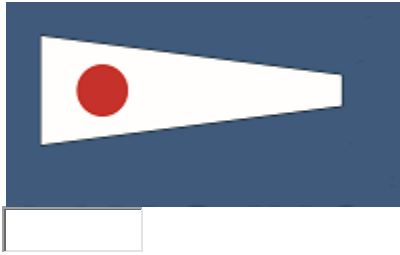


From: [https://shop.pkys.com/Battery-Equalization\\_ep\\_44.html](https://shop.pkys.com/Battery-Equalization_ep_44.html)



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## Battery Equalization

Equalizing lead acid batteries is a process designed to de-sulphate the battery plates by carrying out a controlled overcharge. Battery plates tend to acquire a sulphate coating over time which then hinders the chemical action between the electrolyte and the plate. By equalizing the battery in this controlled overcharge the outer layer of the plate, including the sulphate coating, is blown off, thereby rejuvenating the battery and allowing all the surface area of the plates to interact with the electrolyte. It also causes the electrolyte to bubble and in wet cell batteries this mixes up the acid and distributes it evenly throughout the cell.

Recommendations on the frequency at which equalization be carried out vary from monthly to once or twice a year. Some manufacturers only recommend it be carried out when necessary, (Trojan), or once every six months or as necessary, (Rolls). My personal experience is that equalizing the batteries is a rather tedious, worrisome and smelly process so once or twice a year is more than enough. I particularly recommend it though for boats that rarely come to the dock. Such vessels get their batteries fully charged less often and seem to report tired batteries on a more frequent basis than boats that get fully charged on a regular basis.

Equalizing the batteries is a tool that can be used to rejuvenate tired batteries or to prevent batteries from becoming tired. As a tool it is a double edged sword of course, this removal of the outer layer of the plates reduces their size and volume and thus their longevity. The material removed will fall to the bottom and may eventually short out the plates. I find that the best way to decide on whether to equalize and how often is to consult the information from the relevant battery manufacturer. You will find different opinions even among battery manufacturers on the way equalization is to be carried out.

If you are reading this article it is probably because you are having battery trouble. One of the best ways of heading off trouble in the future



is to install an [amp hour meter](#) to give you a better idea of how your batteries are performing. Scroll to the end of this article for more information.

#### Equalizing wet cell batteries

1. The batteries must be fully charged to begin with.
2. Disconnect all loads. You are going to allow the battery voltage to rise higher than normal; to 15 or 16 volts for a 12 volt battery bank. You don't want to damage sensitive electronic equipment that might be connected.
3. Remove any hydrocaps fitted to the cells
4. Connect the charger and set it to the equalizing voltage. (For Trojan wet cell batteries the recommended equalizing voltage is 15.5 volts for a 12 volt bank, for Rolls the equivalent voltage is 15.5 - 16 volts)
5. Batteries will begin gassing and bubbling vigorously
6. Don't allow the battery temperature to rise much above 115 degrees F and never above 125 degrees. Measure from a center cell.
7. Take the specific gravity at hourly intervals
8. Equalization is complete when the specific gravity no longer rises.

For Rolls batteries the end of the instructions were more specific

9. If severely sulfated, it may take many hours for the specific gravity to rise.
10. Once the specific gravity begins to rise the bank voltage will most likely drop or the charging current will increase. The charging current may need to be lowered if temperature approaches 125°F (46°C). If the charge controller was by passed, it should now be used or put back in line.
11. Continue measuring the specific gravity until 1.265 is reached.
12. Charge for another 3 hours. Add water to maintain the electrolyte above the plates.

13. Allow bank to cool and check and record the specific gravity of each cell. The gravities should be  $1.265 \pm 0.005$  or lower. Check the cell electrolyte levels and add water IF necessary.

#### Equalizing AGM and other sealed batteries

Equalizing AGM and other sealed batteries is a bit more tricky. The bubbling electrolyte results in some loss; electrolyte vapor exits the vent caps. However because there is no way to replace the lost electrolyte it is obvious that a different strategy is required. I couldn't find any manufacturer that recommended equalizing Gel batteries. These batteries are highly sensitive to over-charge and equalizing is not going to work for them. However although I did find a

manufacturer that definitely did not recommend equalizing their AGM batteries (Trojan) I did find at least one manufacturer (Lifeline) that did recommend equalizing their AGM batteries.

Lifeline use the term "Conditioning". They say this should only be done when the battery is showing loss of performance due to having spent extended time in a partial or low state of charge, or that don't often get charged above 90% (Cruisers that never come to the dock please take note!)

Lifeline AGM instructions:

To apply a conditioning charge, first go through the normal charge cycle to bring the battery to full charge. The conditioning charge should then be applied by charging for 8 hours. At 77°F (25°C), the conditioning voltage should be set at 2.58 VPC (15.5 volts for a 12 volt battery). The conditioning voltage at other temperatures is shown in Table 5-2. By using the temperature compensated conditioning voltage, batteries that are not in controlled temperature environments may be conditioned without bringing them to room temperature. If temperature compensation is not available, it is best to bring the battery as close to room temperature as possible before applying the conditioning charge.

[Equalizing Trojan wet cell batteries](#)

[Equalizing Rolls Surette batteries](#)

[Lifeline AGM battery recommendations for equalization](#) (see page 20 for Conditioning and Equalization)

Here at PKYS we only have a few battery chargers capable of carrying out an equalizing charge. One range that does is the [Blue Sea Systems Pacific Series chargers](#). The [Baltmar MC614-H](#) alternator regulator is also capable of giving an equalizing charge



More information on batteries can be found on the very useful website [www.BatteryFAQ.org](http://www.BatteryFAQ.org)



Heading off future trouble with an Amp Hour Meter

Amp hour meters such as this [Victron BMV700](#) keep a historical record of your battery efficiency. They start off assuming a default efficiency of 90% but over time they calculate what the actual value is. When batteries are new they are about 90% efficient and in the first few months the efficiency may exceed 90%, but as their working life progresses they will spend most of their time around 90% efficiency. Eventually the efficiency will start to drop and I normally tell people that by the time the battery has got to 85% efficient it is time to replace it as the deterioration of performance will become more rapid as the

end of its useful life approaches. Without a meter you wouldn't notice a drop to 85% so that is why an amp hour meter can be such a useful tool if you know how to use it.

Having an amp hour meter doesn't mean you won't have to equalize your batteries, but it might tell you when to equalize and when it is time to replace them.