DEFINITIONS AND TERMS IN THE STANDBY POWER INDUSTRY

ABSORBED GLASS MAT BATTERY (AGM): Absorbed glass mat technology is a battery construction method where a thin fiberglass mat (usually about 1⁄8 inches thick) is placed between and touching the positive and negative plates. All of the electrolyte (liquid) in the cell is absorbed in this mat to about 85% saturation. There is no free liquid to leak or spill.

AMP HOUR CAPACITY: A general measure of the capacity of a cell. The meaning is the Amps available from the cell multiplied by the Hours for which this current is available. (AH = amps x hours). Usually, the eight-hour rate is used to define the AH capacity of stationary industrial grade cells. AH capacities of different cells should not be used for comparison unless the same temperature, time base, electrolyte specific gravity and end voltage are used. Even in situations where these parameters are held constant, cells of equal AH capacity may vary as much as 6:1 in their ability to adequately handle a specific load profile due to varying discharge periods, cell size, and varying current magnitudes in load profiles.

BATTERY: A group of cells connected in series or parallel to make up an equivalent total voltage and current capacity.

BATTERY CHARGER: A device (usually static) to provide DC current to recharge a battery.

Note: Battery chargers can be provided in "single rate" designs for periodic connection to the battery. These are not recommended for continuous "float" service battery applications.

"Dual Rate" battery chargers provide both a "float" voltage setting and an "equalize/recharge" voltage setting to provide optimum battery life and minimum battery maintenance.

BATTERY LIFE: The end of useful life for any secondary (rechargeable) battery. This has been defined by IEEE specification as 80% of its original rated capacity. Thus, when the battery has been fully recharged and then discharged, it will provide less than 80% of its original rated capacity and will have "failed".

CELL: A single electrochemical couple. The smallest voltage equivalent for that specific type of electrode grouping.

Note: The nominal cell voltage of a nickel cadmium electrochemical couple is a 1.2 VDC. The nominal cell voltage of a lead acid electrochemical couple is 2.0 VDC.

DC/DC CONVERTER: A device (usually static) to convert one DC voltage to another DC voltage.

ELECTROLYTE: The current transporting medium used in all cells. For nickel cadmium cells, the electrolyte is a dilute potassium hydroxide, normally at a specific gravity of 1.190 ± .020. For lead acid cells the electrolyte is a dilute sulfuric acid, normally at a specific gravity of 1.215 ± .01 (flooded cells), 1.280 ± .005 (maintenance free). The electrolyte may be liquid or gelled (blended with silica to form a paste-like substance).

EQUALIZE VOLTAGE: (For lead acid cells) The voltage setting of the charger necessary to assure equal charge capacity in each of the cells in the battery.

Note: Lead acid cells are usually equalized every 60 to 90 days for at least 24 hours, even if they have not been discharged by an external load. For the better grades of lead acid cells, the time between equalizing charges can be as long as one year if the cell is "floated" at 2.25-2.30 v/c. Typical equalize voltages are 2.33-2.40 v/c. The equalizing charge is designed to compensate for variation in self discharge of the individual cells in the battery.

FLOAT VOLTAGE: The voltage setting of the charger for maximum cell life and minimum water consumption for continuous service. Typical float voltages: nickel cadmium 1.40-1.42 v/c, lead acid 2.17-2.25 v/c. (2.3 v/c for maintenance free lead acid).

GELLED CELL BATTERY: The term Gel/Cell is a registered trademark of Johnson Controls Battery Division. However, this general type of battery construction is being used by a large number of manufacturers. The liquid sulfuric acid is blended with silica to form a paste or jelly-like substance. The cell is constructed with the standard microporous rubber separator between each positive and negative plate.

INVERTER: A device (usually static) to convert DC voltage into AC voltage.

LEAD ACID BATTERY: An electrochemical couple configured by using lead active material in a dilute sulfuric acid electrolyte. The various types of lead acid batteries, i.e. "lead antimony", "lead calcium", etc., indicate only the type of metal which has been alloyed with lead to form the grid for the plate construction. Also, the various types of plate construction, i.e. Planté, tubular or Faure (flat pasted), are all just differing types of construction for lead acid batteries.

[More detail is given in Section 12 relating to the strengths and weaknesses of the various types of lead acid batteries.]

