SLOVENSKI STANDARD
SIST EN 4199-001:2009

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Aeronavtika - Ozemljitvene zbiralke za letala - 001. del: Tehniļne specifikacije

Aerospace series - Bonding straps for aircraft - Part 001: Technical specification

Luft- und Raumfahrt - Masseverbinder für Luftfahrzeuge - Teil 001: Technische Lieferbedingungen

Série aérospatiale - Tresses de métallisation pour avion - Partie 001 : Spécification technique

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ICS:

49.060	Letalska in vesoljska elektriļna oprema in sistemi	Aerospace electric equipment and systems

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English Version

Aerospace series - Bonding straps for aircraft - Part 001: Technical specification

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This European Standard was approved by CEN on 20 February 2006.

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Contents

Page

Foreword

This European Standard (EN 4199-001:2006) 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of an identical text or by endorsement, at the latest by November 2006, and conflicting national standards shall be withdrawn at the latest by November 2006.

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1 Scope

This standard specifies the general characteristics of bonding straps with flat or round braided copper or aluminium conductor, and terminal lugs, crimped on both ends, for use on aircraft.

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.

IEC 50 (581), *International Electrotechnical Vocabulary — Chapter 581: Electromechanical components for electronic equipment.*

EN 2591*, *Aerospace series — Elements of electrical and optical connection — Test methods*.

EN 3373-001, *Aerospace series — Terminal lugs and in-line splices for crimping on electric conductors — Part 001: Technical specification*.1)

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

EN 9133, *Aerospace series — Quality assurance — EN aerospace products — Qualification procedure*.

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in IEC 50 (581) and the following apply.

— A flat or round braided copper conductor, tin or nickel plated or aluminium conductor.

— Crimped on terminal lugs at both ends.

4 Required characteristics

See product standard.

4.1 Temperature range

See Table 1.

*) All its parts quoted in this standard.

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

Table 1

Class	Temperature range	Material/finish
T	– 65 °C to 150 °C	Tin plated copper braided conductor and tin plated copper terminal lugs
N	– 65 °C to 260 °C	Nickel plated copper braided conductor and nickel plated copper terminal lugs
A	– 65 °C to 150 °C	Aluminium braided conductors and terminal lugs

4.2 Material

Materials shall be suitable for the intended use and as specified in the product standard.

4.3 Finish

See product standard.

4.4 Dimensions and mass

See product standard.

5 Design

Bonding straps for aircraft shall be designed and assembled in a careful and workmanlike manner such as to withstand normal handling during installation and maintenance in service. In order to achieve good reliable crimped connections the correct crimping tool shall be used.

When using bonding straps on equipment or installations generating or processing frequencies greater than 100 kHz, care shall be taken not to exceed a length to width ratio of five to one for reasons of electromagnetic compatibility.

6 Tests

6.1 Tests on the braids

The tests of EN 3475 listed in Table 2 shall be applicable for testing of round and flat braid conductors used in the construction of bonding straps.

Table 2

EN 3475-	Designation of the test	Details
201	Visual examination	No visible deformations
202	Mass	Mass, shall be carried out on each batch or lot of material, whichever is the smaller.
203	Dimensions	Including correct braid angle
301	Ohmic resistance per unit length	Table see product standard.
512	Flexure endurance	–

6.2 Tests on the bonding strap assemblies

The tests of EN 2591, applicable in the context of this standard as well as the details necessary for implementing them and for inspecting bonding straps are given in Table 3 of this standard.

Table 3

EN 2591-	Designation of the test	Details
101	Visual examination	Initial examined details to be examined: — identification of materials in accordance with product standard; — identification; — appearance; — marking; — surface finish; — final examination.
102	Examination of dimensions and mass	As defined in product standard.
218	Ageing of terminal lugs and in-line splices by temperature and current cycling	Test current and initial voltage drop as specified in product standard. Maximum deviation at end of test shall not exceed that specified in EN 2591-218.
301	Endurance at temperature	Method B 20 h in dry heat at temperature of (150 ± 5) °C for tin plated or (260 ± 5) °C for nickel plated bonding straps. No deviation from tensile strength listed in this standard and from max. permissible voltage drop specified in the appropriate product standard.
305	Rapid change of temperature	Temperature cycles: Five cycles after variations – 65 °C to 150 °C for tin plated, – 65 °C to 260 °C for nickel plated bonding straps. No deviation from tensile strength listed in this standard and from maximum permissible voltage drop specified in the appropriate product standard.
307	Salt mist	48 h No deviation from maximum permissible voltage drop specified in the appropriate product standard
403	Sinusoidal and random vibration	Method A level 2 Assembly as per Figure 1. Test in Y and Z axis. No sign of fracture no deviation from tensile strength listed in this standard and from max. permissible voltage drop specified in appropriate product standard.
417	Tensile strength (crimped connection)	EN 3373-001, terminal lugs on both ends. The specimen shall not break at a value less than that specified in the product standard.

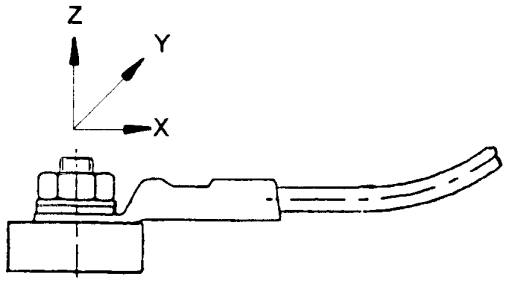
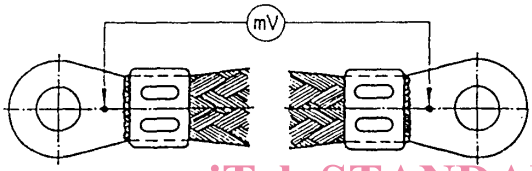


Figure 1 — Assembly

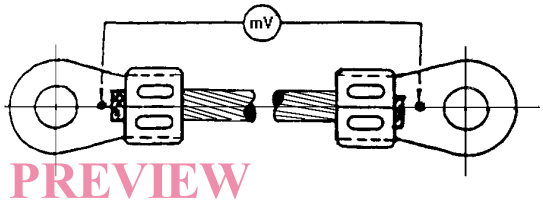
6.3 Voltage drop

Voltage drop and test current of complete bonding strap assembly shall be defined in the product standard, when measured in accordance with Figure 2 or Figure 3 at (20 ± 5) °C.



Bonding straps with flat braid conductor

Figure 2



Bonding straps with round braid conductor

Figure 3

6.4 Mechanical fatigue test

Specimens shall be bonding straps assembled with a terminal at each end, the dimension between the stud holes being 250 mm centre to centre.

The specimen shall be mounted on the test apparatus as shown in Figure 4, the axis of the terminal lugs passing through the pivot point of the apparatus.

One test cycle shall consist of one flex to 50° upwards, return to neutral position followed by flex to 50° downwards and then return to the neutral, starting, position.

The specimen shall be flexed for the number of cycles detailed in the product standard. A visual examination and test 6.3 shall be performed after 5 000 cycles and at intervals of 5 000 cycles until completion of the test. Failure of the specimen is deemed to be a fracture of the specimen or when the voltage drop is above the value specified.