SLOVENSKI STANDARD
SIST EN 2346-005:2014

01-februar-2014

Aeronavtika - Električni ognjevzdržni kabli - Delovne temperature med -65 °C in 260 °C - 005. del: Družina DW, snop enožilnih in večžilnih kablov z možnostjo UV-laserskega tiskanja - Lahki kabli - Standard za proizvod

Aerospace series - Cable, electrical, fire resistant - Operating temperatures between - 65 °C and 260 °C - Part 005: DW family, single UV laser printable and multicore assembly - Light weight - Product standard

Luft- und Raumfahrt - Feuerbeständige elektrische Leitungen - Betriebstemperaturen zwischen - 65 °C und 260 °C - Teil 005: DW-Familie, ein-und mehradrige Leitungen UV-laser bedruckbar - Gewichtsoptimiert - Produktnorm

Série aérospatiale - Câbles électriques résistant au feu - Températures de fonctionnement comprises entre - 65 °C et 260 °C - Partie 005: Famille DW, fil simple marquable au laser UV et éléments assemblés - Version allégée - Norme de produit

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This European Standard was approved by CEN on 28 September 2013.

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

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Foreword

This document (EN 2346-005:2013) 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of an identical text or by endorsement, at the latest by June 2014, and conflicting national standards shall be withdrawn at the latest by June 2014.

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1 Scope

This European Standard specifies the characteristics of light weight fire proof, unscreened, electrical cables for use in the on-board electrical systems of aircraft at operating temperature between – 65 °C and 260 °C.

This cable has not been demonstrated to be arc resistance at a.c.voltages above 200 V rms (network 115/200 V rms).

Single core is UV Laser printable in accordance with EN 3838; UV laser markability is not mandatory for multicore cables.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2234, *Aerospace series — Cable, electrical, fire resistant — Technical specification*

EN 2346-002, *Aerospace series — Cable, electrical, fire resistant — Operating temperatures between – 65 °C and 260 °C — Part 002: General*

EN 3475 (all parts), *Aerospace series — Cables, electrical, aircraft use — Test methods*

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

EN 4608-001, *Aerospace series — Cable, electrical, fire resistant — Single and multicore assembly, screened and jacketed — Operating temperatures between – 65 °C and 260 °C — Part 001: Technical specification*

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

IEC 28:1925, *International standard of resistance for copper*

3 Terms and definitions

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

4 Materials and construction

4.1 Materials

4.1.1 Conductors

Individual strands used for the conductors shall be cylindrical and shall be:

— of nickel clad copper alloy for nominal cross sections of 0,4 mm^2 (004) and 0,25 mm^2 (002),

— of nickel clad copper for nominal cross sections ≥ 0,6 mm^2 (006).

The copper shall meet the requirements of IEC 28 and the copper alloy the requirements of EN 2234.

4.1.2 Insulation

The insulation shall comply with the requirements of the present standard and Subclause 4.2 of EN 2234.

4.2 Construction

See Table 1.

Table 1

No. of core	Code number	Nominal cross section mm²	AWG [a]	Number of strands	Nominal diameter of strands mm	Conductive resistance at 20 °C max. Ohm/km	Conductor diameter max. mm	External diameter min. mm	External diameter max. mm	Mass max. g/m	Number of missing strands
1	002	0,25	24	19	0,12	131,00	0,62	1,53	1,68	5,00	0
	004	0,4	22	19	0,15	80,90	0,80	1,59	1,8	6,66	0
	006	0,6	20	19	0,20	44,30	1,04	1,89	2,11	10,61	0
	010	1,0	18	19	0,25	27,90	1,29	2,34	2,54	16,45	0
	012	1,2	16	19	0,30	18,80	1,53	2,50	2,70	20,35	0
	020	2,0	14	37	0,25	13,90	1,82	2,95	3,25	28,02	0
	030	3,0	12	37	0,32	8,9	2,28	3,48	3,80	42,31	0
2	002	0,25	24	19	0,12	133,6	0,62		3,36	10,30	0
	004	0,4	22	19	0,15	82,5	0,80		3,60	13,72	0
	006	0,6	20	19	0,20	45,2	1,04		4,22	21,86	0
	010	1,0	18	19	0,25	28,5	1,29	—	5,08	33,89	0
	012	1,2	16	19	0,30	19,2	1,53		5,40	41,92	0
	020	2,0	14	37	0,25	14,2	1,82		6,50	57,72	0
	030	3,0	12	37	0,32	9,1	2,28		7,60	87,16	0
3	002	0,25	24	19	0,12	133,6	0,62		3,61	15,45	0
	004	0,4	22	19	0,15	82,5	0,80		3,87	20,58	0
	006	0,6	20	19	0,20	45,2	1,04		4,54	32,79	0
	010	1,0	18	19	0,25	28,5	1,29	—	5,46	50,83	0
	012	1,2	16	19	0,30	19,2	1,53		5,81	62,88	0
	020	2,0	14	37	0,25	14,2	1,82		6,99	86,58	0
	030	3,0	12	37	0,32	9,1	2,28		8,17	130,74	0

