

# BATTERY CHARACTERISTICS

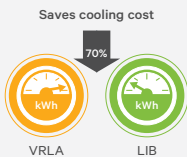
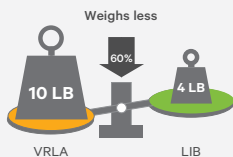
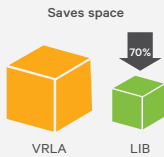
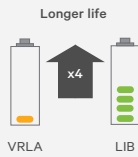


VRLA vs Lithium-ion

## BENEFITS

Vertiv has significant experience with lithium-ion batteries.

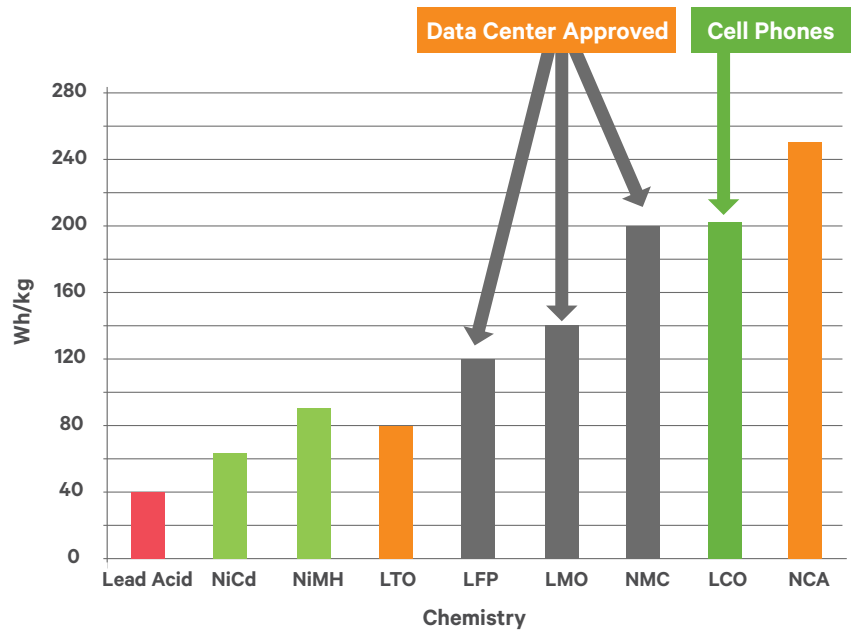
- Testing since 2011
- Installation success
- Compatible with many Liebert® UPS systems



Lithium-ion batteries are emerging as an alternative to VRLA (valve-regulated lead-acid) technologies in the data center. The below chart offers a brief comparison.

KEY CHARACTERISTIC	LEAD-ACID (VRLA)	LITHIUM-ION*
Energy Density	Moderate	High
Lifespan	Medium	Long (approx. 4X)
Weight	High	Low
Footprint required	Large	Small-Moderate
Recharge	Moderate	Fast
Maintenance cost	Moderate	Low
Cooling required	Moderate	Low
Battery Monitoring	Optional	Optional
Battery Management	Optional	Built-in
Transport concerns	Flexible	Ground
Disposal/Recycle	Widespread	Disposable, not yet recyclable
First cost	Moderate	High

\* Batteries perform differently depending on their chemistry. This chart summarizes various types. Note our preferences for critical use (gray).



Key: LTO (Lithium Titanate), LFP (Lithium Iron Phosphate), LMO (Lithium Manganese Oxide), NMC (Lithium Nickel Manganese Cobalt Oxide), LCO (Lithium Cobalt Oxide), NCA (Lithium Nickel Cobalt Aluminum Oxide).

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VertivCo.com | Vertiv Headquarters, 1050 Dearborn Drive, Columbus, OH, 43085, USA

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