Calculation Formula

NOTE: If your specific battery type is not listed in the chart above, use the formula below to calculate the amount of Battery De-Sulfater to add to each cell of the battery.

Battery De-Sulfater Volume Calculation formula:

((w * 2.5) ÷ c) ÷ 30 = s
w = Weight of battery, in pounds
c = Number of cells in battery (e.g., 3, 6, 12, 18, 24)
s = Number of fluid ounces of Battery De-Sulfater to add to each cell

Multiply the weight of the battery (in pounds) by 2.5, then divide this number by the number of cells present in the battery (e.g., 3, 6, 12, 18, 24), then divide this number by 30. This is the amount of Battery De-Sulfater to add to each cell of a deep cycle battery. If treating a starting battery, use at least 1/3 less than the amount calculated.

After calculating the correct volumes, follow these instructions:

BATTERY DE-SULFATION USAGE& BATTERY EQUALIZATION INSTRUCTIONS

An equalized charge is often defined as a controlled overcharge. This is a true 100% full charge of the battery bank. Check each cell voltage with a hand held digital voltmeter and compare readings of all the cells of the bank so that you can tell how equal all the cells are. Cells voltages should all be within .05 volts for batteries at rest (no charging or discharging happening) for example the highest reading may be 2.15 volts and the lowest reading may be 2.10 volts. If cells vary by more than this then you should charge the batteries until all cells fall within .05 volts.

If the battery bank consists of 6 volt or 12 volt batteries that do not allow you to take voltage readings of each individual 2 volt cell and you do not have a All Cell Digital Tester then checking each cell with a battery hydrometer is the only way to be absolutely sure that the batteries are equalized. Each cell is fully charged at or about 1.270 points specific gravity on a temperature compensated battery hydrometer. This reading may actually vary slightly due to manufacturers different specs for various battery types. Some batteries may be fully charged at 1.260 specific gravity. Equalized cells will all be fully charged and all within .010 points specific gravity of each other.

Unequal cells as measured by specific gravity with a battery hydrometer are a normal fact of battery life especially with deep

cycle batteries. Over several charge/discharge cycles the individual 2 volt cells (3 per each 6 volt battery) drift apart in voltage and the only way to bring them all back to an equal state of charge is to overcharge the entire battery bank until the cells lowest in charge catch up with the other cells. Cells that are in a low state of charge will begin to sulfate, that is the lead sulfate on the plates stays there because it is not driven off during a complete recharging of that cell. The longer the sulfate stays on the battery plate the more crystallized and hard it becomes making it more difficult to get it off the plates and back in the electrolyte solution. Sulfation on the plates means less plate area for the electro- chemical process to take place which results in reduced storage capacity.

Battery De-Sulfater Instructions

Battery De-Sulfater is a non-acid chemical formula that will break down deadly sulfation corrosion that has formed on the plates and insulators. Battery De-Sulfater will restore the normal action in the cells of a mechanically sound battery (mechanically sound meaning batteries that still barely work and that do not have a cracked and / or broken plate and or connection) by breaking down, dissolving and help to keep hard crystallized sulfation from forming again. Battery equalization works if the battery is not too heavily sulfated but if it is then there is the risk of creating too much heat which would result in shedding some active material from the plates, warping them and ultimately destroying the battery. Battery De-Sulfater added to the sulfated cells breaks up hard sulfation and allows the battery to charge

back up much faster with much less heat therefore preserving the integrity of the battery.

Before adding Battery De-Sulfater shake bottle well to mix up the ingredients. (This is very important). Avoid contact with metal as this could neutralize the chemical. Add exact amount of Battery De-Sulfater according to chart on bottle. If your battery is not listed on the bottle refer to web site **www.thermoil.com** under quantity charts and read instructions at lower bottom of page. **CAUTION: Adding to much Battery De-Sulfater may raise the voltage, possibly resulting in damage to your battery. If you are treating a starting battery cut dosage by at least 1/3 because the plates in a starting battery are much thinner than a deep cycle battery.**

After adding Battery De-Sulfater charge at 5 amps or less for the first few charges. If battery is heavily sulfated charge at 2 amps the first few charges. This gives the product more time to slowly dissolve the lead sulfate crystals with much less chance of heating the battery up and shedding more material off the plates. Note that charging at this low amperage it will take days to bring back these heavily sulfated batteries. After that cycle (cycle meaning discharge/charge) the battery 4 to 7 times for maximum removal of lead sulfate crystals. If after cycling and charging at this low amperage and the battery is still not charging up fully then charge at a much higher rate. Note that the battery might start to heat up but this is what must be done

then. Do not let the battery get over 120º while on charge. If it gets this hot then stop and let cool then discharge and charge again. After several times of doing this your battery will start taking more of a charge & discharge each time until all or most of the sulfation is driven off the plates. If your 12 volt battery is below 11 volts or your 6-volt battery below 5 volts then it is be best to just replace the batteries. Battery De-Sulfater works every time in any mechanically sound battery.

Battery De-Sulfater was really made for deep cycle batteries because deep cycles corrode and use much more water than starting batteries That being said all you have to do is cut the dosage of De-Sulfater for starting batteries because the plates are much thinner. The formula that I would start with for starting batteries is this. Battery Weight x 1.875 divided by the number of cells then divided by 30. Take the weight of the battery then multiply that by 1.875 then divide that by the number of cells in battery then divide that by 30.

Example say your starting battery weighs 50 lbs. You multiply that by 1.875 so 50lbs x 1.875 = 93.75 Now if it is a 12-volt battery you have 6 cells so you divide the 93.75 by 6 which will equal 15.62 Now you divide that 15.62 by 30 so we have 15.62 divided by 30 = 0.52 so I would add basically no more than 1/2 oz per cell to this type battery.

(If the battery was a 6-volt then you would divide that 93.75 by 3 because you would only have 3 cells in the

battery). 93.75 divide by 3 = 31.25 divided by 30 = 1.04 so a 6 volt 50 lb battery this weight would require 1 oz per cell.)

If it is a deep cycle battery the formula would then be weight x 2.5 then divide by number of cells then divide that by 30. I would start with that formula and if you needed to add a little more you could but do not add to much. The formula we have on the instruction sheet that we send with the product is weight x 2.5 then divided by number of cells then divided by 30 then we say cut back about 1/3 if it's a starting battery but I would start with the formula above.

If you have any questions about Battery De-Sulfater always feel free to give us a call at 800-221-5351 or watch the Treating Your Battery With Battery De-Sulfater Video which is on the home page at www.thermoil.com . Just click on the videos link on home page then scroll down to the Treating Your Battery With Battery De-Sulfater Video.

CAUTION: Always wear eye protection and rubber gloves when servicing a battery. Batteries contain sulfuric acid which can cause severe burns. Keep away from eyes and skin. In case of eye or skin contact, flush thoroughly with water. Avoid breathing of vapors. Do not take internally. If swallowed, do not induce vomiting, call a physician immediately. Keep out of the reach of children.

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