



WHY USE ZERO RPM LITHIUM?

ENGINES CAN'T POLLUTE AT ZERO RPM[®]

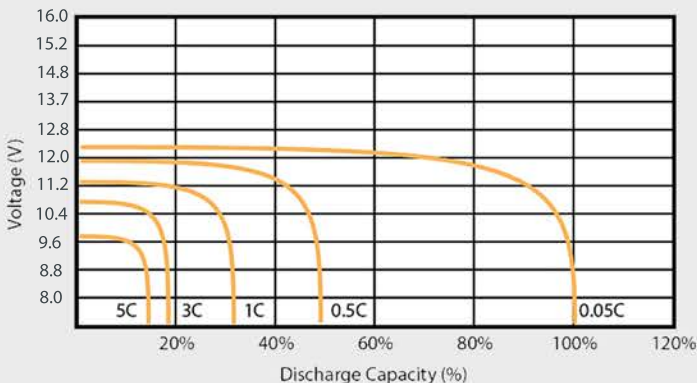
Traditional deep-cycle lead-acid batteries are being replaced with lithium-iron battery systems in multiple vehicle applications. ZeroRPM[®] products provide exceptional energy, dependability, and safety by using lithium-iron batteries and our patented controls technology. Uncompromising stability and energy density make lithium-iron technology a clear outperformer compared to other battery technologies such as flooded lead-acid and AGM. The chart below compares the three most common battery types.

Comparison Chart	Flooded Lead-acid	AGM	Lithium-iron
Safety ZeroRPM lithium-iron battery chemistry (LiFeMnPO4) is considered one of the most inherently safe of all lithium-ion batteries. In addition to being chemically safer, ZeroRPM batteries offer electromechanical protection by automatically disconnecting if a cell voltage or temperature exceeds specified operating limits. They also have a relief valve to prevent explosions in the event of a puncture.			
Weight Per kilowatt, lithium-iron batteries have about 1/3 the weight of lead-acid and AGM batteries. It takes three lead-acid based batteries to equal the usable energy of one lithium-iron battery.			
Charge Time One of the most valuable properties of lithium-iron technology is its ability to charge much faster than other battery technologies. This equates to more time saving fuel and improving operator comfort and less time charging.			
Energy Capacity Lithium-iron batteries offer nearly double the usable energy capacity of other battery technologies as they have a deeper depth of discharge (DOD). AGM and flooded lead-acid batteries offer a 50% DOD, whereas lithium-iron offers an 80% DOD.			
Battery Cycle Life Lithium-iron technology is capable of extraordinarily long life. ZeroRPM batteries have a much greater service life than those based on other technologies. Depending on factors such as temperature and discharge rate, they can last well over 2,000 cycles.			
Upfront Cost Although lithium-iron technology has a higher upfront cost than other battery technologies, this is outweighed by its significantly lower lifetime cost.			
Lifetime Cost Lithium-iron batteries' exceptional capacity and service life make them much more cost-effective in the long term than batteries based on other technologies, offsetting their higher upfront cost.			

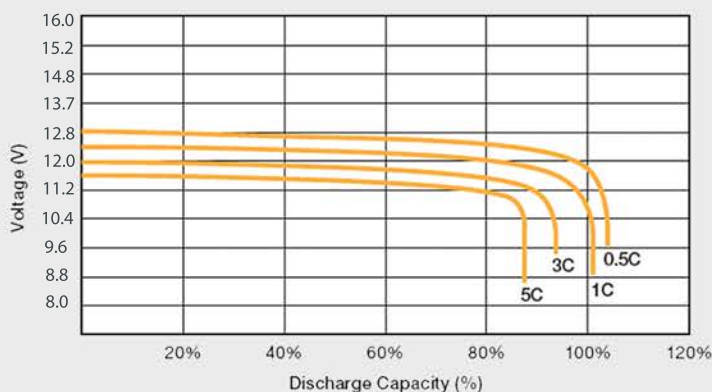
DISCHARGE PERFORMANCE

Likely the most valuable trait of Lithium-iron batteries is their ability to maintain excellent voltage and discharge stability when under heavy loads. As seen in the charts below, lead acid based batteries suffer as higher loads are applied.

Lead Acid - Discharge Capacity vs Terminal Voltage



Lithium - Discharge Capacity vs Terminal Voltage



**Some data in this document was referenced from Victron Energy