TERMS TO KNOW

SEASONAL USE

Inactivity can be extremely harmful to all lead-acid batteries. If seasonal use is anticipated, we recommend the following:

a. Charge the battery completely before storing and before first usage after storage.

b. Remove all electrical connections from the battery, including series/parallel connectors before storage.

c. Store the battery in as cool a place as possible. However, do not store in a location which could fall below 32˚ F (0˚ C). Batteries will discharge when stored; the lower the temperature, the lower the self-discharge.

d. When not in use, recharge every two months or when OCV drops to 2.07 volts/cell.

75-AMP RATE

A 75-Amp rate is the amount of time (in minutes) it takes a battery to go from fully charged to (5.25V – 6V, 10.5V – 12V) 1.75 volts per cell using a constant 75-Amp discharge at 80˚ F (26.7˚ C).

20-HOUR RATE

A 20-hour rate is the total amount of Ampere hours a fully charged battery can provide in a 20-hour period, reaching a discharge level of 1.75 volts per cell at 80˚ F (26.7˚ C). Divide the Ah rating by 20 (hrs.) to determine the discharge current rate.

6-HOUR RATE

A 6-hour rate is the total amount of Ampere hours a fully charged battery can provide in a 6-hour period, reaching a discharge level of 1.75 volts per cell at 80˚ F (26.7˚ C). Divide the Ah rating by 6 (hrs.) to determine the discharge current rate.

CONVERT 20-HR TO 6-HR CAPACITY

To convert a 20-hour rate to a 6-hour rate, multiply 20-hour Ampere hour capacity by 0.84. Divide the result by 6 hours to determine the approximate discharge current rate.

RESERVE CAPACITY

Reserve capacity is the time (in minutes) it takes for a fully charged battery to reach 1.75 volts per cell using a constant 25 Amp discharge at 80˚ F (26.7˚ C).

COLD CRANKING AMPS (CCA)

Cold Cranking Amps (CCA) is a rating usually applied to starting, lighting, ignition (SLI) batteries. It is the highest discharge Amps that can be sustained by a fully charged battery for 30 seconds without dropping voltage below 1.2 volts per cell at 0˚ F (-17.8˚ C).

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DEEP-CYCLE BATTERY MAINTENANCE

Deep-cycle Batteries

The term deep cycle refers, in general, to a battery that has the capability of deeply discharging hundreds of times. Deep-cycle batteries are either liquid electrolyte or sealed lead-acid. How do they differ from other batteries? An automotive starting battery is manufactured specifically to provide a quick burst of energy thousands of times in its lifetime while only being able to deeply discharge less than 50 cycles during its life.

What Is a Cycle?

A cycle is one battery discharge and recharge of any depth (see Figure 1). The amount of battery discharge (in percent) compared to its full capacity determines the need for a shallow, moderate or deep cycle. This is appropriately called battery depth of discharge (DOD) and is expressed in percentages. For example, 40% DOD indicates that a battery has been discharged by 40% of its total capacity and has a 60% state of charge remaining.

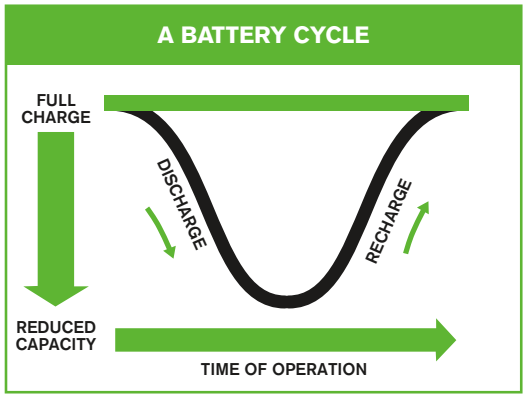

FIGURE 1

Types of Cycles

There are three primary types of battery discharge cycles: shallow, moderate and deep. These terms help us understand the type of cycling batteries experience. Let's take a look at all three types. Shallow cycles occur when only a small percentage of the total battery capacity is discharged. Moderate or deep cycles are discharged by a higher percentage of the battery's total capacity (see Figure 2).

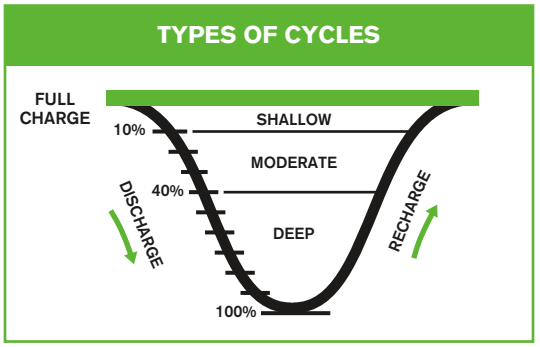

FIGURE 2

After Purchasing a Deep-cycle Battery

- New batteries should be given a full charge before use.
- New deep-cycle batteries need to be cycled several times before reaching full capacity (50-125 cycles, depending on type). Capacity will be limited during this period.
- For best battery life, batteries should not be discharged below 80% of their rated capacity. Proper battery sizing will help avoid excessive discharge.

Routine Maintenance Tips

- Battery cables should be intact, and the connectors kept tight at all times. Always use insulated tools to avoid shorting battery terminals. Regular inspection is recommended.
- Vent caps should be correctly installed and tightened during operation and battery charging.
- Batteries should be kept clean and free of dirt and corrosion at all times.
- Water used to replenish batteries should be distilled or treated, not to exceed 200 T.D.S. (total dissolved solids parts per million). Particular care should be taken to avoid metallic contamination (iron).

Deep-cycle Charging Tips

- Battery chargers should be matched to fully charge batteries in an 8-hour period. Defective and mismatched chargers will damage batteries or severely reduce their performance.
- Avoid charging at temperatures above 120˚ F (49˚ C) or ambient, whichever is higher.
- If needed, batteries should always be watered after charging unless plates are exposed before charging. If exposed, plates should be covered by approximately 1/2″ of electrolyte.
- Check acid level after charge. The acid level should be kept 1/8″ below the bottom of the fill well in the cell cover.
- As batteries age, the maintenance requirements change. This means longer charging time and/or higher finish rate (higher amperage at the end of the charge). Usually, older batteries need to be watered more often and the capacity decreases.
- Lead-acid batteries should be brought up to full charge at the earliest opportunity. Avoid continuously operating batteries in a partially charged condition. This will shorten battery life and reduce capacity.
- Deep-cycle batteries may need to be equalized periodically. Equalizing is an extended, low-current and high-voltage charge performed after the normal charge cycle. This extra charge helps keep all cells in balance.

Miscellaneous Care

- In situations where multiple batteries are connected in series, parallel or series/parallel, replacement batteries should be of the same size, age and usage level as the companion batteries.
- Extreme temperatures can substantially affect battery performance and charging. Cold reduces battery capacity and retards charging. Heat increases water usage and can result in overcharging. Very high temperatures and overcharging can cause thermal run-away, which may lead to an explosion or fire. If extreme temperature is an unavoidable part of the application, consult a battery/charger specialist about ways to deal with the situation.