

Stationary lead-acid batteries —

Part 11: Vented types — General requirements and methods of tests

The European Standard EN 60896-11:2003 has the status of a
British Standard

ICS 29.220.20

National foreword

This British Standard is the official English language version of EN 60896-11:2003. It is identical with IEC 60896-11:2002. It supersedes BS EN 60896-1:1992 which will be withdrawn on 2005-12-01.

The UK participation in its preparation was entrusted to Technical Committee PEL/21, Secondary cells and batteries, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Cross-references

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**Stationary lead-acid batteries
Part 11: Vented types -
General requirements and methods of tests
(IEC 60896-11:2002)**

Batteries stationnaires au plomb
Partie 11: Batteries au plomb
du type ouvert -
Prescriptions générales
et méthodes d'essai
(CEI 60896-11:2002)

Ortsfeste Blei-Akkumulatoren
Teil 11: Geschlossene Batterien -
Allgemeine Anforderungen und
Prüfverfahren
(IEC 60896-11:2002)

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Foreword

The text of document 21/572/FDIS, future edition 1 of IEC 60896-11, prepared by IEC TC 21, Secondary cells and batteries, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60896-11 on 2002-12-01.

This European Standard supersedes EN 60896-1:1991 + A2:1992.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2003-09-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-12-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annex A is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60896-11:2002 was approved by CENELEC as a European Standard without any modification.

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STATIONARY LEAD-ACID BATTERIES –

Part 11: Vented types –

General requirements and methods of tests

1 Scope and object

This part of IEC 60896 is applicable to lead-acid cells and batteries which are designed for service in fixed locations (i.e. not habitually to be moved from place to place) and which are permanently connected to the load and to the d.c. power supply. Batteries operating in such applications are called “stationary batteries”.

Any type or construction of lead-acid battery may be used for stationary battery applications. This part 11 of the standard is applicable to vented types only.

The object of this standard is to specify general requirements and the main characteristics, together with corresponding test methods associated with all types and construction modes of lead-acid stationary batteries, excluding valve-regulated types.

Recommendations on the use of tests for stationary battery application are given in Table A.1.

Recommendations relating the type of cell or monobloc to the use of tests are given in Table A.2.

Statements and claims of basic performance data by the manufacturer shall correspond to those tests.

The tests may also be used for type qualification.

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 60050(151), *International Electrotechnical Vocabulary (IEV) – Part 151: Electrical and magnetic devices*

IEC 60051 (all parts), *Direct acting indicating analogue electrical measuring instruments and their accessories*

IEC 60359, *Electrical and electronic measurement equipment – Expression of performance*

IEC 60417 (all parts), *Graphical symbols for use on equipment*

IEC 60485, *Digital electronic d.c. voltmeters and d.c. electronic analogue-to-digital converters*

3 Definitions

For the purposes of the present part of IEC 60896, the following definitions apply.

3.1

electrolyte reserve

volume of electrolyte between minimum and maximum level indication

3.2

rated capacity

C_{rt}

quantity of electricity, declared by the manufacturer, which a cell or battery can deliver under specified conditions after a full charge. This value is usually expressed in ampere-hours (see IEC 486-03-22)

3.3

nominal capacity

C_{nom}

suitable approximate quantity of electricity used to identify the capacity of a cell or battery. This value is usually expressed in ampere-hours (see IEC 486-03-21)

3.4

endurance

ability of a cell or battery to function and withstand operations under specified conditions for a minimum period of time or repeated application thereof

4 Mechanical strength

Stationary cells or batteries shall be designed to withstand mechanical stresses during normal transportation and handling.

Resistance to earthquakes, if required, shall be particularly specified.

5 Electrolyte levels

5.1 Each cell shall be equipped with a device to indicate the minimum and maximum electrolyte levels.

5.2 For containers made of translucent material, the minimum and maximum levels shall be indicated on the container wall.

5.3 For containers made of an opaque material, a gauge shall be provided indicating the position of the electrolyte level in relation to the minimum and maximum levels.

6 Electrolyte reserve

6.1 The electrolyte reserve (see 3.1), together with the battery design and the charging method used, governs the frequency of inspections for electrolyte level readjustments.

6.2 For batteries in float operation (see 8.1) the minimum electrolyte reserve is specified in Item d) of 8.2.

7 Capacity

(Test, see Clause 14).

7.1 The essential characteristic of a stationary cell or battery is its capacity for the storage of electric energy. This capacity, expressed in ampere-hours (Ah) varies with the conditions of use (discharge current and voltage, and temperature).

The recommended t -values are:

$$t = 240 \text{ h}, 20 \text{ h}, 10 \text{ h}, 8 \text{ h}, 5 \text{ h}, 3 \text{ h}, 2 \text{ h}, 1 \text{ h}, 0,5 \text{ h}.$$

From these various C_{rt} values one value may be selected and declared as rated capacity C_{rt} (see 3.2).

7.2 The most commonly used values of t are between 10 h and 3 h. For these, the final voltage (end-of-discharge voltage) shall be $U_f = 1,80 \text{ V}$ per cell (unless otherwise recommended or requested by the manufacturer or user). For other discharge rates, the recommended value of U_f shall be set by national standards or shall be stated by the manufacturer together with the value of C_{rt} or together with the particular performance data (see 7.5).

7.3 The discharge current corresponding to the rated capacity C_{rt} at the chosen reference temperature 20°C or 25°C is:

$$I_{rt} = C_{rt} / t \quad (\text{A})$$

to the final discharge voltage U_f in accordance with 7.2.

7.4 The actual capacity C_a shall be determined by discharging a fully charged cell or battery in accordance with Clause 14. The resultant value shall be used for comparison with the rated capacity C_{rt} stated by the manufacturer, or for control of the state of a battery after long periods of service.

7.5 The determination of the actual capacity C_a in accordance with Clause 14 may also be used for comparison with particular performance data indicated by the supplier. In this case the current I_{rt} in 14.4 shall be substituted by the particular current corresponding to the relevant performance data.

8 Suitability for floating battery operation

(Test, see Clause 15).

8.1 Stationary batteries are mainly used in floating operation

A battery in floating operation has a constant voltage U_{flo} , permanently applied to its terminal which is sufficient to maintain it in a state close to full charge and is intended to supply a circuit whose normal power supply may fail. Suitability for this operation shall be checked by a test carried out on cells or on batteries.

Batteries which are not in true floating operation (for example, solar power storage) should not be qualified according to the test method described in Clause 15.