

# SLOVENSKI STANDARD

## SIST EN 2267-010:2017

01-oktober-2017

Nadomešča:

SIST EN 2267-010:2014

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**Aeronavtika - Električni kabli za splošno uporabo - Delovne temperature med  $-55^{\circ}\text{C}$  in  $260^{\circ}\text{C}$  - 010. del: Družina DR, enožilni kabli z možnostjo UV-laserskega tiskanja - Standard za proizvod**

Aerospace series - Cables, electrical, for general purpose - Operating temperatures between  $-55^{\circ}\text{C}$  and  $260^{\circ}\text{C}$  - Part 010: DR family, single UV laser printable - Product standard

**iTeh STANDARD PREVIEW**

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Luft- und Raumfahrt - Leitungen, elektrisch, für allgemeine Verwendung - Betriebstemperaturen zwischen  $-55^{\circ}\text{C}$  und  $260^{\circ}\text{C}$  - Teil 010: DR-Familie Einadrige Leitungen UV-Laser bedruckbar - Produktnorm

<https://standards.iteh.ai/catalog/standards/sist/d6f22b57-69f9-41e1-962b-5e5b2eafa3dd/sist-en-2267-010-2017>

Série aérospatiale - Câbles, électriques, d'usage général - Températures de fonctionnement comprises entre  $-55^{\circ}\text{C}$  et  $260^{\circ}\text{C}$  - Partie 010: Famille DR, fil simple marquable au laser UV - Norme de produit

**Ta slovenski standard je istoveten z: EN 2267-010:2017**

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**ICS:**

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

**SIST EN 2267-010:2017**

**en,fr,de**

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EUROPEAN STANDARD

EN 2267-010

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2017

ICS 49.060

Supersedes EN 2267-010:2013

English Version

**Aerospace series - Cables, electrical, for general purpose -  
Operating temperatures between -55 °C and 260 °C - Part  
010: DR family, single UV laser printable - Product  
standard**

Série aérospatiale - Câbles, électriques, d'usage général  
- Températures de fonctionnement comprises entre -  
55 °C et 260 °C - Partie 010: Famille DR, fil simple  
marquable au laser UV - Norme de produit

Luft- und Raumfahrt - Leitungen, elektrisch, für  
allgemeine Verwendung - Betriebstemperaturen  
zwischen -55 °C und 260 °C - Teil 010: DR-Familie  
Einadrige Leitungen UV-Laser bedruckbar -  
Produktnorm

This European Standard was approved by CEN on 20 February 2017.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, 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: Avenue Marnix 17, B-1000 Brussels**

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## European foreword

This document (EN 2267-010:2017) 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 European 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 2018, and conflicting national standards shall be withdrawn at the latest by February 2018.

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 2267-010:2013.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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**EN 2267-010:2017 (E)****1 Scope**

This European Standard specifies the characteristics of UV laser printable electrical lightweight wires DR family for use in the on-board 115 V (phase to neutral) or 200 V (phase to phase) AC electrical systems of aircraft at operating temperatures between – 65 °C and 260 °C. These cables are demonstrated to be arc resistant in sizes AWG 26 to 14 (115/200 V AC).

In addition, these cables may be suitable for use at 230/400 V AC in pressurised zones only when installed to take account of possible short circuit effects.

It shall also be possible to mark these cables by qualified compatible marking. These markings shall satisfy the requirements of EN 3838.

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

EN 2084, *Aerospace series — Cables, electrical, general purpose, with conductors in copper or copper alloy — Technical specification*

EN 2267-002, *Aerospace series — Cables, electrical, for general purpose — Operating temperatures between – 55 °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 4434, *Aerospace series — Copper or copper alloy lightweight conductors for electrical cables — Product standard (Normal and tight tolerances)*

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

TR 6058, *Aerospace series — Cable code identification list*<sup>1)</sup>

**3 Terms, definitions, symbols and abbreviations**

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

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

## 4 Materials and construction

### 4.1 Materials

#### Conductor:

These cable conductors shall be made of copper or copper alloy and nickel plated according to EN 4434 code D.

#### Insulation:

For all sizes codes shall be defined to satisfy all required characteristics of Clause 5.

For single core, it shall be possible to mark the outer layer of the insulation by UV laser printing.

### 4.2 Construction

See EN 4434 and Table 1.

