



American Signal

Lithium Iron Phosphate LiFePO_4

🌱 A Practical, Green Solution for today's equipment 🌱



Discussion

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Lithium Iron Phosphate VS other LITHIUM

- LiFePO_4 is popular in industries with heavy use and rough environments.
- While this chemistry has a slightly lower energy density (3.2V/Cell), it can withstand a lot of abuse.
- It has a long lifespan, and is less costly and much safer because it does not contain cobalt.
- Can even withstand a very wide range of temperatures. LiFePO_4 can also withstand discharge currents up to 20 X Capacity but typical usage patterns include 1 X Capacity.
- Overall this is the safest and most reliable chemistry.

Abusive Test Comparison

<https://lithiumwerks.com/products/technology/comparative-study/>

Test Results	LiFePO4	LCO
Nail Penetration Test Pierce cell with metal nail to cause internal short	PASS	FIRE
Round Bar Crush Test Slow crush with metal nail to cause internal short	PASS	FIRE
Abnormal Charge Test 3x recommended charge rate for 48 hours – no restrictions	PASS	FIRE
Extended Hot Box Test 150°C exposure for greater than 10 minutes	PASS	FIRE
Bullet Test Multi-cell Pack Abuse Testing	PASS	FIRE
Series/Parallel Test Multi-cell Pack Abuse Testing	PASS	FIRE

Practical Reasons for using Lithium- IRON LiFePO_4

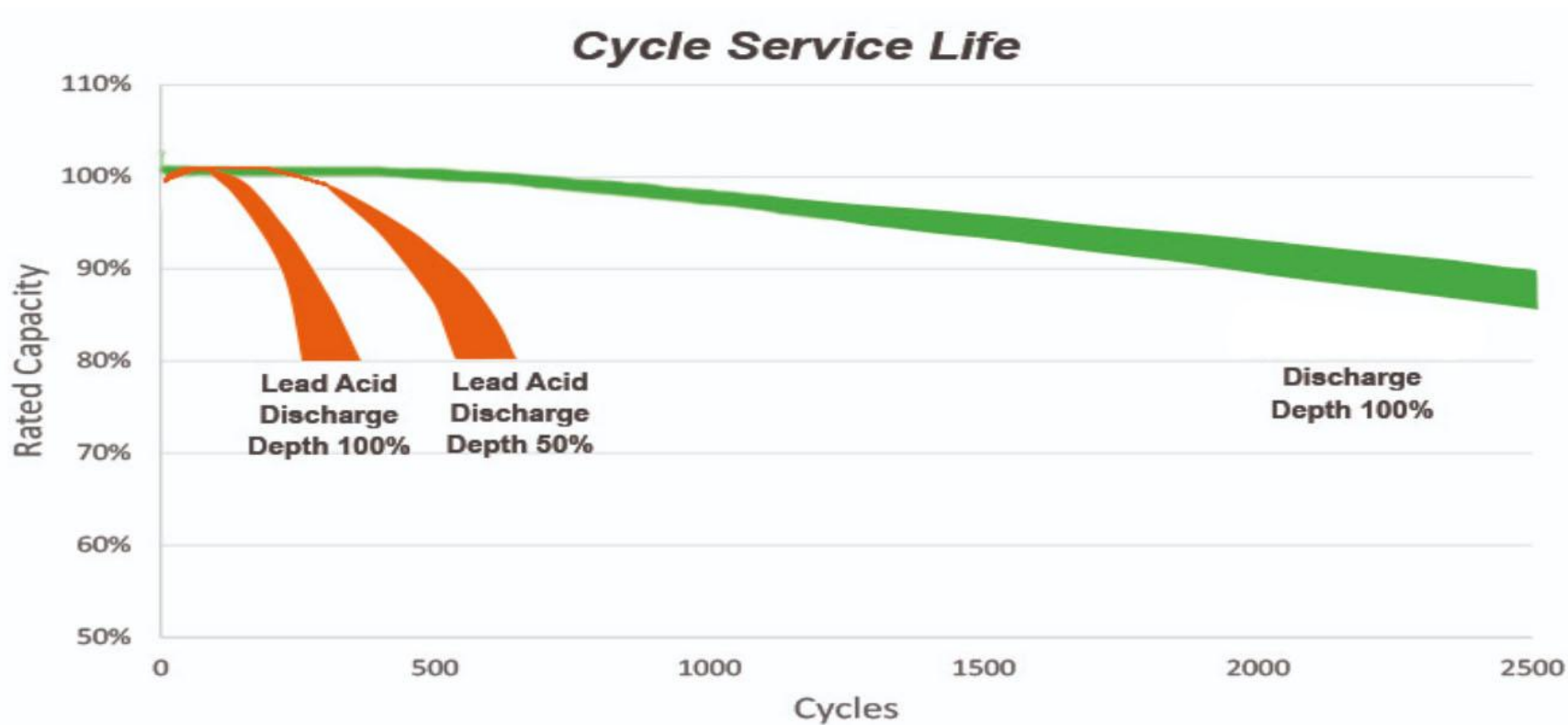
- Battery for life of product 7 Year Warranty (USED IN AMSIG EQUIPMENT)
- Performs more reliably in both low temperature and high temperature conditions.
- No Derating in cold weather due to discharge rate is not a concern
- Safe Charging at low temperatures C/10
- Allows for compact battery designs
- High energy density for products such as light plants, can fit 5x more capacity in the same area
- Low volatility compared with lithium polymer batteries
- Existing Products can be upgraded with minimal effort
- Easier to handle and install, reducing strain on equipment and workers while enhancing maneuverability



