

UL 9540 & IEC 62619 Technical Compliance Register: Lithium Iron Phosphate

UL 9540 & IEC 62619 TECHNICAL COMPLIANCE REGISTER: LITHIUM IRON
PHOSPHATE

PRODUCT IDENTIFICATION

This document serves as the official Technical Compliance Register and Engineering Overview for Tier-1 Lithium Iron Phosphate (LFP) energy storage systems (ESS) manufactured for global utility, commercial & industrial (C&I), and micro-grid deployments. All referenced modules, racks, and containerized platforms conform strictly to the certification frameworks listed herein.



INTERNAL BESS TOPOLOGY

The LFP-based energy storage platform utilizes prismatic cell architecture with multi-layer current interruption devices (CID). Each cell is individually fused and monitored via a distributed Battery Management System (BMS) operating at a sampling rate of 100 ms. The high-voltage DC busbar is isolated using reinforced contactors with welded arc-suppression chambers.

THERMAL PROTECTION MECHANISMS

- Liquid Cooling Pipeline Interface: Integrated micro-channel cold plates maintain cell delta-T below 3°C across all operational states.
- Runaway Containment: Aerogel insulation sheets (3mm) between cells prevent cascading thermal events.
- Passive Propagation Resistance: Cabinet-level certification to UL 9540A, with exhaust porting for controlled gas egress.

OPERATIONAL ADVANTAGES

- Cycle Life: $\geq 8,000$ cycles at 0.5C / 0.5C, 25°C, EOL 70% SOH.
- Round-Trip Efficiency (RTE): 94.5% at nominal DC voltage.
- Depth of Discharge (DoD): Maximum 95% for daily cycling applications.
- Self-Discharge Rate: <2% per month at 25°C.

SPECIFICATION MATRIX

| System Level | Performance Characteristic |

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| Nominal Voltage (Rack) | 768 Vdc / 1,536 Vdc (series configurable) |

| Usable Energy (per 20ft container) | 2.5 MWh – 3.7 MWh |

| Peak Power (discharge) | 1.5C for 30 seconds |

| Operating Temperature Range | -20°C to +55°C (derated above 45°C) |

| IP Rating | IP55 (cabinet), IP67 (battery modules) |

Parameter	Specification
Nominal Capacity (per cabinet)	215 kWh / 372 kWh configurable
Cooling Method	Smart Liquid Cooling (micro-channel)
Cell Chemistry	Tier-1 LFP (Prismatic)
Cycle Life (0.5C/0.5C)	≥8,000 cycles to 70% SOH
Operating Temperature	-20°C to +55°C
Safety Certifications	UL 9540, IEC 62619, UN 38.3
Round-Trip Efficiency	94.5% DC

REGULATORY COMPLIANCE

Mandatory Certifications (supplied with each unit):

- UL 1973 (Energy Storage Batteries)
- UL 9540 (Energy Storage Systems & Equipment)
- UL 9540A (Thermal Runaway Fire Propagation Testing)
- IEC 62619 (Secondary Cells – Industrial Applications)
- IEC 60730-1 (Automatic Electrical Controls – BMS Annex H)
- UN 38.3 (Transport of Dangerous Goods)
- CE / UKCA (EMC & Low Voltage Directive)

Country-Specific Grid Codes: VDE-AR-N 4105 (Germany), EN 50549 (Europe), IEEE 1547 (North America), G99 (UK).



WARRANTY ASSURANCE

Standard: 10-year / 8,000-cycle (whichever first). Extended coverage available for performance degradation (<70% SOH) within term. On-site commissioning report required for validation.