SLOVENSKI STANDARD
SIST EN 4612-005:2019

01-november-2019

Nadomešča:
SIST EN 4612-005:2012

Aeronavtika - Kabli, električni, za splošne namene, eno- in večžilni - Družina XLETFE - Oplaščeni ali zaslonjeni in oplaščeni - 005. del: Pocinjeni baker - Obratovalne temperature med –65 °C in 135 °C - Dvojno ekstrudirana izolacija za zunanjo uporabo, s plaščem brez zaslona - Potiskljiva z UV-laserjem - Standard za proizvod

Aerospace series - Cables, electrical, for general purpose, single and multicore assembly XLETFE Family jacketed or screened and jacketed - Part 005: Tin plated copper - Operating temperatures, between - 65 °C and 135 °C - Dual extruded wall for open applications, with jacket without screen - UV laser printable - Product standard

Luft- und Raumfahrt - Ein- und mehradrige elektrische Leitungen zur allgemeinen Verwendung, XLETFE Familie, ummantelt oder geschirmt und ummantelt - Teil 005: Kupfer verzinnt, Betriebstemperaturen zwischen -65°C und 135°C, doppelt extrudierte Isolierung für offene Anwendungen, ummantelt ohne Schirm, UV-Laser bedruckbar - Produktnorm

Série aérospatiale - Câbles, électriques, d'usage général, mono et multiconducteurs - Famille XLETFE - Gainés ou blindés et gainés - Partie 005 : Cuivre étamé - Températures de fonctionnement comprises entre –65 °C et 135 °C - Fil double isolé pour applications externes, gainé non blindé - Marquable au laser UV - Norme de produit

Ta slovenski standard je istoveten z: **EN 4612-005:2019**

ICS:

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

SIST EN 4612-005:2019 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 4612-005

August 2019

ICS 49.060

Supersedes EN 4612-005:2011

English Version

Aerospace series - Cables, electrical, for general purpose, single and multicore assembly - XLETFE Family - Jacketed or screened and jacketed - Part 005: Tin plated copper - Operating temperatures, between - 65 °C and 135 °C - Dual extruded wall for open applications, with jacket without screen - UV laser printable - Product standard

Série aérospatiale - Câbles, électriques, d'usage général, mono et multiconducteurs - Famille XLETFE - Gainés ou blindés et gainés - Partie 005 : Cuivre étamé - Températures de fonctionnement comprises entre - 65 °C et 135 °C - Fil double isolé pour applications externes, gainé non blindé - Marquable au laser UV - Norme de produit

Luft- und Raumfahrt - Ein- und mehradrige elektrische Leitungen zur allgemeinen Verwendung - XLETFE-Familie - Ummantelt oder geschirmt und ummantelt - Teil 005: Kupfer verzinnt - Betriebstemperaturen zwischen -65 °C und 135 °C - doppelt extrudierte Isolierung für offene Anwendungen, ummantelt ohne Schirm - UV-Laser bedruckbar - Produktnorm

This European Standard was approved by CEN on 5 May 2019.

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, 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 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

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European foreword

This document (EN 4612-005:2019) 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 February 2020, and conflicting national standards shall be withdrawn at the latest by February 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 4612-005:2011.

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 and the United Kingdom.

1 Scope

This document specifies the characteristics of UV laser printable jacket, tin plated copper conductor, electrical cables, Crosslinked Ethylene Tetra Fluoro Ethylene co-polymer XLETFE family for use in the on-board electrical systems of aircraft at operating temperatures between – 65 °C and 135 °C operating at voltages not exceeding 600 V rms at sea level. This insulation system has been used in aerospace applications using 115 V (phase-to-neutral) 400 Hz ac and 28 Vdc. Verification of the suitability of cables for use in other electrical systems is the responsibility of the user.

These cables are suitable for airframe use without additional protection. In case of conflict between this standard and other referenced documents the requirements of this standard shall take precedence.

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 2235, *Aerospace series — Single and multicore electrical cables, screened and jacketed — Technical specification*

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

EN 4611-004, *Aerospace series — Cables, electrical, for general purpose, single and multicore assembly — XLETFE Family — Part 004: Tin plated copper — Operating temperatures, between – 65 °C and 135 °C — Dual extruded wall for open applications — UV laser printable — Product standard*

EN 4612-002, *Aerospace series — Cables electrical, for general purpose, single and multicore assembly — XLETFE Family — Jacketed or screened and jacketed — Part 002: General*

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 Materials and construction

4.1 Materials

These cables shall consist of the following:

- cores according to EN 4611-004;
- number of cores 2 (two) to 4 (four).

