

GLOSSARY OF TERMS FOR VALVE REGULATED (SEALED) LEAD-ACID BATTERIES

Glossary of main battery terms

- **ABS RESIN**
A plastic material largely used for the case and cover of batteries.
- **ACTIVE MATERIAL**
The substance which electrochemically reacts in the electrode of batteries. Lead-acid batteries adopt lead dioxide for the positive electrode and spongy lead for the negative electrode.
- **AMBIENT TEMPERATURE**
Average temperature in the vicinity of the battery.
- **AVAILABLE CAPACITY**
The capacity actually available from a cell/ battery. The available capacity is the capacity of a battery when it discharges at a specified hour rate, and expressed in hour rate and Ah.
- **BOLT FASTENING TERMINAL**
A type of battery terminals, to which lead wires are connected with bolts.
- **BUILT-IN THERMOSTAT**
The built-in thermostat is a resettable switch built in a battery for temporarily cut off the battery circuit when the temperature of the battery exceeds a preset value or when the battery charges/discharges at a higher rate than predetermined.
- **CAPACITY**
The electric capability of a battery. It usually means ampere- hour capacity expressed in Ah or C (coulomb).
- **CELL**
The minimum battery unit which composes a storage battery. Nominal voltage of the cell of the lead-acid battery is 2 V.
- **CHARGE**
The operation of supplying a battery with a DC current from an external power source to have the electrode active materials conduct chemical reactions then to store electric energy as chemical energy in the battery.
- **CHARGE ACCEPTANCE TEST**
Test of batteries to check whether or not they are adequately recharged after discharge.
- **CHARGING EFFICIENCY**
General term for ampere-hour efficiency and watt-hour efficiency. In many cases, however, it means the ampere-hour efficiency.
- **CONSTANT CURRENT CHARGE**
A method of charging: to charge a battery with a constant current.
- **CONSTANT VOLTAGE CHARGE**
A method of charging: to charge a battery by applying a constant voltage to the terminals.
- **C-RATE**
A charge or discharge current rate expressed in A or mA. It is numerically the same as the hour rate capacity of a battery expressed in Ah of the rated capacity.
- **CUT-OFF VOLTAGE OF DISCHARGE**
The terminal voltage of a battery at which discharging should be discontinued. This voltage depends on discharge current, type of electrodes and construction of battery.
- **CYCLE LIFE**
The number of charge/discharge/rest cycles a cell/battery can provide. Cycle life is usually expressed by the number of cycles available before duration of discharge decreases to a half of the initial value.
- **DEPTH OF DISCHARGE**
A value to express the state of discharge of a battery. The depth of discharge is generally expressed by the ratio of discharge amount to rated capacity of the battery.
- **DISCHARGE**
To draw off the electric energy stored in a cell/ battery.

- **DISCHARGE RATE**

The term to express the magnitude of discharge current. When assuming discharge current and time to discharge cut-off voltage t hours, this discharge is called t hour rate (tHR) discharge, and the current is called t-hour rate discharge current. When time t is minutes instead of hours, tMR is used.

- **DUTY CYCLE TEST**

Test of batteries in ordinary use including charge, discharge and rest.

- **ELECTROLYTE**

The medium which serves to conduct ions in the electrochemical reactions in batteries. The lead-acid battery adopts diluted sulfuric acid as the electrolyte.

- **ENERGY DENSITY**

Energy available per unit Approx. mass or unit volume of a cell/ battery. Energy density is expressed in Wh/ kg or Wh/l.

- **FLOAT CHARGE**

The system in which a constant voltage is continuously applied to a battery connected to a rectifier in parallel with a load to maintain the battery in charged state: on occurrence of power failure or load variation, the battery supplies power to the load without any short break.

- **GAS RECOMBINATION ABILITY**

Capability of a battery to recombine (or absorb) internally generated oxygen gas at the negative plate. The greater this capability is, the larger the available charge current.

- **HIGH RATE DISCHARGE**

A very rapid discharge of a battery. (In many cases it means discharging at approx. 1 CA or higher rate.)

- **INTERNAL PRESSURE**

The pressure within a sealed battery. Internal pressure of a battery is increased by oxygen gas which is generated from the positive plate at the end of charging.

- **INTERNAL RESISTANCE**

The resistance within a battery: it is the total of individual resistances of the electrolyte and the positive and negative plates. Internal resistance is simply measured with the current four-terminal method (1,000 Hz) and expressed in the composite value of resistance component and capacitor component.

- **INTERNAL SHORT-CIRCUIT**

Touching of the positive and negative plates within a cell.

- **LIFE**

The time period until a cell/battery loses its expected characteristics.

- **LOW MAINTENANCE**

Low maintenance means that no watering nor equalizing charge is required in operating batteries.

- **LOW-VOLTAGE CUT-OFF**

A circuitry designed to discontinue discharge of a battery at a predetermined voltage level.

- **MALE TAB**

The metallic pieces which are attached to a VRLA battery as the terminals.