Table 1

Code for nominal section	Nominal section mm <sup>2</sup>	AWG <sup>a</sup>	Linear resistance at 20 °C Ω/km max.	External diameter mm		Mass kg/km max.
				min.	max.	
001	0,15	26	160,0	0,75	0,84	2,08
002	0,25	24	114,0	0,85	0,96	2,72
004	0,4	22	60,0	1,00	1,10	4,14
006	0,6	20	33,2	1,22	1,34	6,85
010	1	18	21,1	1,46	1,61	10,43
012	1,2	16	14,5	1,76	1,92	14,61
020	2	14	10,9	2,04	2,24	19,78
030	3	12	6,8	2,50	2,70	31,33
051	5	10	4,1	3,13	3,33	49,85
090	9	8	2,3	4,10	4,40	90,00
140	14	6	1,58	5,30	5,70	135,00
220	22	4	0,97	6,71	7,41	222,00
340	34	2	0,61	8,28	9,16	347,00

<sup>a</sup> AWG = closest American Wire Gage.

### 4.3 Number of cores

See EN 2267-002.

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## 4.4 Colour coding of cores

See EN 2267-002.

## 5 Required characteristics

According to EN 2084 and EN 3475-100.

See Table 2.

Table 2 (1 of 4)

EN 3475-	Designation of the test	Details
201	Visual examination	Applicable including laser marked specimen
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	Applicable
303	Insulation resistance	Applicable
304	Surface resistance	Applicable
305	Overload resistance	Applicable $T_1 = (310 \pm 5) ^\circ\text{C}$ ; $T_2 = (450 \pm 5) ^\circ\text{C}$
306	Continuity of conductors	Applicable
307	Corona extinction voltage	Not applicable
401	Accelerated ageing	Applicable including laser marked specimen Temperature $(310 \pm 5) ^\circ\text{C}$
402	Shrinkage and delamination	Applicable Temperature $(290 \pm 5) ^\circ\text{C}$ Maximum shrinkage at each end of cable: — 0,15 mm <sup>2</sup> to 0,60 mm <sup>2</sup> : 0,80 mm; — 1,00 mm <sup>2</sup> to 1,20 mm <sup>2</sup> : 1,00 mm; — 2,00 mm <sup>2</sup> to 5,00 mm <sup>2</sup> : 1,20 mm; — 9,00 mm <sup>2</sup> : 1,50 mm; — 14,00 mm <sup>2</sup> : 2,00 mm.
403	Delamination and blocking	Applicable Temperature $(310 \pm 5) ^\circ\text{C}$
404	Thermal shock	Applicable Temperature $(260 \pm 5) ^\circ\text{C}$ and $(-65 \pm 2) ^\circ\text{C}$ Maximum shrinkage at each end of cable: — 0,15 mm <sup>2</sup> to 0,60 mm <sup>2</sup> : 0,80 mm; — 1,00 mm <sup>2</sup> to 1,20 mm <sup>2</sup> : 1,00 mm; — 2,00 mm <sup>2</sup> to 5,00 mm <sup>2</sup> : 1,20 mm; — 9,00 mm <sup>2</sup> : 1,50 mm; — 14,00 mm <sup>2</sup> : 2,00 mm.



Table 2 (2 of 4)

EN 3475-	Designation of the test	Details
405	Bending at ambient temperature	Applicable including laser marked specimen
406	Cold bend test	Applicable Temperature ( $-65 \pm 2$ ) °C
407	Flammability	Applicable Extinguishing time: 3 s max.
408	Fire resistance	Not applicable
409	Air-excluded ageing	Not applicable
410	Thermal endurance	Applicable 10 000 h at 260 °C with curve extrapolation 100 000 h at 200 °C with curve reading
411	Resistance to fluids	Applicable including laser marked specimens
412	Humidity resistance	Applicable Method B - Temperature ( $95 \pm 5$ ) °C Duration 360 h
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
501	Dynamic cut-through	Applicable Temperatures ( $20 \pm 3$ ) °C and ( $260 \pm 5$ ) °C

Nominal section mm <sup>2</sup>	Cut-through force	
	20 °C N	260 °C N
0,15	70	15
0,25	85	30
0,40	110	45
0,60	140	55
1,00	140	70
1,20	150	85
2,00	150	95
3,00	165	105
5,00	180	120
9,00	195	135
14,00	210	150