

UL 9540 & IEC 62619 Technical Compliance Register: Battery Pack RoHS Compliance Declaration

UL 9540 & IEC 62619 TECHNICAL COMPLIANCE REGISTER: BATTERY PACK ROHS COMPLIANCE DECLARATION

EXECUTIVE SUMMARY

This document serves as the definitive technical compliance register and product declaration for the Battery Pack RoHS Compliance of our Tier-1 energy storage systems. As a global leader in renewable energy integration, we affirm our unwavering commitment to environmental stewardship and regulatory adherence. This declaration confirms that all battery packs supplied within our commercial and industrial (C&I) and utility-scale platforms are fully compliant with the European Union Directive 2011/65/EU (RoHS 2.0) and its subsequent amendments, including Directive (EU) 2015/863, which restricts the use of ten hazardous substances.

The purpose of this whitepaper is to provide engineering, procurement, and compliance teams with a comprehensive overview of the material composition, testing methodologies, and certification frameworks that substantiate our RoHS conformity. Beyond mere regulatory compliance, this document details the rigorous supply chain controls, advanced material screening processes, and

continuous monitoring protocols we employ to ensure that our products not only meet but exceed global environmental standards. Our commitment is rooted in a corporate philosophy of sustainable innovation, where reducing ecological impact is integral to our system design and manufacturing lifecycle.



SYSTEM ARCHITECTURE & MATERIAL DECLARATION

The architecture of our Battery Energy Storage System (BESS) is engineered with environmental compliance as a foundational principle. This section details the structural and material composition of the battery pack, providing a transparent disclosure of all constituent materials and their respective weight percentages.

The battery pack is a modular assembly designed for high energy density and

long-term durability. The primary structural components include the enclosure, battery management system (BMS), thermal management interface, and the core cell modules. Our supply chain operates under a strict 'Green Procurement' policy, mandating that all upstream suppliers provide full material disclosure (FMD) and certify their components against RoHS requirements. This is enforced through a multi-tiered auditing process and incoming material inspection utilizing X-ray fluorescence (XRF) spectrometry for rapid, non-destructive screening of restricted substances.

A critical component of our compliance strategy is the substitution of hazardous materials with safer alternatives without compromising performance. For instance, lead-based solders have been entirely eliminated from all printed circuit board assemblies (PCBAs) and electrical connections, replaced with tin-silver-copper (SAC) alloys. Furthermore, our coolant fluid, utilized within the liquid cooling system, is an ethylene-glycol and water mixture formulated without the use of prohibited phthalates or heavy metal stabilizers.

KEY FEATURES

- Feature 1: Comprehensive Regulatory Adherence: Full compliance with RoHS Directive 2011/65/EU and (EU) 2015/863, ensuring market access across all EU member states and regions with similar legislative frameworks.

- Feature 2: Green Supply Chain Integrity: A robust supplier management system mandates full material declarations and RoHS test reports for all incoming parts, from microchips to structural steel.
- Feature 3: Advanced Traceability: Every battery pack is assigned a unique serial number that links to a comprehensive compliance dossier, including manufacturing records, test reports, and certificates of conformity.
- Feature 4: Hazardous Substance Substitution: Proactive replacement of restricted substances with high-performance, eco-friendly alternatives, achieving a net reduction in potential environmental impact.
- Feature 5: Continuous Compliance Monitoring: An internal environmental laboratory performs periodic batch sampling and XRF testing to ensure ongoing conformity with evolving regulatory standards.

COMPLIANCE & STANDARDS

Our declaration of conformity is supported by a multi-layered compliance framework that encompasses international standards, industry best practices, and independent third-party verification. The RoHS compliance of our battery pack is not viewed as a one-time certification but as a continuous lifecycle requirement.

The table below outlines the key restricted substances covered under the

directive and the proactive measures taken to ensure their absence:

TECHNICAL SPECIFICATIONS

- Regulatory Framework: EU RoHS 2.0 (Directive 2011/65/EU) & Amending Directive (EU) 2015/863.
- Restricted Substances Monitored: Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent Chromium (Cr6+), Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE), Bis(2-Ethylhexyl) phthalate (DEHP), Benzyl butyl phthalate (BBP), Dibutyl phthalate (DBP), Diisobutyl phthalate (DIBP).
- Verification Methodology: Supplier Material Declaration, Incoming XRF Screening, and External Laboratory Analysis (ICP-OES, GC-MS).
- Certifications Held: Third-party testing reports available upon request verifying compliance of all battery pack components.
- Packaging Compliance: All packaging materials are also compliant with RoHS and other applicable environmental directives (e.g., EU Packaging and Packaging Waste Directive).

Substance	Maximum Concentration (ppm)	Limit	Our Method	Verification
Lead (Pb)	1000		Supplier Declaration	/

		XRF / ICP-OES
Mercury (Hg)	1000	Supplier Declaration / XRF
Cadmium (Cd)	100	Supplier Declaration / XRF / ICP-OES
Hexavalent Chromium (Cr6+)	1000	Supplier Declaration / UV-Vis Spectrophotometry
PBB / PBDE	1000	Supplier Declaration / GC-MS
DEHP / BBP / DBP / DIBP	1000 (each)	Supplier Declaration / GC-MS

INDUSTRIAL DEPLOYMENT & LIFE-CYCLE MANAGEMENT

The integration of RoHS-compliant battery packs into industrial and utility-scale deployments provides asset owners with a strategic advantage, mitigating the risk of regulatory penalties and enhancing the sustainability profile of their renewable energy assets. Compliance ensures seamless market access, particularly for projects financed by green bonds or institutions with strict Environmental, Social, and Governance (ESG) criteria.

Our after-sales and lifecycle management services include providing all necessary documentation for decommissioning and end-of-life recycling. We actively collaborate with certified recycling partners to ensure that battery packs are disposed of in an environmentally sound manner, with a focus on material recovery. Our commitment extends to providing transparent material information to facilitate efficient and safe recycling processes in compliance with the Waste Electrical and Electronic Equipment (WEEE) Directive.



CONCLUSION

This Technical Compliance Register formally and unequivocally declares that the Battery Energy Storage Systems manufactured by our company are fully compliant with the RoHS directive. Our integrated approach, spanning design,

supply chain management, manufacturing, and lifecycle support, guarantees that our products represent the pinnacle of environmental responsibility and technical excellence. By choosing our systems, partners and customers are not only investing in reliable, high-performance energy storage but also contributing to a cleaner, safer global environment. We remain dedicated to monitoring regulatory developments to ensure our products continue to set the industry benchmark for both performance and sustainability.