



# SLOVENSKI STANDARD SIST EN 2713-011:2009

01-junij-2009

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Aerospace series - Cables, electrical, single and multicore for general purpose -  
Operating temperatures between - 55 °C and 200 °C - Part 011: Silver plated copper  
screened (spiral) and jacketed, UV laser printable - Product standard

**STANDARD PREVIEW**

Luft- und Raumfahrt - Leitungen, elektrisch, ein- und mehradrig, für allgemeine  
Verwendung - Betriebstemperaturen zwischen - 55 °C und 200 °C - Teil 011:  
Versilbertes Kupfer, geschirmt (Umseilung) und ummantelt, UV-Laser-bedruckbar -  
Produktnorm

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Série aérospatiale - Câbles, électriques, mono et multiconducteurs d'usage général -  
Températures de fonctionnement comprises entre - 55 °C et 200 °C - Partie 011 : Cuivre  
argenté, blindés (guipés) et gainés, marquables au laser UV - Norme de produit

**Ta slovenski standard je istoveten z: EN 2713-011:2006**

**ICS:**

49.060 Š^cē \ æā Ą^• [ |b \ æ Aerospace electric  
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**SIST EN 2713-011:2009 en,de**

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EUROPEAN STANDARD

EN 2713-011

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2006

ICS 49.060

English Version

**Aerospace series - Cables, electrical, single and multicore for  
general purpose - Operating temperatures between - 55 °C and  
200 °C - Part 011: Silver plated copper screened (spiral) and  
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marquables au laser UV - Norme de produit

Luft- und Raumfahrt - Leitungen, elektrisch, ein- und  
mehradrig, für allgemeine Verwendung -  
Betriebstemperaturen zwischen - 55 °C und 200 °C - Teil  
011: Versilbertes Kupfer, geschirmt (Umseilung) und  
ummantelt, UV Laser bedruckbar - Produktnorm

This European Standard was approved by CEN on 6 January 2006.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

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## Foreword

This European Standard (EN 2713-011:2006) has been prepared by the AeroSpace and Defense 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 2007, and conflicting national standards shall be withdrawn at the latest by January 2007.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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**EN 2713-011:2006 (E)****1 Scope**

This standard specifies the characteristics of UV laser printable, single and multicore silver plated copper screened (spiral) and jacketed electrical cables for use in the on-board electrical systems of aircraft, at operating temperatures between – 55 °C and 200 °C.

It shall also be possible to mark these cables by hot stamp printing or ink jet printing. These markings shall be in accordance with EN 3838.

**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 2083, *Aerospace series — Copper and copper alloy conductors for electrical cables — Product standard*

EN 2235, *Aerospace series — Cables, electrical, single and multicore, screened and jacketed — Technical specification*

EN 2266-003, *Aerospace series — Cables, electrical, for general purpose — Operating temperatures between – 55 °C and 200 °C — Part 003: Ink jet printable — Product standard<sup>1)</sup>*

EN 2713-002, *Aerospace series — Cables, electrical, single and multicore for general purpose — Operating temperatures between – 55 °C and 200 °C — Part 002: Screened and jacketed — General*

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

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

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

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**3 Definitions and symbols**

See EN 3475-100.

**4 Materials and construction****4.1 Materials**

These cables shall consist of the following:

- cores according to EN 2266-003, top coat dispersion fluorocarbon;
- number of cores 1 to 4.

2 to 4-core cables shall be twisted together according to EN 2235.  
Filler cores shall not be permitted.

Screen:

- silver-plated copper stranded spiral screen;
- for dimensions of strands, see Table 1;
- material according to EN 2083, tests according to EN 3475-100;
- construction according to EN 2235.

Outer jacket:

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1) In preparation at the date of publication of this standard.

- layer of polyimide with total wall thickness (nominal value) of 30 µm, coated on both sides with a layer 2,5 µm thick of fluorocarbon;
- direction of winding immaterial — overlap min. 51 %;
- top coat of dispersion fluorocarbon, wall thickness 15 µm min. including the necessary additives for the acceptance of user-applied UV laser marking.

## 4.2 Construction

See EN 2083 and Table 1.

Table 1

Number of cores	Code for nominal section	Nominal section mm <sup>2</sup>	AWG <sup>a</sup>	Linear resistance	Screen strands nominal diameter mm	External diameter	Mass kg/km max.
				at 20 °C Ω/km max.		mm max.	
1	001	0,15	26	160,00	0,08	1,22	4,15
	002	0,25	24	114,00	0,08	1,32	5,15
	004	0,4	22	60,00	0,08	1,48	6,70
	006	0,6	20	33,20	0,08	1,74	10,00
	010	1	18	21,10	0,08	1,98	13,85
	012	1,2	16	14,50	0,10	2,28	19,45
	020	2	14	10,90	0,10	2,53	24,70
	030	3	12	6,80	0,10	3,00	36,80
	051	5	10	4,10	0,10	3,64	57,00
2	001	0,15	26	165,00	0,08	2,05	7,40
	002	0,25	24	117,00	0,08	2,26	9,20
	004	0,4	22	61,70	0,08	2,57	12,35
	006	0,6	20	34,10	0,10	3,14	19,80
	010	1	18	21,70	0,10	3,63	27,60
	012	1,2	16	14,90	0,12	4,17	38,30
	020	2	14	11,20	0,12	4,67	49,80
	030	3	12	6,80	0,15	5,06	72,70
3	001	0,15	26	165,00	0,08	2,18	10,20
	002	0,25	24	117,00	0,08	2,40	12,60
	004	0,4	22	61,70	0,08	2,74	17,20
	006	0,6	20	34,10	0,10	3,35	27,70
	010	1	18	21,70	0,10	3,87	39,00
	012	1,2	16	14,90	0,12	4,46	54,70
	020	2	14	11,20	0,15	5,06	72,70
	030	3	12	6,80	0,15	5,06	72,70
4	001	0,15	26	165,00	0,08	2,39	13,10
	002	0,25	24	117,00	0,08	2,64	16,50
	004	0,4	22	61,70	0,10	3,07	23,70
	006	0,6	20	34,10	0,10	3,70	36,40
	010	1	18	21,70	0,12	4,31	52,90
	012	1,2	16	14,90	0,12	4,94	71,40

