



EUROBAT



ASSOCIATION OF EUROPEAN AUTOMOTIVE
AND INDUSTRIAL BATTERY MANUFACTURERS

GUIDE TO IEC/EN STANDARDS FOR THE SPECIFICATION OF VALVE REGULATED LEAD- BASED STATIONARY CELLS AND BATTERIES

This guide to IEC/EN standards aims to increase the awareness, understanding and use of valve regulated lead-acid batteries for stationary applications and to provide the 'user' with guidance in the preparation of a Purchasing Specification. In this revision, particular reference is made to 'General Definitions', 'Product Characteristics', 'Design Life', 'Service Life' and 'Safety'.

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STATIONARY
CELLS AND
BATTERIES



GENERAL DEFINITIONS

VALVE REGULATED CELLS AND BATTERIES

A valve regulated cell or battery is closed under normal conditions by a non-return control valve that allows gas to escape if the internal pressure exceeds a predetermined value.

The valve does not allow gas (air) to enter the cell. The maximum pressure reached inside the cell under any or limited sets of circumstances can be indicated by, or requested from, the manufacturer.

The cells cannot receive additions to the electrolyte. This description applies equally to 'Absorbent Glass Mat (AGM)' or 'Gelled' electrolyte cells.

PRODUCT CHARACTERISTICS & QUALIFICATION

In the absence of any other agreement between the manufacturer and the 'user', the following key characteristics may be qualified by "test methods" in IEC/EN 60896-21 and by "requirements" in IEC/EN 60896-22.

Where a test method is appropriate, the text is marked with an asterisk*.

FLOAT

Most stationary batteries are electrically 'floating' across the DC supply in parallel with the rectifier and the load, thereby providing uninterrupted power to the system.

The manufacturer shall state the recommended float voltage limits, as defined in chap. 3.42 of IEC/EN 60896-21 and -22.

RETENTION

Charge retention is important to users, who normally hold stocks of batteries.

Charge retention determines the frequency for recharging batteries held in storage.

*Manufacturers shall state the charge retained.

This item is covered by chapter 6.12 of IEC/EN 60896-21 and -22.

CAPACITY

Unless otherwise declared by the manufacturer, the Nominal Capacity is defined at the 10 hour rate (C_{10}) at 20°C to an end voltage of 1.80 Volts per cell (V_{pc}). Users should note that the value of the capacity quoted is dependent upon the rate, temperature and end voltage of the discharge.

For the purposes of specific applications, other rates of discharge may be requested for capacity.

*User acceptance capacity tests may be agreed

separately with the manufacturer and will be subject to contractual negotiation.

This item is covered by chapter 6.11 of IEC/EN 60896-21 and -22.

CYCLES

This characteristic gives a measure of the endurance of the battery to repeated charge and discharge cycles.

*As a general rule, 'users' should note that the number of cycles is dependent upon the depth of discharge, load and charging regime.

This item is covered by chapter 6.13 of IEC/EN 60896-21 and -22.

CALENDAR LIFE CLASSIFICATION

3 - 5 YEARS STANDARD COMMERCIAL

This group of batteries is at the consumer end of standby applications. They are popular in small emergency equipment.

6 - 9 YEARS GENERAL PURPOSE

This group of batteries is usually used when an improved life is required in comparison to the Standard Commercial product, and also in cases where operational conditions are more severe.

10/12 YEARS LONG LIFE

This group of batteries is used where high power, long life and high reliability are required.

> 12 YEARS VERY LONG LIFE

This group of batteries is used in applications where longest life and highest reliability are required.

SAFETY

FLAMMABILITY

Some 'users' have operational procedures that require the use of flame retardant plastic materials to a defined rating.

The battery manufacturer shall indicate the category of flame retardancy in accordance with IEC 60695-11-10 and IEC 60695-11-20, which is harmonized with UL94 Standards.

EMISSIONS

In normal conditions of use, gas emissions for valve regulated lead-acid batteries are considerably lower than for flooded batteries. Ventilation of battery rooms or cabinets shall be in accordance with National Regulation and/or IEC/EN 62485-2.

INTERNAL RESISTANCE AND SHORT CIRCUIT CURRENTS

Internal resistance can be important to the equipment design and operation. The manufacturer shall state the value of internal resistance for a new battery.

This item is covered by chapter 6.3 of IEC/EN 60896-21 and -22.

OPERATIONAL RECOMMENDATIONS

SERVICE LIFE & AFFECTING FACTORS

The service life is the value, established on the basis of field experience (under optimal conditions. It describes the time in which a specified capacity (or power can be used (optimum application and (operating conditions have to be specified).)

Should the battery be (required to perform the full specified discharge (duty cycle throughout its (life, then a 125% factor (for age should be applied (in the initial battery size (calculation.)

This item is covered by chapter 6.15 of IEC/EN 60896-21 and -22

Service life is strongly (related to the working (conditions of the battery.) Factors affecting the service life are:

AMBIENT TEMPERATURE

The operation of valve regulated (lead-acid batteries on float (at temperatures higher (than 20°C reduces the battery life expectancy, (with 50% life reduction per (10°C constant increase of the temperature. However, (adjusting the float (voltage according to (the ambient temperature (may reduce this effect. (More information should (be available in the (manufacturer's (specification or operating (guide.)

In case of elevated (ambient temperature, float (voltage compensation is (recommended.)

Reference should be made (to the manufacturer's (recommendations.)

Temperatures higher than (40°C can produce ever (increasing float current (values, which can create a (thermal runaway condition (and cause premature

(failure of the battery.)

FLOAT CHARGE RIPPLE

(Excessive ripple on the (DC) supply across a battery has the (effect of reducing life and (performance.)

It is recommended, therefore, that (voltage regulation across the (system, including the load, should (be better than +/- 1% between (5% to 100% load, without the (battery connected and under (stable state of conditions.)

Transient and other ripple type (excursions can be (accommodated provided that, (with the battery disconnected but (the load connected, the system (peak to peak voltage, including (the regulation limits, falls within (±/- 2.5% of the recommended (float voltage of the battery.

Under (no circumstances should the (current flowing through the (battery when it is operating under (float conditions reverse into the (discharge mode.)

FLOAT STABILISATION RIPPLE

This form of ripple arises when (the demands of the load are (out of phase with the capabilities (of the rectifier and the battery is (used to stabilize the system. (Some static Uninterrupted Power Supply systems (UPS) (behave in this manner, and the (condition is more like shallow (cycling.)

In these circumstances, normal (battery characteristics no longer (apply and the manufacturer (should provide the optimum (operational conditions.)

DEEP DISCHARGING

It is recommended that, at the (discretion of the user, low (voltage disconnect features (should be used in connected (equipment.)

It is, however, recognised that (there may be circumstances, (particularly for system safety (reasons, where the (requirements for maximum (performance would preclude the (use of a low voltage disconnect (feature.)

INSTALLATION AND COMMISSIONING

Cells and batteries should be (installed, commissioned and (operated in accordance with:

- The manufacturer's (recommendations/ (instructions.)
- IEC (62485-2 Safety requirements (for (secondary batteries and (battery installations (– Part 2: Stationary (batteries.)
- Regional/national/ (local environmental standards.

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EUROBAT

EUROBAT is the leading association for European automotive and industrial battery manufacturers, covering all battery technologies and has more than 50 members. The purpose of the Association is to study all matter of interests, promoting regulatory, commercial and economic interests, to facilitate the continued growth of the European industry and to work with stakeholders to help develop new battery solutions



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