

LARGE CAPACITY BATTERIES

We all have large batteries we use everyday like those in our cars and trucks. There are several types of these large capacity batteries and this article is to help explain the required maintenance for these batteries to get the longest possible life form each type. There are also things like tractors, boats, motorcycles, and other devices that use batteries but are stored for long periods of time without being used. The care of these types are also covered in this article.

There are four types of batteries that fall in the category of large capacity and they are shown below:

<u>Selection</u>	<u>Description</u>
Regular	Normal "flooded batteries with Removable caps for adding water
Gel	Gel-cell batteries Non-Removable caps
Calcium*	Batteries with lead-calcium plate Construction
Maintenance Free	Batteries with non-removable caps User cannot add water to cells

*Such as ACDELCO, and Voyager brands.

Note that "Deep-Cycle" is not one of your choices. This is because any of the battery types listed can also be of the deep-cycle variety. This does not change the information that follows.

The most effective way to extend the useful life of your batteries is to ensure that they remain fully charged between uses. An uncharged battery will slowly lose its ability to retain a charge through the process of sulfation. This loss of capacity can become permanent if the battery remains in a discharged or undercharged state for an extended period. Sulfation, in fact, is the primary cause of battery failure. It is very common for us that have Tractors, etc. to leave them sit for long periods of time. Now you know why those boat, and motorcycle batteries tend to not last very long.

The second leading cause of battery failure is overcharging. Forcing even a small amount of excess current into your batteries for an extended time will damage the batteries through accelerated plate corrosion and heating. Unfortunately, many battery charging and maintenance devices are not designed to be left safely attached to your batteries for more than a day or two at a time. We all have done this.. "I'll just leave the charger on the battery all year". Unless you have a good three mode charger this is just as bad as leaving it unattended.

So why not just put a full charge on the battery and store it until it is needed again? When left unattended, all batteries lose charge from internal chemical processes at a rate of 1-2% of the battery's rated amp hour capacity per day. Therefore, even if the battery is stored fully charged, it soon loses enough of its charge to be susceptible to Sulfation.

So here is what a good charger will do for you:

Mode 1 - Bulk Mode: The charger is in current-limit and delivers its maximum rated current to the battery. It is in this mode that the battery receives most of its recharge. When the battery voltage rises to approximately 14.7V (for a 12V system), the battery is at a 75% to 90% recharge level and the charger switches to absorption mode.

Mode 2 - Absorption Mode: The charger is in a constant-voltage mode delivering approximately 14.7V to the battery. The charger measures the amount of charging current being delivered to the battery. When the charging current drops to approximately 10% of the chargers maximum-current rating, the battery is 100% recharged and the charger switches to float mode. It is because of the absorption mode that this type of charger should not be used as a power supply

Mode 3 - Float Mode: The charger is in constant-voltage mode at a lower voltage than in absorption mode (approx. 13.8V for a 12V system). This allows the battery to draw just enough current to make up for its internal leakage current. When the charger is in this mode, the battery may remain connected to the charger for all of the battery's service life with no damage to the battery.

Be sure to check electrolyte levels every couple of months...

EQUALIZATION:

There is also a maintenance function that you can perform on large capacity batteries called Equalizing. (NOTE THAT GEL CELL BATTERIES DO NOT NEED THIS AND WILL BE DMAGED OR DESROYED BY TRYING!!)

Be Sure and check the electrolyte levels before and after you equalize as this function consumes electrolyte. Equalizations occurs under a rapid charge rate such as what would be supplied by a typical automotive charger. This is done by forcing the voltage as high as 17 volts and charging at a high current rate. This will ensure that all the individual cells (6 of them in a 12 volt battery) receive equal charges. This however will also reduce the life of your battery and should only be done when the capacity of the battery seems to have been decreased. This may not be required at all if the batteries are maintained by a good three stage charger. The disadvantage of using a 3 stage charger is if you use a device that draws current from the battery while the charger is connected. This will cause the battery charger to think the battery needs charging and revert to mode one. This is not a problem for some devices such as motorcycles, boats, tractors, etc. since they will be disconnected prior to use. Some devices such as emergency radio power could be used with the charger still connected. This is not suggested!! A simple disconnect device either automatic or manual will help the charger not to be confused and will assure that radio or other device will not see the increase in voltage due to the battery charger coming on line.

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