<sup>a</sup> AWG = Closest American Wire Gauge.

## 4.3 Colour coding of cores and jacket

See EN 2713-002.

## EN 2713-011:2006 (E)

## 5 Required characteristics

According to EN 2235 and EN 3475-100.

See Table 2.

Table 2

EN 3475-	Test	Details
201	Visual examination	Applicable
202	Mass	Applicable; see Table 1
203	Dimensions	Applicable; see Table 1
301	Electrical resistance per unit length	Applicable; see Table 1
302	Voltage proof test	Applicable
303	Insulation resistance	Applicable
304	Surface resistance	Applicable
305	Overload resistance	Not applicable
306	Continuity of conductors	Applicable
401	Accelerated ageing	Applicable Temperature (250 ± 5) °C
402	Shrinkage and delamination	Applicable Temperature (250 ± 5) °C Maximum shrinkage at each end of cable: — jacket 2 mm, — core insulation, see EN 2266-003
403	Delamination and blocking	Applicable Temperature (250 ± 5) °C
404	Thermal shock	Applicable Temperature (250 ± 5) °C Maximum shrinkage at each end of cable: — jacket 2 mm, — core insulation, see EN 2266-003
405	Bending at ambient temperature	Applicable
406	Cold bend test	Applicable
407	Flammability	Applicable 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
412	Humidity resistance	Applicable
501	Dynamic cut-through	Not applicable
502	Notch propagation	Applicable Notch depth: 40 µm
503	Scrape abrasion	Applicable Test force on needle for cables 0,15 mm <sup>2</sup> to 0,60 mm <sup>2</sup> = 5 N 1,00 mm <sup>2</sup> to 1,20 mm <sup>2</sup> = 7 N 2,00 mm <sup>2</sup> to 5,00 mm <sup>2</sup> = 9 N
504	Torsion	Not applicable



Table 2 (concluded)

EN 3475-	Test	Details
505	Tensile test on concentric conductors and strands	Applicable
506	Plating continuity	Applicable
507	Adherence of plating	Applicable
508	Plating thickness	Applicable
509	Solderability	Applicable
511	Cable to cable abrasion	Not applicable
512	Flexure endurance	Not applicable
601	Smoke density	Applicable
602	Toxicity	Applicable
603	Resistance to wet arc tracking and electric arc propagation	Not applicable
604	Resistance to dry arc tracking and electric arc propagation	Not applicable
605	Wet short circuit	Not applicable
701	Strippability and adherence of insulation to the conductor	Applicable
702	Braid screen pushback capability	Not applicable
703	Permanence of manufacturer's marking	Applicable
704	Flexibility	Not applicable

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**6 Quality assurance**

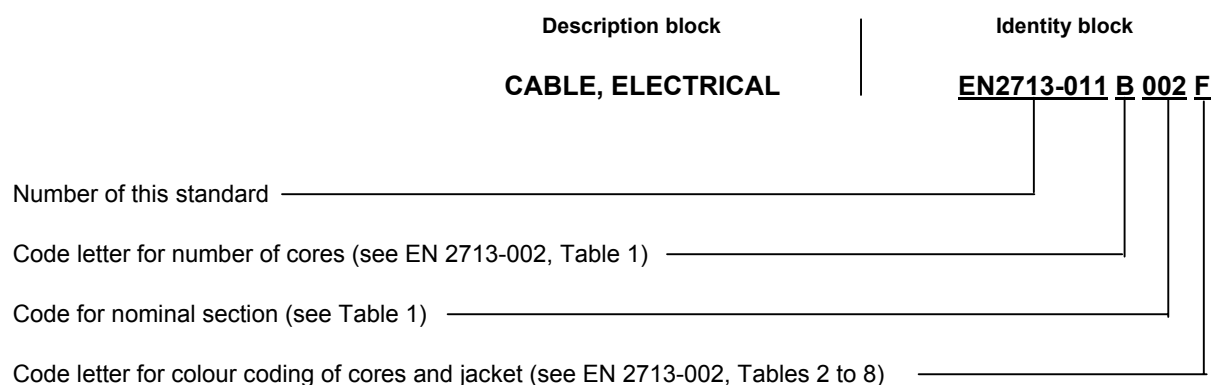
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See EN 9133

**7 Designation**

EXAMPLE



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