Cores be twisted together according to EN 2235.

Filler cores shall not be permitted.

Outer jacket:

- it shall be possible to mark the jacket by UV laser printing;
- minimum thickness shall be 0,15 mm.

4.2 Construction

See Table 1.

Table 1 — Multicore without screen, with jacket

Size	AWG [a]	2 (two) cores			3 (three) cores			4 (four) cores		
		Dia. max. mm	**Mass** max. kg/km	**DC Res.** max. Ω/km	**Dia.** max. mm	**Mass** max. kg/km	**DC Res.** max. Ω/km	**Dia.** max. mm	**Mass** max. kg/km	**DC Res.** max.. Ω/km
004	22	2,92	11,65	61,8	3,12	16,70	61,8	3,45	21,74	61,8
006	20	3,40	18,44	34,2	3,64	25,44	34,2	4,03	33,35	34,2
010	18	3,88	24,54	21,7	4,16	35,77	21,7	4,61	47,01	21,7
012	16	4,16	31,11	16,3	4,46	45,30	16,3	4,99	59,68	16,3
020	14	5,34	46,86	11,2	5,73	68,65	11,2	6,36	90,44	11,2
030	12	6,36	69,86	7,0	6,83	102,83	7,0	7,60	135,81	7,0
050	10	7,68	106,11	4,3	8,26	156,81	4,3	9,20	207,50	4,3

[a] AWG = Closest American Wire Gauge.

4.3 Colour coding of cores

See EN 4612-002.

5 Required characteristics

According to EN 2235 and EN 3475-100.

See Table 2.

Table 2 — Tests *(1 of 3)*

EN 3475-	Designation of the test	Details
201	Visual examination	Applicable
202	Mass	Applicable, see Table 1.
203	Dimensions	Applicable, see Table 1.
301	Ohmic resistance per unit length	Applicable, see Table 1.
302	Voltage proof test	Not applicable
303	Insulation resistance	Not applicable
304	Surface resistance	Not applicable
305	Overload resistance	Not applicable
401	Accelerated ageing	Applicable Temperature (200 ± 3) °C
402	Shrinkage and delamination	Applicable Temperature (150 ± 5) °C Maximum shrinkage at each end of cable: Jacket: — 2 mm on sizes 001 to 010, — 3 mm on sizes 012 to 030. Cores: — 0,80 mm on sizes 001 to 006, — 1,00 mm on sizes 010 to 012, — 1,20 mm on sizes 020 to 030.
403	Delamination and blocking	Applicable Temperature (150 ± 5) °C
404	Thermal shock	Applicable Temperatures (– 65 ± 3) °C and (135 ± 3) °C Maximum shrinkage at each end of cable: Jacket: — 2 mm on sizes 001 to 010, — 3 mm on sizes 012 to 030. Cores: — 0,80 mm on sizes 001 to 006, — 1,00 mm on sizes 010 to 012, — 1,20 mm on sizes 020 to 030.
405	Bending at ambient temperature	Applicable
406	Cold bend test	Applicable Temperature (– 65 ± 2) °C

Table 2 — Tests *(2 of 3)*

EN 3475-	Designation of the test	Details
407	Flammability	Applicable – Methods 1 and 2 Flame applied for 15 s Extinguishing time: 3 s max.
408	Fire resistance	Not applicable
409	Air-excluded ageing	Not applicable
410	Thermal endurance	Not applicable
411	Resistance to fluids	Applicable Volume swell not greater than 10 % Scrape not applicable
412	Humidity resistance	Applicable Method B Temperature (90 ± 2) °C Duration 672 h
413	Wrap back test	Applicable
414	Differential scanning calorimeter (DSC test)	Not applicable
501	Dynamic cut-through	Not applicable
502	Notch propagation	Not applicable
503	Scrape abrasion	Not applicable
504	Torsion	Not applicable
505	Tensile test on conductors and strands	Not applicable
506	Plating continuity	Not applicable
507	Adherence of plating	Not applicable
508	Plating thickness	Not applicable
509	Solderability	Not applicable
510	Tensile strength and elongation of extruded insulation, sheath and jacket material	Applicable Eb 75 % minimum TS 35 MPa minimum
511	Cable-to-cable abrasion	Not applicable
512	Flexure endurance	Applicable code 006 Mandrel Ø 15 mm Weight 0,75 kg – 750 cycles
601	Smoke density	Not applicable
602	Toxicity	Not applicable
603	Resistance to wet arc tracking	Not applicable
604	Resistance to dry arc propagation	Not applicable
605	Wet short circuit test	Not applicable