

LFP & OEV

The proven, winning combination

Lithium Iron Phosphate (LFP) - the superior battery chemistry for yard trucks - is used in all Orange EV trucks

Proven in > 2,600 deployments at hundreds of customer sites

- >99% of OEV trucks are still running on original LFP battery packs, with first deployments > 10 yrs ago & multiple trucks exceeding 35,000 hrs of operation
- In more than 16 million operating hours, no OEV battery pack has experienced thermal runaway
- OEV designs and builds its own battery packs and offers a 7.5 yr battery warranty*

Why LFP?

Best performance
More sustainable
Longest lasting
Least complex

*See OEV warranty for details

Proven in Cold Weather

- **Routine winter operation**: One-fifth (~20%) of all Orange EV trucks operate in cold weather states and provinces in North America including MN, MI, NY, IL, Ontario Canada, and more.
- **Cold-hardy, even to extremes**: Customers operate OEV trucks at sites that reach temps down to -40F.
- **Protection with minimal draw**: OEV trucks are equipped with battery pack heaters that kick on at pre-set minimum temps and consume just 1.7-2.7 kW. The in-cab heat system and defrost utilize 2-6 kW.

More Environmentally Friendly

- LFP batteries do not contain toxic materials, heavy metals, or rare earth elements. Other common battery chemistries utilize cobalt, nickel, cadmium, or lead.
- Older LFP batteries can be repurposed for second-life use (e.g., electricity storage).
- End-of-life LFP batteries can be recycled, reclaiming valuable materials.
- LFP components are more easily ethically sourced and less susceptible to supply chain risks.

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LFP Batteries & Yard Trucks

The winning combination



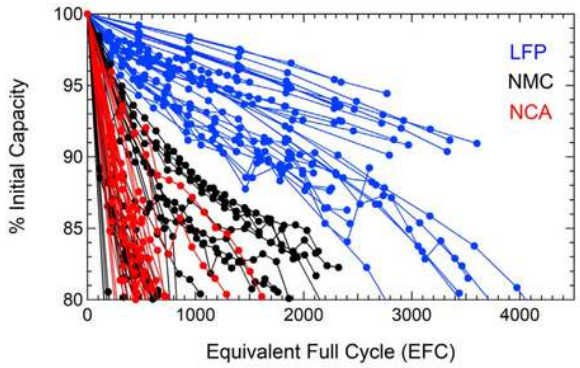


Figure 1. Discharge capacity retention for all LFP (blue), NMC (black), and NCA (red) cells relative to the initial capacity of each individual cell. Circles are data points from the capacity check at the conclusion of each round of cycling and lines are a guide to the eye.

Apples-to-Apples Study

A recent study(1) performed at Sandia National Laboratory has shown Lithium Iron Phosphate (LFP) superiority versus Nickel Manganese Cobalt (NMC) and Nickel Cobalt Aluminum (NCA).

LFP Lasts Longer

As shown in the graph (left), most of the tested **LFP cells lasted thousands of cycles longer** than other chemistries, retaining greater than 80% of initial capacity.

	LFP	NMC	NCA
Can last 10+ years	✅	❌	❌
Retains 90% of capacity later in lifespan	✅	❌	❌
Does NOT contain cobalt or nickel	✅	❌	❌
More resistant to thermal runaway	✅	❌	❌

Compare Battery Chemistries

Compared to other battery chemistries (NMC and NCA), LFP is more durable and reliable, has better capacity-retention, and is safer and more environmentally friendly. Importantly, LFPs do NOT require complex cooling systems for safety and battery longevity.

LFP is the Best Choice

The battery is one of the most important components of a battery electric truck, and Lithium Iron Phosphate (LFP) is the superior choice for yard trucks.

(1) "Degradation of Commercial Lithium-Ion Cells as a Function of Chemistry and Cycling Conditions", Yuliya Preger et al 2020 J. Electrochem. Soc. 167 120532

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