**BATTERY INFO**

**Mini Factoid**

Nearly all batteries will not reach full capacity until cycled 10-30 times. A brand new battery will have a capacity of about 5-10% less than the rated capacity.

Batteries should be watered **after** charging unless the plates are exposed, then add just enough water to cover the plates. After a full charge, the water level should be even in all cells and usually 1/4" to 1/2" below the bottom of the fill well in the cell (depends on battery size and type).

In situations where multiple batteries are connected in series, parallel or series/parallel, replacement batteries should be the same size, type, and manufacturer (if possible). Age and usage level should be the same as the companion batteries. Do not put a new battery in a pack which is more than 6 months old or has more than 75 cycles. Either replace with all new or use a good used battery. For long life batteries, such as the Surrette and Crown, you can have up to a one year age difference.

Inactivity can be extremely harmful to a battery. It is a **VERY** poor idea to buy new batteries and "save" them for later. The best thing - if you buy them, use them.

Most flooded batteries should be charged at no more than the "C/8" rate for any sustained period. While some battery manufacturers state a higher maximum charge rate, such as C/3, higher charge rates can result in high battery temperatures and/or excessive bubbling and loss of liquid. ("C/8" is the battery capacity at the 20-hour rate divided by 8. For a 220 AH battery, this would equal 26 Amps.) Gelled cells should be charged at no more than the C/20 rate, or 5% of their amp-hour capacity. Concorde **and some other AGM** batteries are a special case - they can be charged at up the the Cx4 rate, or 400% of the capacity for the bulk charge cycle for a short period. However, since very few battery cables can take that much current, we don't recommend you try this at home. To avoid cable overheating, you should stick to C/4 or less.

Charging at 15.5 volts will give you a 100% charge on Lead-Acid batteries. Once the charging voltage reaches 2.583 volts per cell, charging should stop or be reduced to a trickle charge. Note that flooded batteries **MUST** bubble (gas) somewhat to ensure a full charge, and to mix the electrolyte. Float voltage for Lead-Acid batteries should be about 2.15 to 2.23 volts per cell, or about 12.9-13.4 volts for a 12 volt battery. At higher temperatures (over 85 degrees F) this should be reduced to about 2.10 volts per cell.

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State of charge, or conversely, the depth of discharge (**DOD**) can be determined by measuring the voltage and/or the specific gravity of the acid with a hydrometer. This will NOT tell you how good (capacity in AH) the battery condition is - only a sustained **load test** can do that.

**Simple Guidelines for Extending Battery Life**

* Allow a fully saturated charge of 14–16 hours. Charge in a well-ventilated area.
* Always keep lead acid charged. Avoid storage below 2.07V/cell or at a specific gravity level below 1.190.
* Avoid deep discharges. The deeper the discharge, the shorter the battery life will be. A brief charge on a 1–2 hour break during heavy use prolongs battery life.
* Never allow the electrolyte to drop below the tops of the plates. Exposed plates sulfate and become inactive. When low, add only enough water to cover the exposed plates before charging. Always fill to the correct level after charge.
* Never add acid. This would raise the specific gravity too high and cause excessive corrosion.
* Use distilled or de-ionized water. Tap water may be usable in some regions.
* When new, a deep-cycle battery may have a capacity of 70 percent or less. Formatting as part of field use will gradually increase performance. Apply a gentle load for the first five cycles to allow a new battery to format.
* New batteries with low capacity many not perform as well as those that begin life with a high capacity. Low performers are known to have a short life. A capacity check as part of acceptance is advisable.