SLOVENSKI STANDARD
SIST EN 2570:2001

01-januar-2001

Aerospace series - Nickel-cadmium batteries - Technical specification

Aerospace series - Nickel-cadmium batteries - Technical specification

Luft- und Raumfahrt - Nickel-Cadmium-Batterien - Technische Lieferbedingungen

Série aérospatiale - Batteries d'accumulateurs au nickel-cadmium - Spécification technique

Ta slovenski standard je istoveten z: **EN 2570:1996**

ICS:

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

SIST EN 2570:2001 **en**

EUROPEAN STANDARD **EN 2570**

NORME EUROPÉENNE

EUROPÄISCHE NORM July 1996

ICS 49.060

Descriptors: aircraft industry, aircraft equipment, electric batteries, storage batteries, nickel cadmium batteries, characteristics, test, quality assurance, marking

English version

Aerospace series - Nickel-cadmium batteries - Technical specification

Série aérospatiale - Batteries d'accumulateurs au nickel-cadmium - Spécification technique

Luft- und Raumfahrt - Nickel-Cadmium-Batterien - Technische Lieferbedingungen

This European Standard was approved by CEN on 1995-06-29. 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

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

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Contents list

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 January 1997 and conflicting national standards shall be withdrawn at the latest by January 1997.

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

0 Introduction

This standard has taken into consideration IEC standards 952-1 and 952-2 implemented at European level as EN 60952-1 and EN 60952-2.

1 Scope

This standard provides information on design and specifies complementary requirements for nickel-cadmium batteries for aerospace applications.

It is applicable whenever referenced.

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.

ISO 7137	Aircraft - Environmental conditions and test procedures for airborne equipment (Endorsement of EUROCAE/ED-14C and RTCA/DO-160C)
IEC 51-1	Direct acting indicating analogue electrical measuring instruments and their accessories - Part 1 : Definitions and general requirements common to all parts
IEC 952-1	Aircraft batteries - Part 1 : General test requirements and performance levels
IEC 952-2	Aircraft batteries - Part 2 : Design and construction requirements
EN 3042	Aerospace series - Quality assurance - EN aerospace products - Qualification procedure

3 Definitions

For the purposes of this standard, the following definitions apply :

Nickel-cadmium cell :

Rechargeable alkaline accumulator in which the positive active mass is nickel-based and the negative active mass is cadmium-based.

Rated capacity C_1 :

Quantity of electricity (in Ah) which the cell is capable of delivering in 1 h, throughout its normal service life, after full charge, under conditions defined with regard to temperature and end discharge voltage.

Recharged capability :

The recharged capability is the product (in Ah) of the discharge current values and the duration.

Charge or discharge currents :

Level of direct current (in A) at which charging [1] or discharging [1] is carried out.

Charged battery :

Battery which has been charged, unless otherwise indicated, in accordance with the procedure described in 5.1.6.

End discharge voltage :

Voltage at which discharge shall be stopped. This is obtained by multiplying the voltage per cell by the number of cells.

Maintenance cycle :

Indispensable periodic maintenance and monitoring operation. This is described in the manufacturers' maintenance manuals.

Battery case :

Case, not including the lid, containing the battery cells and on which the connector is fixed.

Cell container :

Container enclosing the positive and negative plates, the electrolyte etc.

4 Design

Batteries shall be :

- made up of electrical cells with vented containers in a battery case from which gas can escape ;
- designed to :
  a) provide an emergency back-up and indirect starting of the main engines (normal batteries);
  b) provide instantaneous high power and direct starting (high-power or high current batteries);
  c) satisfy new requirements (e.g. long service life).

4.1 Battery case

The battery case shall be :

- of metal or other material, resistant to corrosion and, unless otherwise specified, leakproof;
- designed to hold 19 or 20 cells and such that any movement of the cells is avoided and that they can be removed. Where only 19 cells are required, a suitable dummy shall replace the twentieth cell.

Seals and accessories shall be resistant to electrolyte (see 5.3.6) and to the temperatures (see 5.4.3 and 5.4.4).

The case may be fitted in its upper section with air circulation ducts. The arrangement and form of this device are described in the product standards.

---

1) Current (A) $= \frac{C_1\text{Ah}}{t\text{(h)}}$, e. g.: $\frac{C_1\text{A}}{10} = 0{,}1\ C_1\text{A}$

4.2 Lid (of the battery case)

The materials of the lid and its accessories shall have the same characteristics as those of the case.