Lithium Iron Phosphate vs lead-acid solution

- **Energy Density in Less Weight:**
A Lithium Iron battery typically stores 3 times the energy density of a lead-acid solution, in less than half the total weight.
- **Constant Power:**
Low internal resistance means fast charging and no loss of power during the complete discharge cycle.
- **Cost-savings:**
While the initial purchase costs of Lithium batteries may be higher, due to the significantly longer lifespan and lack of maintenance required, the overall cost-per-cycle of a Lithium Iron solution is dramatically lower.
- **Usable Energy:**
Lithium-iron possesses more usable energy over any state of charge. Lithium batteries 100% of rated capacity is available, regardless of discharge rate.
- **Longer Life:**
Lead-acid batteries will only deliver a few hundred cycles before they need replacing. Lithium solutions provide thousands of cycles.
- **Battery Management System**

Cycle Service Life



Environmental Advantages

- Non-toxic: does not contain heavy toxic metals such as cobalt. Also, cobalt extraction and processing causes pollution.
- Longer lifespan: needs to be replaced less frequently, reducing negative environmental impact associated with battery production and disposal
- Recyclable: can be separated and reused in new batteries, reducing need for more raw materials



Environmental Advantages

- Lower Carbon Footprint: Fewer emissions and environmental hazards in manufacturing process compared to wet cell batteries, which contain harmful chemicals.
- Fewer emissions and environmental hazards compared to wet cell batteries , which contain harmful chemicals
- Easier to dispose of safely



Safety Advantages

- Has better thermal stability (lower risk of causing fires and explosions) which is safer for workers and the environment
- Maintenance free requires lower exposure to maintenance team
- Complex recycling process makes cashing in less likely among common criminals.
- Only select recycling schemes can be used
- Lower risk of acid leaks and spills



Safety Advantages

- More stable chemical composition, leading to fewer chances of thermal runaway fires.
- Less batteries = lower exposure to injury
- Lighter weight



Typical Site Applications

Variable Message Boards

Portable, Electric Vehicle Chargers

Light Towers

Security Solutions (Camera Trailers)

HAR

Portable Vehicle Charging



Reduced Total Cost of Ownership

Despite higher initial costs, the long-term savings on maintenance, replacement, and downtime make lithium iron battery solutions more cost effective than traditional batteries.



Savings over life of product. 5 Year

5yr Comp.	\$	7,200.00	\$	2,700.00
Savings:	\$	4,500.00	5yrs	
Battery Cost	\$	2,700.00	\$	2,700.00
Charging Cost	\$	1,250.00	\$	-
Unplanned Event	\$	3,250.00	\$	-
Total Cost	\$	7,200.00	\$	2,700.00



Savings over life of product. 10 Year

10yr Comp.	\$	14,900.00	\$	2,700.00
Savings:	\$	12,200.00	10yrs	
Battery Cost	\$	3,200.00	\$	-
Charging Cost	\$	1,250.00	\$	-
Unplanned Event	\$	3,250.00	\$	-
Total Cost		\$7,700.00	\$	-



Conclusion

By adopting lithium- iron phosphate , jobsite equipment can benefit from enhanced performance, reduced maintenance, and improved safety, ultimately leading to greater efficiency and cost savings.

