand aircraft voltages at a frequency not exceeding 2 000 Hz. Unless specified by individual product standards the maximum demonstrated voltage of rating of these cables is ac 115 V rms phase to neutral and 200 V rms phase to phase and 28 Vdc.

They are divided into types, the characteristics of which are given in the product standards. Unless otherwise specified in the product standard, the tests defined in this standard apply.

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 (all parts), *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General*

EN 3719, *Aerospace series — Aluminium or aluminium alloy conductors for electrical cables — Product standard*

EN 3838, *Aerospace series — Requirements and tests on user-applied markings on aircraft electrical cables*

EN 4651, *Aerospace series — Copper-clad aluminium alloy conductors for electrical cables — Product standard*

EN 4681-002, *Aerospace series — Cables, electric, general purpose, with conductors in aluminium or copper-clad aluminium — Part 002: General*

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

ISO 2574, *Aircraft — Electrical cables — Identification marking*

TR 4648, *Aerospace series — Cable, electrical — Re-qualification following changes in design, material or manufacturing process* [1)]

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

3 Terms and definitions

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

4 Materials and construction of cables

4.1 Conductors

They shall conform to EN 4651 or EN 3719 unless otherwise specified.

4.2 Finished cables

The insulation material shall present a uniform circular cross-section throughout the length of the cable.

Covering over the insulation shall be treated and applied in such a manner that the cables present a smooth appearance and are able to accept marking.

All materials used shall have no corrosive effect upon the conductors and shall not be susceptible to attack by mould or other micro-organisms.

5 Required characteristics

The characteristics of the cables, tested according to the methods described hereafter shall comply with the values given in the product standard.

6 Tests methods

See Table 1 for single core cables and Table 2 for multicore cables without jackets.

Table 1 — Tests: methods, application, requirements — Single core cables *(1 of 4)*

§ No.	Tests							Requirements (and/or particulars)
	Description	EN 3475- (and/or particulars)	Qualification [a] (7.1)	First article (7.1.4)	Each delivery		Periodic every three years (7.2.4)	
					On all cables (7.2.1 and 7.2.2)	Prior to delivery (7.2.1 and 7.2.3)		
6	Test conditions	100	X	X	X	X	X	—
6.1	Visual examination	201	3	X	X			Marking: according to Clause 8
6.2	Mass	202	3	X		X		Minimum length: 0,5 m
6.3	Dimensions (all) — outer diameter	203	3	X	X	X		Conductor: according to concerned EN standard, unless otherwise specified Product standard
6.4	Electrical resistance per unit length	301	3	X		X		Product standard
6.5	Voltage proof test: — immersion test; — dry test; — or dry impulse test.	302 Alternative to dry test	3	X	X	X		2,5 kV rms 5 kV rms 8 kV peak voltage
6.6	Insulation resistance — at (20 ± 2) °C — at (95 ± 2) °C	303	3	X		X	X	For a length of 1 km: 1 500 MΩ min. 15 MΩ min.
6.7	Surface resistance	304	3					Minimum: 1 250 MΩ mm
6.8	Overload resistance	305 T_1 and T_2: product standard	3				X	Applicable to cable of 0,6 mm² only
6.9	Continuity of conductors	306	1	X	X			—
6.10	Corona extinction voltage	307	X	X		X		Applicable for cables rated above 200 V rms
6.11	Accelerated ageing	401 Mandrel diameter and test load: Table 4 Temperature: product standard	3	X			X	Include UV laser marked specimen for qualification
6.12	Shrinkage and delamination	402 Temperature: product standard	3	X		X		Product standard
6.13	Delamination and blocking	403 Mandrel diameter: Table 4 Temperature: product standard	3	X		X		—
6.14	Thermal shock	404 Temperature: product standard	3			X		Product standard

Table 1 — Tests: methods, application, requirements — Single core cables *(2 of 4)*

§ No.	Tests							Requirements (and/or particulars)
	Description	EN 3475- (and/or particulars)	Qualification [a] (7.1)	First article (7.1.4)	Each delivery		Periodic every three years (7.2.4)	
					On all cables (7.2.1 and 7.2.2)	Prior to delivery (7.2.1 and 7.2.3)		
6.15	Bending at ambient temperature	405 Mandrel diameter: Table 4	3					Include UV laser marked specimen for qualification
6.16	Cold bend test	406 Mandrel diameter and test load: Table 4	3				X	—
6.17	Flammability	407	3				X	Product standard
6.18	Fire resistance	408						Not applicable
6.19	Air-excluded ageing	409 Temperature and time: product standard						Not applicable (unless included in the product standard)
6.20	Thermal endurance	410	X					Product standard Applicable to cable of 0,6 mm² only
6.21	Resistance to fluids	411 Per fluid tested	1				X	Applicable to cable of 0,6 mm² which has been UV laser marked
6.22	Humidity resistance	412 Method B: temperature and time: product standard	3				X	Method A or B as requested in product standard
6.23	Wrap back test	413	3	X		X	X	Applicable to cables ≤ 5 mm²
6.24	Differential scanning calorimeter (DSC test)	414	3	X			X	—
6.25	Rapid change of temperature	415						Not applicable
6.26	Thermal stability	416						Not applicable
6.27	Fire resistance inside harness	417						Not applicable
6.28	Conductor thermal endurance	418	X					Size 006 unless specified in the product standard
6.29	Dynamic cut-through	501 (for insulation wall thickness ≤ 0,38 mm)	3	X			X	Product standard [arithmetic mean value of eight (8) tests per specimen]. Applicable to cables ≤ 14 mm²
6.30	Notch propagation	502 Cut depth: product standard	3	X			X	—
6.31	Scrape abrasion	503 Load: product standard	3	X			X	Requirements to be considered at 20 °C unless otherwise specified