[a] Closest American Wire Gage.

4.3 Colour code

See EN 2346-002.

4.4 Number of cores

See EN 2346-002.

See EN 4608-001 Subclause 4.2.1 for assembly.

5 Required characteristics

See EN 2234 and Table 2.

— Operating temperature: 260 °C max. continuous.

— Operating voltage: 600 V AC.

— Use frequency: 2 000 Hz max.

6 Tests

See Table 2 and Table 3.

Table 2 — Tests *(1 of 3)*

EN 3475-	Designation of the test	Remarks
201	Visual examination	Applicable. NOTE For qualification laser marked samples are also to be tested.
202	Mass	Applicable Table 1.
203	Dimensions	Applicable Table 1.
301	Ohmic resistance per unit length	Applicable Table 1.
302	Voltage proof test – Immersion test	Applicable EN 2234.
302	Voltage proof test – Dry spark test	Applicable EN 2234.
303	Insulation resistance	Applicable EN 2234.
304	Surface resistance	Applicable EN 2234.
305	Overload resistance	Applicable to code 006 EN 2234. T1 = (310 ± 5) °C. T2 = (450 ± 5) °C.
306	Continuity of conductors	Applicable.
401	Accelerated ageing	Applicable EN 2234. Temperature: (310 ± 5) °C. NOTE For qualification laser marked samples are also to be tested.

Table 2 — Tests *(2 of 3)*

EN 3475-	Designation of the test	Remarks
402	Shrinkage and delamination	Applicable. Temperature: (310 ± 5) °C. Maximum shrinkage at each end of cable: 1,5 mm for all gauges
403	Delamination and blocking	Applicable EN 2234. Temperature: (310 ± 5) °C.
404	Thermal shock	Applicable EN 2234. Temperature: 260 °C. Maximum shrinkage at each end of cable: 1,5 mm for all gauges
405	Bending at ambient temperature	Applicable EN 2234. NOTE For qualification laser marked samples are also to be tested.
406	Cold bend test	Applicable EN 2234. Temperature: (– 65 ± 2) °C.
407	Flammability – Method 1	Applicable EN 2234. Extinction time: 3 s.
408	Fire resistance	Applicable. 15 min. Insulation resistance: 10 000 ohms. Load 170 g for 002 and 004, 340 g for ≥ 006.
409	Air-excluded ageing	Not applicable.
410	Thermal endurance	Applicable EN 2234, 40 000 h, 260 °C.
411	Resistance to fluids	Applicable EN 2234. NOTE For qualification laser marked samples are also to be tested.
412	Humidity resistance	Not applicable.
413	Wrap back test	Applicable.
414	Differential scanning calorimeter (DSC test)	Applicable (only if PTFE in the construction)
415	Rapid change of temperature	Not applicable.
416	Thermal stability	Not applicable.
417	Fire resistance of cables confined inside a harness	Applicable
501	Dynamic cut-through	Applicable to codes 002 to 030 included. Temperature 20 °C and 260 °C, 1 h. See Table 3.
502	Notch propagation	Applicable to codes 002 to 030 included. Depth notch: 0,25 mm.