



SLOVENSKI STANDARD
SIST EN 2283:2012

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SIST EN 2283:2001

Aeronavtika - Preskušanje ožičenja pri zrakoplovih

Aerospace series - Testing of aircraft wiring

Luft- und Raumfahrt - Prüfung der Verkabelung von Luftfahrzeugen

Série aérospatiale - Vérification des câblages d'aéronefs
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Ta slovenski standard je istoveten z: ~~SIST EN 2283:2010~~ EN 2283:2010

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ICS:

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|--------|---|---|
| 49.060 | Letalska in vesoljska električna oprema in sistemi | Aerospace electric equipment and systems |
|--------|---|---|

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EUROPEAN STANDARD

EN 2283

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2010

ICS 49.060

Supersedes EN 2283:1996

English Version

Aerospace series - Testing of aircraft wiring

Série aéronautique - Vérification des câblages d'aéronefs

Luft- und Raumfahrt - Prüfung der Verkabelung von
Luftfahrzeugen

This European Standard was approved by CEN on 4 March 2010.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This document (EN 2283:2010) 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 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 June 2011, and conflicting national standards shall be withdrawn at the latest by June 2011.

This document supersedes EN 2283:1996.

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, Bulgaria, Croatia, 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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Introduction

Due to the diversity of aircraft, manufacturing and installing methods for wiring, the tests defined in Clause 1 are carried out at different stages in the manufacturing programme:

- after assembly of cables into bundles before installation in the aircraft;
- after installation of bundles into the aircraft;
- after repairs or modifications.

1 Scope

This European Standard specifies:

- the tests for finished wiring, including connectors and, if necessary, terminals, terminal ends, junction boxes, circuit breakers, etc.;
- these tests do not concern equipment installed in the aircraft (see operation of systems and do not apply to the wiring used instrumentation);
- the requirements for verification of aircraft electrical wiring;
 - continuity of circuits;
 - dielectric strength; <https://standards.iteh.ai/catalog/standards/sist/17a3318c-e95b-4d65-b969-db6079f069b5/sist-en-2283-2012>
 - insulation resistance.

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 2282, *Aerospace series – Characteristics of aircraft electrical supplies*

EN 61557-2, *Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 2: Insulation resistance (IEC 61557-2:2007)*

EN 61557-4, *Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 4: Resistance of earth connection and equipotential bonding (IEC 61557-4:2007)*

ISO 2678, *Environmental tests for aircraft equipment – Insulation resistance and high voltage tests for electrical equipment*

IEC 50 (461), *International Electrotechnical Vocabulary – Chapter 461: Electric cables*¹⁾

IEC 50 (581), *International Electrotechnical Vocabulary – Chapter 581: Electromechanical components for electronic equipment*¹⁾

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 50 (461) and IEC 50 (581) apply.

4 Tests

4.1 General

For all the tests, the national safety regulations shall be observed.

These tests may be carried out manually or on automatic equipment. In this case, the equipment operates with programmable sequences and trip thresholds.

The test shall be stopped as soon as a fault is detected, or the fault shall be memorized. The voltage shall increase or decrease in a regular manner to each of the scheduled values and the measurements shall be made after stabilization.

Test equipment is capable of performing the dielectric strength and the insulation resistance tests in a single operation, according to the requirements laid down in Table 2.

4.2 Continuity

The test enables to verify the conformity of cables, bundles and their connections with the design documents.

The direct current or alternating current voltage shall not exceed 28 V.

The Test shall be carried out with equipment according to EN 61557-4.

The value of the current passed shall not cause damage to any part of the circuits.

4.3 Dielectric strength

The test enables to verify the insulation has the operating efficiency to withstand the voltage (limits) given in EN 2282.

The maximum voltage rise or drop during test shall not exceed 500 V per second; this will avoid unintended insulation damage.

When the permitted leakage current is exceeded, the warning or protection system shall operate to avoid damage to the components being tested.

It should be noted that in alternating current tests, the capacitive leakage currents add (vectorially) to the fault currents detected.

