

Specific Gravity Performance

An Introduction

One of the key parameters of battery operation is the specific gravity of the electrolyte. Specific gravity is the ratio of the weight of a solution to the weight of an equal volume of water at a specified temperature. Specific gravity is used as a key indicator of the state of charge of a battery. Proper charging maintains specific gravity levels to create the chemical conditions inside of the battery that yields the best performance. The table below illustrates this concept:

State of Charge	Specific Gravity	Voltage 12V	Voltage 6V
100%	1.265 minimum	12.7	6.3
75%*	1.225	12.4	6.2
50%	1.190	12.2	6.1
25%	1.155	12.0	6.0
Discharged	1.120	11.9	6.0

The Challenge

One key point to understand is that the process of sulfation starts when the specific gravity of batteries falls below 1.225 or voltage measures less than 12.4 (12 volt battery) or 6.2 (6 volt battery). Sulfation hardens the battery plates reducing and eventually destroying the ability to generate volts and amps. The management of specific gravity is the single most important factor in reducing sulfation. It is also the most important variable in determining how long the battery can yield effective energy as it discharges and the overall longevity of a battery. In short, the better specific gravity is managed the greater day-to-day productivity and lower overall costs associated with having to replace batteries more frequently.

The Fundamentals

The lead acid battery is made up of plates, lead, lead oxide, and various other elements with roughly a 35% sulfuric acid and 65% water solution. The solution is called electrolyte which causes a chemical reaction that produces electrons. When a battery is tested with a hydrometer, the gauge measures the amount of sulfuric acid in the electrolyte. If the reading is low, that means that the amount of sulfuric acid available in the solution to produce electrons is deficient. At this point sulfur from the sulfuric acid component of the electrolyte adheres to the battery plates. Charging the battery with a charger, releases the sulfur that adheres to the battery plates back into the electrolyte and restarts the chemical process that allows the battery to accept and store a charge. The quality of the charger and the charge profile delivered directly impacts this process.



The Solution to Better Battery Performance

One of the keys to developing the best battery performance is bringing batteries up to the proper specific gravity levels as recommended by battery manufacturers. Pro Charging Systems, LLC (PCS) manufactures the only chargers that will consistently recharge batteries to a 100% level. By bringing a battery's electrolyte to this charge level and in turn the proper specific gravity level, we significantly reduce sulfation, which is a primary cause of premature battery failure. Our charging profile results in over 25% more discharge time for the customer and much better service life. We provide a very fast recharge time, reaching absorption levels in virtually the same amount of time as our fastest competitors. We then take batteries to a "finishing" level while our competitors have already terminated their charge profile or ended in a float stage.

Pro Charging System battery chargers sets the standard for our industry. Our quality, performance and service are unequalled in the industry. For many years, we have been the premier provider of industrial and marine battery chargers. Today, we continue to innovate and lead the way in battery charging technology. Our chargers are built here in America and they are built to last.



PCS Specific Gravity Comparisons