The lid may :

- be provided with a seal and fitting devices, but is not necessarily sealed;
- serve to secure the battery and/or have a separate attachment system.

These options are described in the product standard.

4.3 Battery cells

Cell containers and lids

They shall be :

- made of insulating material which is resistant to the operating conditions;
- joined together by a weld which is resistant to atmospheric pressure.

Vent plugs

Each cell shall be fitted with a vent plug in plastic material which is resistant to electrolyte and has a seal.

The plug shall contain a device to permit the escape of gas and to prevent the escape of liquid if the battery is inverted.

The vents shall open at an internal overpressure of between 14 kPa and 70 kPa.

The vent plug shall fulfil its function in all specified tests, at the pressures defined in 5.2.6.1.

4.4 Electrolyte

Shall be an aqueous solution of potassium hydroxide.

Purity of the solution shall conform to the battery manufacturer's specifications.

4.5 Connections between cells

These shall be in nickel-coated metal.

The type of metal and the section of connections shall be selected so as to be able to withstand the maximum current which the battery can supply.

The lock washers shall not damage the connections or the terminal nuts.

Where internal monitoring devices are required, these shall not affect the battery characteristics.

4.6 Identification of polarity

The cells shall bear positive polarity markings (+) and if necessary negative (–).

The battery case shall also bear polarity markings : the positive pole of the receptacle shall be on the right, viewed from the outside.

4.7 Battery connector

See figure 1 and table 1, figures 2 and 3 and table 2.

The location of the battery connector is defined in the product standards, in conformity with table 3.

Dimensions and tolerances are in millimetres.

