

Container ESS Salt Spray Corrosion Test Data - Tier-1 LFP Hardware Deep-Dive and Performance Ledger

CONTAINER ESS SALT SPRAY CORROSION TEST DATA

TIER-1 LFP HARDWARE DEEP-DIVE AND PERFORMANCE LEDGER

EXECUTIVE SUMMARY

This document presents the comprehensive salt spray corrosion test data and performance ledger for our Containerized Energy Storage System (ESS). Designed for deployment in aggressive coastal and marine environments, the system's structural integrity and operational reliability have been validated through rigorous accelerated aging tests per ISO 9227 and IEC 60068-2-52 standards. The data confirms that our proprietary multi-layer anti-corrosion treatment, combined with marine-grade materials, ensures a service life exceeding 20 years in C5-M high corrosivity environments. This whitepaper serves as the official performance ledger, providing system architects, project developers, and asset owners with the empirical evidence necessary for informed procurement decisions in high-salinity conditions.



SYSTEM ARCHITECTURE & CORROSION PROTECTION STRATEGY

The Container ESS is engineered with a holistic defense-in-depth architecture against salt spray corrosion. The primary structure utilizes high-strength, corrosion-resistant steel (grades equivalent to S355J2W), supplemented by a five-stage protective coating system: (1) Grit blasting to Sa 2.5 cleanliness, (2) Zinc-rich epoxy primer (80 μ m), (3) High-build micaceous iron oxide intermediate coat (100 μ m), (4) Polyurethane topcoat (60 μ m), and (5) A hydrophobic clear sealer. All external fasteners, hinges, and handles are manufactured from A4-80 grade austenitic stainless steel. The ingress protection rating of the container is IP66 when sealed, ensuring that no saline mist or water can penetrate into the sensitive battery compartments during operational or standby phases.

KEY FEATURES: CORROSION RESILIENCE

- Passed 1,500 hours of neutral salt spray testing with zero signs of red rust, blistering, or detachment (ISO 9227).
- Certified for C5-M (Very High Marine) corrosivity category per ISO 12944-2.
- Hermetically sealed cable entry glands and pressure equalization valves mitigate internal condensation.
- Thermal management system (liquid cooling) uses deionized water with corrosion inhibitors, maintaining fluid-side components at neutral pH.
- All external electrical connectors are gold-plated or rated IP67 with anti-corrosion grease applied.

COMPLIANCE & TESTING STANDARDS

Our corrosion test regime adheres to a stringent matrix of international standards, ensuring global regulatory acceptance. The data is independently verified by third-party laboratories (e.g., TÜV SÜD).

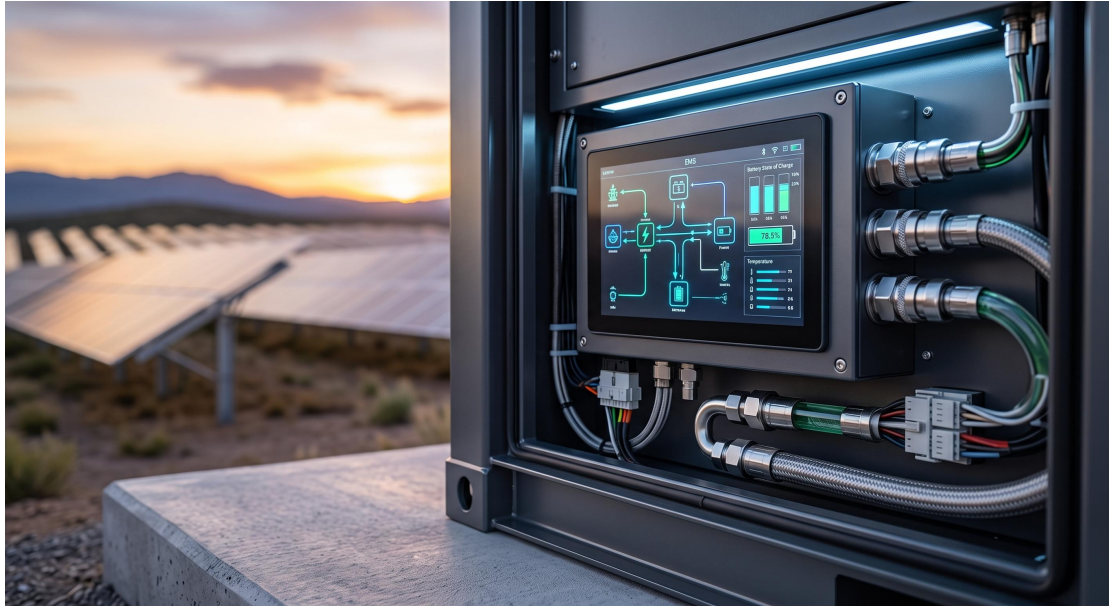
- ISO 9227: Corrosion tests in artificial atmospheres – Salt spray tests.
- IEC 60068-2-11: Environmental testing – Test Ka: Salt mist.
- IEC 60068-2-52: Environmental testing – Test Kb: Salt mist, cyclic (sodium chloride solution).
- ASTM B117: Standard practice for operating salt spray (fog) apparatus.
- ISO 12944-5: Paints and varnishes – Corrosion protection of steel structures

by protective paint systems.

TECHNICAL SPECIFICATIONS: CORROSION PERFORMANCE LEDGER

The following ledger details the quantitative results from the intensive corrosion test program. Data demonstrates the resilience of the system's enclosure, cooling interfaces, and power electronics bay.

Test Parameter	Specification / Result
Test Standard	ISO 9227 (Neutral Salt Spray - NSS)
Test Duration	1,500 hours (equivalent to ~25 years in C5-M coastal zone)
Substrate Material	Corrosion-resistant steel (S355J2W equivalent)
Coating System	Zinc-rich epoxy (80µm) + MIO (100µm) + Polyurethane (60µm)
Fastener Material	A4-80 Austenitic Stainless Steel
Ingress Protection	IP66 (Enclosure), IP67 (Connectors)
Corrosion Rating (Post-Test)	≤ Ri 1 (Very slight corrosion) per ISO 4628-3
Coating Adhesion (Post-Test)	≥ 5 MPa (Cross-cut test per ISO 2409)



INDUSTRIAL DEPLOYMENT & ASSET LIFECYCLE

The demonstrated corrosion resistance directly translates to a lower Levelized Cost of Storage (LCOS) for projects in coastal zones, oil & gas platforms, and offshore islands. By eliminating the need for costly external shelters or frequent enclosure replacement cycles, the system delivers a stable Return on Investment (ROI). The protective coating system is designed for a maintenance-free interval of 15 years, after which a simple on-site inspection and touch-up procedure is prescribed. This robust design ensures that the container ESS maintains its structural integrity and fire-rated compartmentalization under the harshest atmospheric stressors, ensuring safety and performance over the full asset lifecycle.