SLOVENSKI STANDARD

SIST EN 2853:2006

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Aeronavtika ï Standardni tokovi za elektriļ ne kable z vodnikom EN 2083

Aerospace series - Current ratings for electrical cables with conductor EN 2083

Luft- und Raumfahrt - Strombelastbarkeit von elektrischen Leitungen mit Leiter nach EN 2083

Série aérospatiale - Intensités admissibles dans les câbles électriques a conducteur EN 2083

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Aerospace series - Current ratings for electrical cables with conductor EN 2083

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Contents

Page

Foreword

This European Standard (EN 2853:2005) has been prepared by the European Association of Aerospace Manufacturers - Standardization (AECMA-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 AECMA, 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of an identical text or by endorsement, at the latest by April 2006, and conflicting national standards shall be withdrawn at the latest by April 2006.

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1 Scope

1.1 This standard specifies current rating data for cables produced with conductors as defined in EN 2083.

1.2 Electrical ratings for continuous and short term conditions are tabulated such that the requirements of EN 3197 are satisfied.

1.3 A procedure for establishing cable current ratings is given in Annex B of this specification.

1.4 The basis for determining current of cables has been to employ a 40 °C rise as the electrical contribution to operating temperature. Note is made in this standard that, in practice, the voltage drop requirements of EN 2282 will often dictate lower current densities. Additionally, reference to appropriate aerospace series standards for cable terminations and connectors will show constraints which may dictate cable size.

1.5 It is stressed that the current ratings given in this document relate solely to copper and copper alloy conductors as defined in EN 2083. The values are based upon historical evidence and are subject to the caveat given in 4.1. Accordingly the acceptance of data without verification in any particular case is a matter of discretion by both the aircraft design and certification authorities.

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 or copper alloy conductors for electrical cables — Product standard.*

EN 2282, *Aerospace series — Characteristics of aircraft electrical supplies.*

EN 3197, *Aerospace Series — Installation of aircraft electrical and optical interconnection systems.* [1)]

EN 3475-100, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General.*

1) Published as AECMA Prestandard at the date of publication of this standard.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 3475-100, EN 3197 and the following apply.

3.1
Tu
the unpowered conductor temperature of a cable when in an operating environment

3.2
Tr
the maximum rated temperature of a cable. Operation at or below this temperature by any combination of electrical heating and ambient condition shall not be prejudicial to design life

3.3
duty cycle rating
the load current which may be passed through a cable for the duration stated without causing the specified value of Tr to be exceeded

4 Rationale

4.1 It is recognized that the determination of precise current ratings for every cable construction and size can be shown to be a complex matter. Factors such as the thermal conductivity and thickness of insulation, test methods and the criteria employed will all have some effect. The intent of this standard is that the data presented should be sufficiently accurate to permit good engineering judgement to be exercised in the context of EN 3197. However, to enable verification of precise cable rating as noted in Clause 1, a preferred method of measurement is given in Annex B of this standard.

4.2 Cable current ratings are provided, primarily to facilitate selection of the appropriate size to carry a given load. These ratings are also employed to assist, but not solely to determine, the setting of electrical protection levels. Historically some agencies have specified ‘short term current ratings’ in cable specifications and such data represented current values and durations which were deemed to be just below the overload damage point. Implicitly these were fault conditions and were to be experienced on only rare occasions. In this standard this approach has been changed and the short term ratings given herein are those which may be employed within a duty cycle, without prejudice to installed life. As noted in Clause 1, cable rating has been determined as that current which will cause conductor temperature to rise by 40 °C and therefore this same value has been employed for short term ratings.

4.3 Annex A of this specification provides supplementary notes to the foregoing clauses.

5 Tabulated data

5.1 Current ratings

See Table 1.

Table 1 — Current ratings for aircraft cable with copper conductors

Code	Size AWG	Duty cycle ratings A			Continuous ratings [a] A
		2 s	10 s	1 min	
001 [b]	26 [b]	13,0	6,7	4,8	4,8
002 [b]	24 [b]	19,5	9,5	6,5	6,5
004	22	23,0	12,0	8,5	8,5
006	20	39,0	20,0	11,5	11,5
010	18	58,0	30,0	16,0	15,0
012	16	81,5	41,0	21,5	19,5
020	14	105	53,0	28,0	24,0
030	12	160	82,0	43,5	35,0
050	10	245	125	52,8	43,0
090	8	420	215	94,5	68,0
140	6	587	300	135	85,0
220	4	890	450	202	115
340	2	1340	690	325	166
530	0	2015	1020	460	216

[a] Take care of compatibility between load current of cables and that employed for terminations and circuit breakers.

[b] Copper alloy conductors.

NOTE 1 The Duty cycle ratings and the continuous ratings are current values which may be employed without detriment to normal life. They have been determined from cables rates at a Tr of 135 °C which have been heated by electrical loading from a Tu of 95 °C. These 40 °C temperature rise data are for single cables in free air but are generally applicable as noted in 1 and 4 and Annex A of this specification.

NOTE 2 Approximate current ratings which correspond to a conductor temperature rise of dT of other than 40 °C may be calculated by applying the following formula:

$$I_2 = I_1 \sqrt{\frac{Tr - Tu}{40}}$$

Where

I_1 is the rated current to give 40 °C rise, see Table 1;

I_2 is the new rating;

Tr is the rated temperature;

Tu is the unpowered conductor temperature (local ambient).

NOTE 3 Annex B of this specification describes a test method for determining current rating of cables and formula for the interpretation of results.

5.2 Voltage drop at rated current

Table 2 lists the voltage drop obtained for a range of cable sizes when operated singly in free air such that a temperature rise of 40 °C is obtained from an unpowered temperature Tu of 95 °C (as in Table 1). The voltage drop figures are for a 10 m length.

Table 2 — Voltage drop at rated current

Code	Size AWG	Continuous current rating A	Voltage drop for 10 m at conductor temperature of 135 °C
001	26	4,8	11,14
002	24	6,5	10,74
004	22	8,5	7,40
006	20	11,5	5,54
010	18	15,0	4,59
012	16	19,5	4,10
020	14	24,0	3,79
030	12	35,0	3,45
050	10	43,0	2,62
090	8	68,0	2,27
140	6	85,0	1,95
220	4	115,0	1,62
340	2	166,0	1,47
530	0	216,0	1,25