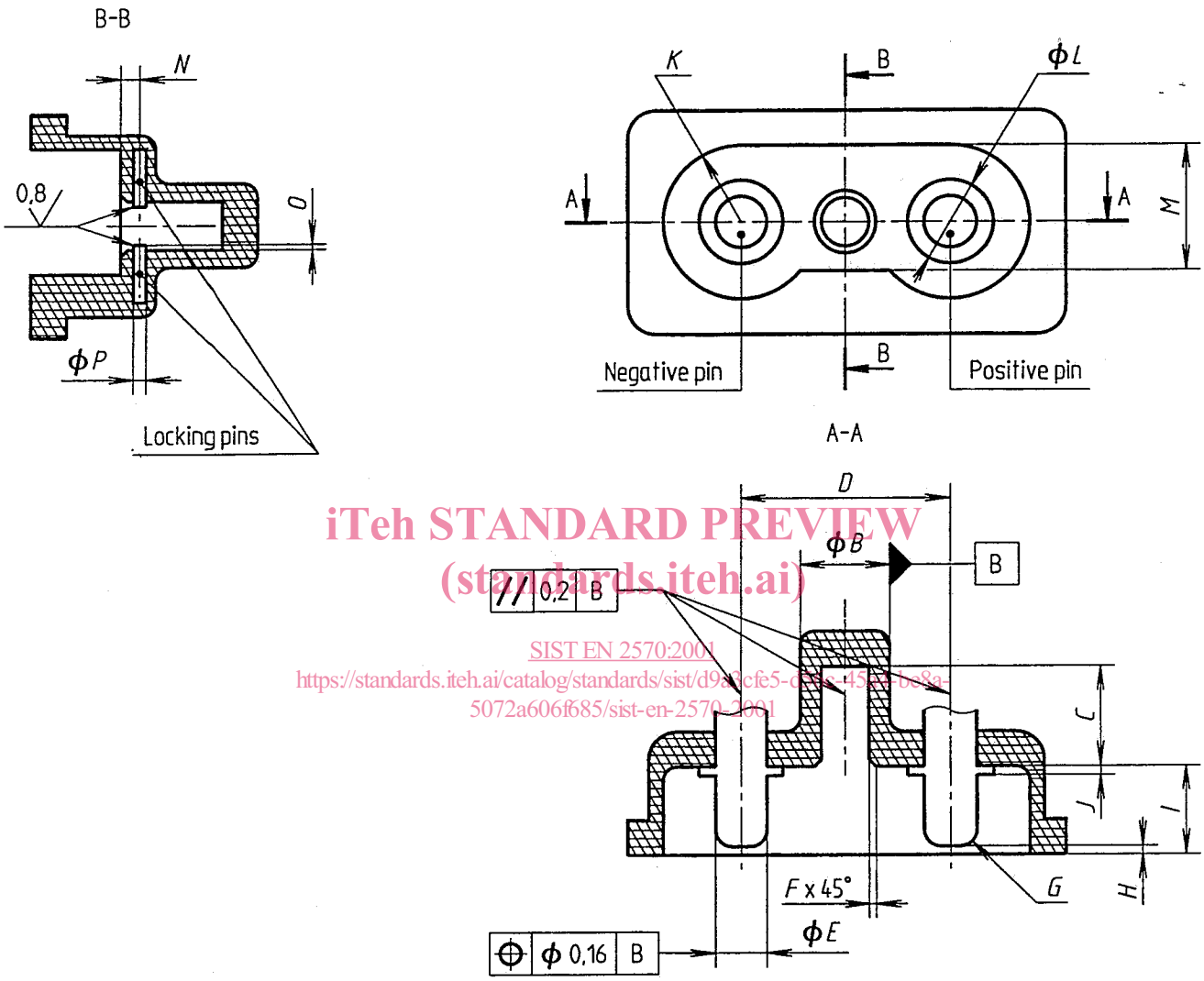


Figure 1 : Battery connector

Table 1

B	*C* min.	*D* ± 0,10	*E*	*F*	*G*	*H*	*I*	*J* max.	*K*	*L* max.	*M*	*N*	*O*	*P* ± 0,05
9,93	17,02	38,91	9,53	1,27	3,18	1,57	16,51	1,70	14,68	16	23,22	3,58	0,97	2,36
Unless otherwise specified, tolerances are ± 0,13 mm.														

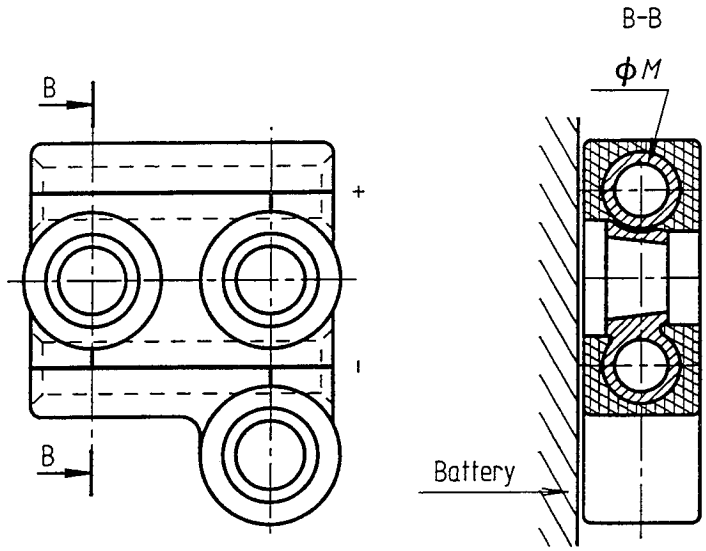
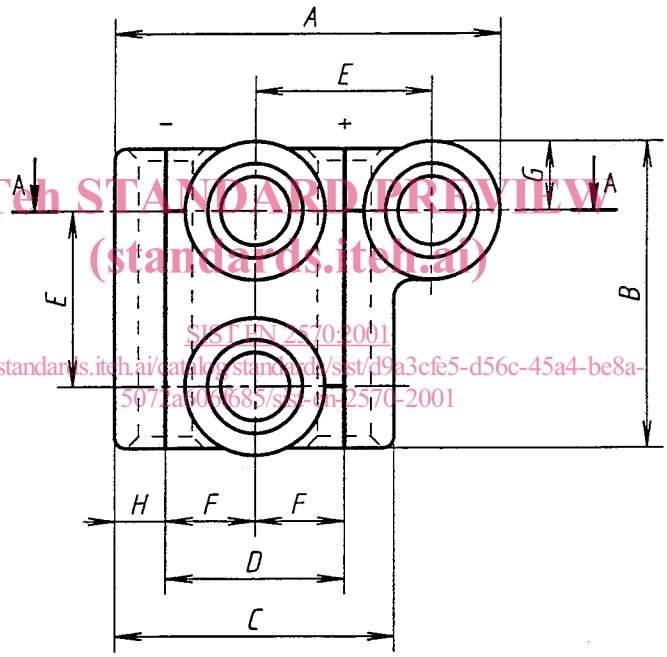


