SLOVENSKI STANDARD
SIST EN 3567-001:2004

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Aerospace series - In-line couplers for use in multiplex data bus systems in accordance with MIL-STD-1553B - Part 001: Technical specification

Aerospace series - In-line couplers for use in multiplex data bus systems in accordance with MIL-STD-1553B - Part 001: Technical specification

Luft- und Raumfahrt - Leitungskoppler für die Anwendung in Multiplex-Datenbussystemen nach MIL-STD-1553B - Teil 001: Technische Lieferbedingungen

Série aérospatiale - Coupleurs en ligne utilisés dans les systemes multiplexés de bus de données suivant MIL-STD-1553B - 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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This European Standard was approved by CEN on 4 June 2001.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 3567-001:2001 E

Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries 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 May 2002, and conflicting national standards shall be withdrawn at the latest by May 2002.

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

Contents list

1 Scope

This standard specifies the electrical, mechanical and environmental characteristics, test methods, test groups and quality assurance for in-line couplers and other components used in the composition of the transmission lines of multiplex databus systems in accordance with MIL-STD-1553B.

These couplers may be used at operating temperatures of – 65 °C to 150 °C or 200 °C and at altitudes up to 30 000 m or an altitude as defined in the product standard.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 2424	Aerospace series – Marking of aerospace products
EN 2591*	Aerospace series – Elements of electrical and optical connection – Test methods
EN 2591-100	Aerospace series – Elements of electrical and optical connection – Test methods – Part 100: General [1)]
EN 2591-309	Aerospace series – Elements of electrical and optical connection – Test methods – Part 309: Dry heat
EN 2591-310	Aerospace series – Elements of electrical and optical connection – Test methods – Part 310: Cold
EN 2591-311	Aerospace series – Elements of electrical and optical connection – Test methods – Part 311: Low air pressure
EN 2591-321	Aerospace series – Elements of electrical and optical connection – Test methods – Part 321: Damp heat, cyclic test
EN 3042	Aerospace series – Quality assurance – EN aerospace products – Qualification procedure
EN 3375-001	Aerospace series – Cables, electrical, for signal data transmissions – Part 001: Technical specification [2)]
MIL-A-8243D	Anti-icing and deicing-defrosting fluid [3)]
MIL-B-4394C	Fire extinguisher fluids [3)]
MIL-C-25769	Cleaning compound, aircraft surface, alkaline water base [3)]
MIL-H-5606E	Hydraulic fluid, petroleum base: aircraft [3)]
MIL-HDBK-217	Reliability prediction of electronic equipment [3)]
MIL-L-7808H	Lubricating oil, aircraft turbine engine, synthetic base [3)]
MIL-L-23699C	Lubricating oil, aircraft turbine engine, synthetic base [3)]
MIL-STD-1553B	Digital time division command/Response multiplex data [3)]
MIL-T-5624L	Turbine, fuel, aviation, grades JP4 and JP5 [3)]
MIL-T-21038	Transformers, pulse, low power, general specification for [3)]

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* All parts quoted in tables 1, 3, 4 and 5 with its title

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

2) In preparation at the date of publication of this standard

3) Published by: Department of Defense (DOD), the Pentagon, Washington D.C. 20301 USA.

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in EN 2591-100 apply.

4 Description

In-line couplers are composed of the following:

– coupling transformer(s) and isolation resistors;

– a screened, environmentally sealed and corrosion resistant enclosure protected with outer insulation. The enclosure may contain one or two couplers.

These couplers are connected to the databus cable during manufacture.

NOTE Since the coupler is magnetic, care should be taken in selecting its location in relation to other equipment.

5 Required characteristics

5.1 Electrical components

5.1.1 Transformers shall meet the electrical performance requirements of MIL-T-21038. The higher number of turns shall be on the isolation resistor side.

5.1.2 The resistors shall be non-inductive.

5.1.3 Documented evidence is required to demonstrate that these components are qualified or compliant.

5.1.4 Cables shall meet the requirements of EN 3375-001.

5.2 Reliability performance

The reliability performance shall be calculated in accordance with MIL-HDBK-217. If required, the manufacturer shall carry out and record the calculation.

6 Dimensions and mass

The dimensions and mass are given in the product standards. The couplers do not have to comply with the diagrammatic representations but the limiting dimensions shall be maintained.

7 Requirements and tests

See table 1.

Table 1

EN 2591-	Designation of the test	Details
101	Visual examination	Naked eye
102	Examination of dimensions and mass	See product standard
205	Housing (shell) electrical continuity	Resistance of screening including cable braid (cable length from the centre of the coupler 500 mm): see product standard
206	Measurement of insulation resistance	Test applicable to bus and stubs Test voltage shall be applied in turn: – between screening and salt water (5 %) in which specimen is immersed; – between screening and two conductors connected together. Insulation resistance = 100 MΩ min.
207	Voltage proof test	Test applicable to bus and stubs Test applied in turn: – between screening and salt water (5 %) in which specimen is immersed; – between screening and two conductors connected together. Test voltage: 500 V r.m.s. Air pressure: ambient Leakage current: 2 mA max.
208	Temperature rise due to rated current	Manufacturer shall make available information on temperature rise (ΔT) upon request (see 5.1.3).
302	Climatic sequence	EN 2591-309: dry heat temperature = maximum operating temperature of the coupler EN 2591-311: low pressure: 1,1 kPa Cable ends sealed for EN 2591-321 EN 2591-310: minimal temperature = – 65 °C
303	Cold/low pressure and damp heat	Five cycles, minimal temperature: – 65 °C Cable ends sealed for test Requirements: transmission test EN 2591-706 during five cycles with received amplitude 1 V peak to peak.
305	Rapid change of temperature	T_A: – 65 °C T_B = max. operating temperature of the coupler t_1: 30 min During EN 2591-305: transmission test EN 2591-706, transmitted amplitude 27 V peak to peak
306	Mould growth	Qualified materials may be used without retesting. Should this not be the case, apply method A. Period of exposure: 28 d No preliminary cleaning