MAINTENANCE FREE BATTERY: The term "maintenance free" has been used by various battery producers in the past to designate any battery constructed so as to require less maintenance. In many cases this may simply mean the manufacturer has chosen to compensate for electrolyte loss by providing more reserve electrolyte. However, in recent years the term "maintenance free" is usually used to designate a battery designed to operate in the oxygen cycle, thus causing the gases generated during discharge and charge cycles to be reconstituted into water and to remain inside the cell.

NICKEL CADMIUM BATTERY: An electrochemical couple configured by using nickel hydroxide (positive) and cadmium oxide (negative) active material in a dilute potassium hydroxide electrolyte. The various types of plate construction used, i.e. “pocket plate”, “sintered plate”, etc., are all different forms of the nickel cadmium battery.

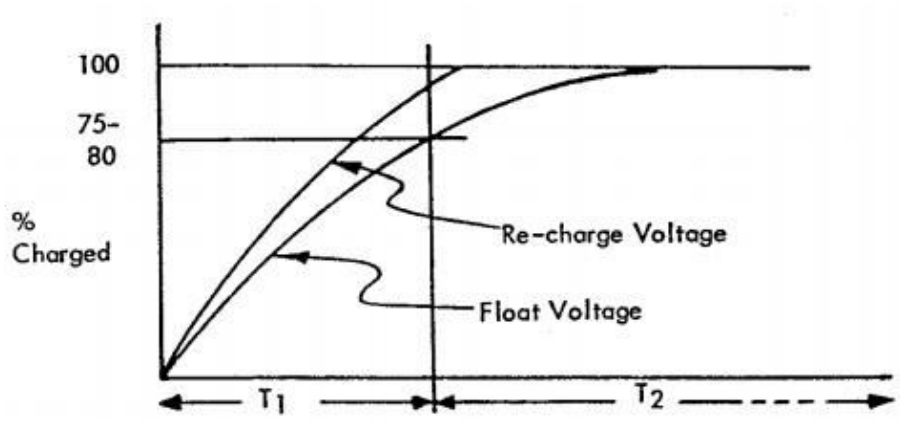
[More detail is given in Section 12 relating to the strengths and weaknesses of the various types of nickel cadmium batteries.]

OXYGEN CYCLE: The term “oxygen cycle” refers to a battery designed and constructed in such a way as to cause the oxygen gases being generated at the surface of the positive plate to migrate to the surface of the negative plate where they react to form lead dioxide which in turn reacts with the electrolyte to form lead sulfate and water. Thus no gases escape the cell under normal operation.

RECHARGE TIME: The time required to recharge a discharged battery. In all electrochemical couples, this time is actually the sum of two individual units of time.

T_1 = The time required to bring the cell form discharged to approximately 75-80% charged.

T_2 = The time required to bring the cell from approximately 75-80% charged to fully recharged.



T_1: directly relates to the current capacity of the charger. (Double the current capacity of the charger and T_1 is reduced by a factor of approximately 2.)

T_2: shows very little relationship to the charger’s current capacity, but is very much affected by the recharge voltage setting of the charger.

Note: Nickel cadmium cells can accept current very rapidly without experiencing damage. Lead acid cells, however, are prone to plate warpage if charged too rapidly. Because of this, it may be desirable for the specification to read, “The charger will recharge the battery sufficiently to perform another specified duty cycle in _____ hours” instead of specifying “fully recharged in _____ hours”.

RECHARGE VOLTAGE: The voltage setting of the charger to accomplish complete recharge of a discharged battery. Typical recharge voltages are 1.55-1.60 v/c for nickel cadmium and 2.33-2.40 v/c for lead acid.

Note: The time the charger is left at this voltage setting is also an important factor in accomplishing complete recharge.

SOLAR PHOTOVOLTAIC SYSTEM: A system, usually consisting of solar photovoltaic arrays, charge regulator and batteries to convert solar energy to electrical energy for powering various DC loads. If part or all of the load requires AC power, an inverter must be used to convert the solar generated DC power to AC power.

UPS: (Uninterruptible Power Supply) In its purest form, the term “UPS system” could indicate any power source which continues to provide its power after the utility line has failed. This could be a DC supply or an AC supply. However, in the industry the term has been applied almost exclusively to an AC/AC system configured with a minimum of a battery charger, battery and inverter.

VOLTAGE WINDOW: The delta between the maximum voltage the load can accept without damage, and the minimum voltage at which the load will continue to operate to specification.

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