Figure 2 : Adaptor position for horizontal coupling



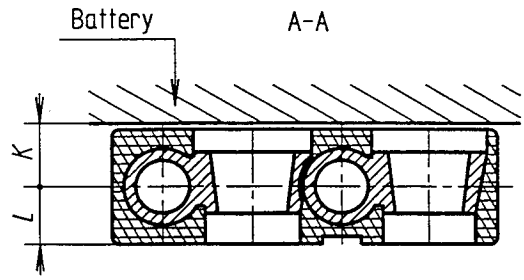


Figure 3 : Adaptor position for vertical coupling

Table 2

A max.	***B*** max.	***C*** max.	***D*** ± 0,2	***E*** ± 0,1	***F*** ± 0,1	***G*** max.	***H*** max.	***K*** ± 1,5	***L*** ± 0,2	***M*** + 0,027 0
100	82	72	46	46	23	18	13	15,5	15	13,75

Table 3

Type of connector	Type of contact	Mounting	Location
See figure 1	Male	Receptacle	Battery
See figures 2 and 3	Female	Receptacle	Battery

4.8 Electrical characteristics

4.8.1 Rated voltage

4.8.1.1 Of a cell

1,2 V

The recommended number of cells for 28 V d.c. system is 20.

4.8.1.2 Of the battery

1,2 V multiplied by the number of cells connected in series.

4.8.2 Rated capacity

It shall correspond to that indicated in the product standard.

5 Tests

5.1 General

The manufacturer shall supply all accompagning documents (see 8), approved in advance, which may be necessary for the performance and monitoring of tests.

5.1.1 Test conditions

Unless otherwise indicated, these are as follows:

- ambient temperature (23 ± 5) °C;
- pressure 85 kPa to 106 kPa;
- relative humidity ≤ 85 %.

The batteries to be tested shall be in a vertical position, with or without a lid, depending on the type of test. Unless otherwise required, the vent plugs shall be fitted.

The cells shall not be used outside the battery case.

5.1.2 Thermal stabilization

Thermal stabilization is reached when a probe inserted between two centre cells reaches the required temperature, to ± 1 K, for 1 h.

All batteries heated or cooled in a test shall be left to rest, on open circuit, at the ambient temperature of the test station for at least 16 h.

5.1.2.1 High temperature tests

16 h to 24 h, at the specified temperature, without exceeding 12 h between charge and discharge.

5.1.2.2 Low temperature tests

16 h to 24 h at the specified temperature.

5.1.3 Connections

Batteries shall be connected electrically using the appropriate connector.

The battery voltage shall be measured at the connection points between the cable and the aircraft-side connector; the voltage drop in the connector shall be taken into account.

Cables connected to connectors shall be of a suitable section so that in high temperature rapid discharge tests the temperature of the connector terminals remains lower than that of the internal battery connections.

Connections between cells shall be tightened at the terminals to the torque (on the bolt or nut) specified by the manufacturer.

5.1.4 Measuring equipment

Electrical measuring equipment shall have an accuracy at least equivalent to category 0,5 (see IEC 51-1), including shunts.

Voltmeters shall have a resistance of at least 1 000 Ω/V and thermometers shall be accurate to less than 1 K.

5.1.5 Instructions - maintenance

During the course of tests, batteries shall undergo the necessary maintenance operations specified by the manufacturer.

All operations, including reconditioning, shall be recorded in the test report.

Examples :

- the quantity of distilled water added shall be stated;
- measurement of cell voltage variance between cells shall not be carried out unless signs of imbalance are detected at the end of discharge or during tests.

Replacement of defective cells is not authorised during qualification tests.

5.1.6 Direct current charging method

To ensure that qualification provides valid comparisons with regard to performance, all charging cycles followed by measurement of capacity at the end of discharge shall be carried out using direct current (regulated to ± 1%), in accordance with the two phases shown below, the initial internal battery temperature being brought to (23 ± 2) °C :

- charge at a current of 1 C_1A until the voltage corresponding to an average of 1,58 V per cell is reached at the battery terminals. Where only a charger set to 0,5 C_1A is available, this phase shall be terminated at the mean voltage of 1,55 V per cell;
- supplementary charge at a current of 0,1 C_1A for 3 h ; when the test is not followed by measurement of electrical performance and when the amount of distilled water to be added is not specified, supplementary charge at 0,1 C_1A may be omitted.

For some specific tests, different charging conditions are specified in the appropriate clauses.

Charging methods appropriate for special batteries are described in their product standards.

5.1.7 Capacity measurement (controlled discharge)

Unless otherwise indicated, leave the battery to rest on open circuit for 2 h to 4 h after the end of charge, and verify that it has returned to (23 ± 2) °C.