- **MEMORY EFFECT**

A phenomenon where a temporary drop of discharge voltage is observed during deep discharge of an alkaline rechargeable battery which has been subjected to shallow charge/discharge. Cycles or trickle charging over long time.

- **NEGATIVE PLATE**

The battery electrode into which a current from the external circuit flows during discharging. The negative plate has lower electric potential than the positive plate to the electrolyte. The negative plate is incorporated with connection parts such as the electrode pole.

- **RATED CAPACITY**

A nominal value of capacity of a cell/battery, which is a measure of electric capability. Rated capacity is rather approximate compared with rated capacity.

- **NOMINAL VOLTAGE**

A nominal value to indicate the voltage of a cell battery. Generally, nominal voltage value of a battery is somewhat lower than its electromotive force. Nominal voltage of the lead-acid battery is 2.0 V per unit cell.

- **OPEN CIRCUIT VOLTAGE**

Measured voltage of a cell/battery which is electrically disconnected from the external circuit.

- **OVERCHARGE**

Continued charging of a fully charged cell/battery. With batteries which require watering, overcharge causes electrolysis of water, resulting in rapid decrease of electrolyte. Generally, overcharge adversely influences battery life.

- **OVERDISCHARGE**

Discharge of a battery to a voltage below a predetermined cut-off voltage.

- **PARALLEL CHARGE**

Simultaneous charging of two or more batteries connected in parallel. In cyclic use of batteries, specifically, the parallel charge tends to cause an imbalance in charge state among the batteries, which may shorten their service life.

- **POLYPROPYLENE RESIN**

A plastic material which is often used for the case and cover of batteries.

- **POSITIVE PLATE**

The battery electrode from which a current flows to the external circuit during discharging. The positive plate has higher electric potential than the negative plate to the electrolyte. The positive plate is incorporated with connection parts such as the electrode pole.

- **QUICK CHARGE (RAPID CHARGE)**

Charging in a short time with a large current.

- **RATED CAPACITY**

The stated capacity of a battery; namely, the ampere-hour amount which can be drawn from the battery in fully charged state at a specified temperature, at a specified discharge rate, and to a specified cut-off voltage. The symbol CN may be used to express the rated capacity of N-hour rate.

- **RECHARGEABLE BATTERY**

The rechargeable battery is a system comprising two different electrodes and an ion-conductive medium, which is capable of converting chemical energy to electric energy, and vice versa. It is also called a secondary battery.

- **REFRESH CHARGE (AUXILIARY CHARGE)**

Charging of a battery mainly to compensate for its self discharge.

- **RESIDUAL CAPACITY**

Residual capacity of a battery after partial discharge or after storage for long time.

- **RETAINER TYPE**

A method to control flowing electrolyte in a battery with the retainer mat, etc..

- **REVERSE CHARGE**

Charging of a battery with its polarity reversed. Namely, the battery discharges.

- **SELF DISCHARGE**

Reduction in capacity of a battery while no current is drawn by the external circuit. Self discharge depends on temperature: amount of discharge approximately doubles by each (10°C) rise of ambient temperature.

- **SEPARATOR**

A porous or microporous liquid-absorbent material which is installed between the battery electrodes for preventing short-circuit, securing the separation of the electrodes and retaining electrolyte. The separator should be resistant to oxidation and chemicals; it should excel in electric insulation and liquid-retention; and it should not disturb diffusion of the electrolyte and ionic conduction.

- **STANDBY USE**

General term of constant stand-by battery systems. Batteries are kept charged by trickle/float method at all times in preparation for unforeseen power disruptions.

- **TEMPERATURE COMPENSATION**

Compensation of charge voltage for temperature variation of a cell/battery or in its vicinity. Qualitatively, charge voltage should be corrected to higher side for low temperatures and to lower side for high temperatures.

- **TERMINAL VOLTAGE AT DISCHARGE**

The voltage of a battery during discharging.

- **THERMAL RUNAWAY**

Such phenomena as an excessively high set-up voltage in constant-voltage charging of a battery and a very high battery temperature cause charge current to increase, which then raises the temperature further: this vicious cycle is called thermal runaway, which may, in the worst case, result in breakage of the battery due to heat.

- **TRICKLE CHARGE**

To charge a battery in the state of disconnection from the load to compensate for its self discharge.

- **TRICKLE LIFE**

The service life of a battery in the trickle use. Usually, the trickle life is the time expressed in years before the dischargeable time of the battery decreases to a half of the initial value.

- **UL**

Abbreviation of Underwriters Laboratories Inc. in USA. The UL establishes various safety standards, and performs official recognition of materials, parts and products.

- **UPS (Uninterruptible Power Supply)**

Equipment or system which is automatically connected to the load to supply power if the main power fails.

- **VALVE (ONE WAY VALVE)**

A valve on each battery which automatically releases gas from the battery when internal pressure of the battery exceeds a predetermined value: it prevents breakage of the battery due to excessive internal pressure caused by the gas generated by charging or other reasons. The valve also serves to prevent outside air from entering batteries.