After each dielectric strength test, the measurement point shall be grounded in order to discharge the circuit (except when this circuit remains connected to the reference point).

1) Published by: International Electrotechnical Commission (IEC), 3 rue de Varembé, 1211 Geneva 20, Switzerland.

EN 2283:2010 (E)**4.4 Insulation resistance**

The test enables to verify the insulation resistance of the wiring is in a proper state to meet the operating efficiency. The voltages used for these measurements are between 50 V and 500 V direct current.

The Test shall be carried out with equipment according to EN 61557-2. The fault current shall not exceed 5 mA (for a short-circuit).

The reading shall not be made until voltage and current stabilization is achieved.

4.5 Test preparation

The conductors and screens of screened or coaxial cables shall be tested in the same way as single core cables, provided they are accessible at both ends.

The screened cable test, with respect to the ground, shall be carried out before the screens are grounded.

The connector shells covered with conducting protection or other conductive supports shall be grounded.

Electronic components housed in junction boxes shall be short-circuited or disconnected.

Connectors, switches, circuit breakers, etc. can be left in circuit provided that they can withstand the test. Otherwise the test voltage shall be decreased.

No equipment shall be connected.

The parts of circuits having already been brought into contact with flammable liquids or hydraulic fluids shall only be tested when the national safety regulations are observed, so as to avoid any risk of explosion or fire.

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5 Procedures**5.1 General**

The types of wiring, the systems to which they belong and their functions require several categories (see Table 1).

Table 1

| Categories | Description |
|------------|---|
| A | All wiring apart from specific cases dealt with under B or C |
| B | Specific circuits for each type of aircraft to be defined by mutual agreement between manufacturers and authorities |
| C | Screened wiring, in principle isolated from the ground for tests, before being connected to the ground |

Aircraft wiring presenting installation difficulties and wiring that are not complete and require to be finished in the aircraft shall be subject to test and inspection after installation (Table 2, Part II).

Table 2

| | Tests | Characteristics | Categories (see Table 1) | | |
|--|-------------------------------------|--------------------------------|---|---|---|
| | | | A | B | C |
| Part I : Tests after manufacture (prior to installation in aircraft) | Voltage strength | – | 1 000 V a.c. ^a or 1 300 V d.c. | 380 V a.c. ^a or 500 V d.c. | 40 V a.c. ^a or 50 V d.c. |
| | | Minimum application time | 1 s | 0,1 s | 0,1 s |
| | Minimum insulation resistance | Measuring voltage (± 10 %) | 500 V d.c. | 500 V d.c. | 50 V d.c. |
| RH ^b = 70 % | | 20 MΩ | 50 MΩ | 10 MΩ | |
| Part II : Tests of assembled bundles (after installation in aircraft) | Voltage strength | – | 1 000 V a.c. ^a or 1 300 V d.c. | 380 V a.c. ^a or 500 V d.c. | 40 V a.c. ^a or 50 V d.c. |
| | | Application time | 0,1 s to 1 min | 0,1 s to 1 min | 0,1 s to 1 min |
| | Minimum insulation resistance | Measuring voltage (± 10 %) | 500 V d.c. | 500 V d.c. | 50 V d.c. |
| | | RH ^b = 70 % | 10 MΩ | 20 MΩ | 2 MΩ |
| RH ^b 70 % to 80 % | 5 MΩ | 10 MΩ | 1 MΩ | | |
| <p>^a Root mean square, frequency 50 Hz to 60 Hz.</p> <p>^b Relative humidity.</p> | | | | | |

All the tests for wiring shall take place before the connection of equipment.

Electrical and electronic components connected within the wiring shall not be exposed to voltages and currents, which could damage them (see 4.5).

Dielectric strength and insulation resistance tests shall be carried out between each conductor and any other conductor, and between each conductor and earth (structure). See Table 2 for conditions and requirements.

Tests on pre-assembled wiring shall comply with the requirements in 5.2 and the requirements of Table 2, Part I.

Tests on finished wiring (assembled and installed) shall comply with the requirements of 5.3 and the requirements of Table 2, Part II.