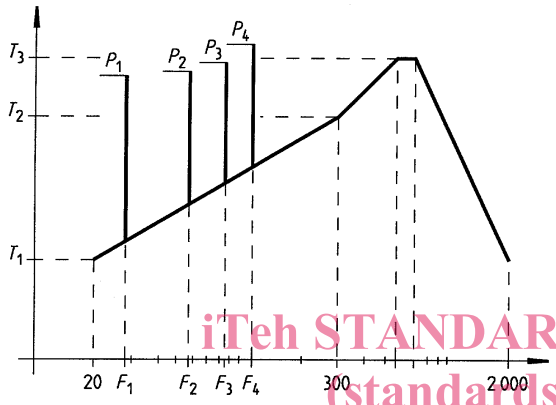
continued

Table 1 *(continued)*

<table>
<tr><th>EN 2591-</th><th>Designation of the test</th><th>Details</th></tr>
<tr><td>307</td><td>Salt mist</td><td>Duration: see product standard
Cable ends sealed</td></tr>
<tr><td>308</td><td>Sand and dust</td><td>One cycle
Velocity: (3,5 ± 0,5) m/s</td></tr>
<tr><td>314</td><td>Immersion at low air pressure</td><td>Pressure: see product standard</td></tr>
<tr><td>315</td><td>Fluid resistance</td><td>Fluids and temperatures: see below</td></tr>
<tr><td colspan="3">
<table>
<tr><th colspan="2">Fluids</th><th>Immersion temperature °C</th><th>Oven drying temperature °C</th></tr>
<tr><th>Types</th><th>Reference documents</th><th></th><th></th></tr>
<tr><td>Fuel</td><td>MIL-T-5624L JP5</td><td>25</td><td>65</td></tr>
<tr><td>Mineral hydraulic fluid</td><td>MIL-H-5606E</td><td>85</td><td>65</td></tr>
<tr><td rowspan="2">Synthetic lubricant</td><td>MIL-L-23699C</td><td>120</td><td>65</td></tr>
<tr><td>MIL-L-7808H</td><td>120</td><td>65</td></tr>
<tr><td rowspan="4">Cleaning compound</td><td>MIL-C-25769</td><td>65</td><td>65</td></tr>
<tr><td>Isopropanol</td><td>25</td><td>65</td></tr>
<tr><td>Methanol</td><td>25</td><td>65</td></tr>
<tr><td>Ethanol</td><td>25</td><td>65</td></tr>
<tr><td>De-icing fluids</td><td>MIL-A-8243D</td><td>65</td><td>65</td></tr>
<tr><td>Fire extinguishing fluids</td><td>MIL-B-4394C</td><td>20</td><td>65</td></tr>
</table>
</td></tr>
<tr><td>317</td><td>Flammability</td><td>Method A</td></tr>
<tr><td>402</td><td>Shock</td><td>Waveform, see product standard.
Three shocks in each direction, total:
18 shocks
During transmission test EN 2591-706:
received amplitude 1 V peak to peak</td></tr>
</table>

continued

Table 1 *(continued)*

EN 2591-	Designation of the test	Details
403	Sinusoidal and random vibration	Method B (random) Duration: 8 h in three axes Figure 3, level J Ambient temperature During transmission test EN 2591-706: received amplitude 1 V peak to peak Method for gunfire: tested in three axes Duration: 26,5 min/axis Test spectra and test levels according to:  T_1 (g_n^2/Hz) 0,072 T_2 (g_n^2/Hz) 1,335 T_3 (g_n^2/Hz) 4,165 F_1 (Hz) 28,3 F_2 (Hz) 56,6 F_3 (Hz) 84,9 F_4 (Hz) 113,2 P_1 (g_n^2/Hz) 2,977 P_2 (g_n^2/Hz) 3,068 P_3 (g_n^2/Hz) 3,621 P_4 (g_n^2/Hz) 4,991 Ambient temperature Test EN 2591-706: received amplitude 1 V peak to peak Transmission during test
701	Electrical elements - Measurement of open circuit impedance of couplers	Impedance shall be greater than 3 kΩ for a single coupler or 1,5 kΩ for a double coupler. Temperatures: – 65 °C and 150 °C or 200 °C
702	Electrical elements - Measurement of signal distortion of couplers	$D < 20$ % $S < 2$ V peak to peak Ambient temperature
703	Electrical elements - Common mode rejection of couplers	$T > 45$ dB $L1 = L2 = 0,5$ m Ambient temperature
704	Electrical elements - Measurement of turns ratio on a transformer used in a coupler	$N = 1,41 \pm 3$ % Ambient temperature
705	Electrical elements - Measurement of stub input impedance of couplers	$Z = (77 \pm 7)$ Ω Ambient temperature
706	Electrical elements - Transmission test	Validity criteria to MIL-STD-1553B. Duty cycle between 75 % and 80 %. Number of words: 44×10^6 Amplitude: transmitted 27 V peak to peak received 1 V peak to peak Applicable test temperature
707	Electrical elements - Measurement of characteristic impedance of a bus or a stub terminator	$Z_o \pm 2$ % Ambient temperature

continued