

Aircraft batteries —

Part 2: Design and construction requirements

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National foreword

This British Standard has been prepared under the direction of the Light Electrical Engineering Standards Policy Committee and is the English language version of EN 60952-2:1993 *Aircraft batteries Part 2: Design and construction requirements*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 952-2:1991 published by the International Electrotechnical Commission (IEC).

Part 1 of this British Standard is the English language version of EN 60952-1:1993 and is identical with IEC 952-1:1988, referred to in Annex ZA. A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Aircraft batteries
Part 2: Design and construction requirements
(IEC 952-2:1991)

Batteries d'aéronefs
Partie 2: Exigences de conception et de
construction
(CEI 952-2:1991)

Flugzeug-Batterien
Teil 2: Anforderungen für Planung und
Konstruktion
(IEC 952-2:1991)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

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

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Foreword

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 952-2:1991 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as a European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 60952-2 on 9 December 1992.

- latest date of publication of an identical national standard (dop) 1993-12-01
- latest date of withdrawal of conflicting national standards (dow) 1993-12-01

For products which have complied with the relevant national standard before 1993-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1998-12-01.

Annexes designated “normative” are part of the body of the standard. Annexes designated “informative” are given only for information. In this standard, Annex A, Annex B and Annex ZA are normative and Annex C is informative.

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Section 1. General

1.1 Scope

This part of IEC 952 covers both nickel-cadmium and lead-acid aircraft batteries containing vented or valve-regulated cells or monoblocs. The batteries are used for both general purposes and specific applications.

The object of the present part is to define the physical design and construction requirements for aircraft batteries as well as the structure and contents of Declarations of Design and Performance (DDP) for the different battery types.

A preferred range of aircraft batteries is specified in Annex A but this part of IEC 952 may be used for other battery sizes, arrangements and ratings. For particular applications, other design requirements may be called for. These will be in addition to the requirements of this part and will be covered by specific documents.

1.2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of IEC 952. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of IEC 952 are encouraged to investigate the possibility of applying the most recent editions of the standard listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 952-1:1988, *Aircraft batteries — Part 1: General test requirements and performance levels*.

Section 2. Construction requirements

2.1 General construction requirements

2.1.1 The battery shall be robust and shall withstand normal application and handling.

2.1.2 The battery shall be constructed of appropriate materials and in such a manner as not to be detrimentally affected by electrolyte and all fluids normally found in aircraft maintenance including engine oils, fuel and cleaning solutions.

2.1.3 The battery shall be constructed so as to avoid the occurrence of short circuiting of battery or cells.

2.2 Dimensions

For the preferred range of aircraft battery types, formats A to H, the dimensions and — as far as appropriate — complementary notes are specified in Annex A together with the corresponding specific characteristics.

2.3 Marking

2.3.1 The manufacturer's marking and labelling on the battery exterior shall contain the following minimum information in a legible and durable form:

- a) manufacturer's name;
- b) manufacturer's type or part number;
- c) modification numbers or letters;
- d) nominal battery voltage;
- e) rated capacity;
- f) battery polarity;
- g) power rating;
- h) chemical system (e.g. nickel-cadmium or lead-acid);
- i) date of manufacture;
- j) manufacturer's serial number;
- k) number of cells (nickel-cadmium).

2.3.2 Provision shall be made on the battery case for the entry of the date of last service or test. Appropriate handling precautions shall be prominently and durably displayed.

2.3.3 Batteries shall not be coloured in any manner that may cause confusion between chemical systems and therefore no pink colour shall be displayed on nickel-cadmium battery cases and no blue colour shall be displayed on lead-acid battery cases.

2.3.4 Replaceable cells or monoblocs shall display the following minimum information:

- a) manufacturer's name;
- b) manufacturer's type or part number;
- c) manufacturer's serial number or equivalent batch identification;
- d) a raised or indented positive polarity symbol and/or a suitable identification.

2.4 External electrical connection

The main electrical terminations of the eight battery types, format A to H, according to Annex A, will be specified in part 3 of IEC 952, which is presently in preparation.

In Annex C the reference designations of those terminals which are frequently used by the manufacturers are listed. This Annex C will be deleted as soon as part 3 of IEC 952 is available.

2.5 Venting

2.5.1 The design of the battery shall employ a method of fresh air dilution of the gases generated during overcharge. The purging system may be either by natural ventilation or by assisted ventilation.

2.5.2 In natural ventilation, the battery container and/or cover shall have sufficient holes or louvres to ensure that the requirement of **2.5.1** is fulfilled in still air. Such holes or louvres shall be made adequately protected against the ingress of solid objects. Appropriate warning shall be provided that holes or louvres must be kept free.

2.5.3 In assisted ventilation, the liberated gases from all the cells shall pass into a sealed venting chamber, having ports for the purging air. There are two preferred methods of achieving a purging air flow:

- a) the entry of air into the battery is via an entry housing with an integral non-return valve. It shall not be possible to connect a pipe to the inlet side of the valve. The air is taken from the battery by a pipe connection;
- b) the air is taken to and from the battery by pipe connections and the direction of ventilation is immaterial.

2.5.4 A battery which is to be operated with assisted ventilation shall be so designed that, when the battery is secured in position, utilizing securing fixtures:

- a) there shall be no loss of pressure exceeding 0,7 kPa after a period of 2 min, when a pressure equivalent of 2,5 kPa $\pm$ 0,2 kPa is applied to the external ports (except those containing non-return valves);
- b) the pressure drop across the battery shall not exceed 3,5 kPa when an air flow of 0,03 m³/min $\pm$ 10 % is extracted from the outlet port, and
- c) the venting chamber can withstand a negative pressure of 65 kPa.

2.6 Safely

2.6.1 The battery shall be constructed such that there will be no ignition source inside the battery sufficient to cause ignition of hydrogen/oxygen mixtures in the event of failure of the venting system. All auxiliary equipment such as thermal sensors, thermostats, heaters and switching devices shall be so designed that they cannot be the source of an explosion. The current-carrying components of the battery shall be dimensioned and constructed so as to provide no ignition source under any external short circuit conditions.

2.6.2 The battery shall be so constructed that any debris due to any internal explosion failure shall be contained within the casing.

2.6.3 The battery shall be constructed of materials which, in the absence of externally supplied energy, will not support combustion.

2.7 Temperature monitoring

Thermal switches and temperature sensors, where used, shall be so installed that they may be readily removed for test and/or calibration purposes. Temperature sensors shall be monitored throughout all electrical tests defined in IEC 952-1 in order to demonstrate that there is no erroneous operation.

2.8 Environmental conditions

2.8.1 As described in IEC 952-1, batteries shall be suitable for operation at sea level in the ambient temperature – 30 °C to + 50 °C. Temporary exposure to the ambient temperature range – 40 °C to + 70 °C shall not affect the physical integrity of the battery.

2.8.2 Batteries shall be suitable for operation at ambient pressures equivalent to altitudes of up to 21 000 m.

2.8.3 Batteries shall meet the requirements of environmental tests in IEC 952-1.

Section 3. Declarations

3.1 Declaration of design and performance (DDP)

For each particular battery type a declaration of design and performance shall be supplied by the manufacturer to the user and/or supervising authorities, as required. The DDP shall confirm in detail the characteristics and performance of the battery type. This shall include values for the parameters required by IEC 952-1.

An example of a DDP is given in Annex B.