



Battery Pack Test and Validation

Ensuring safe and reliable operation for the life of the vehicle.



Comprehensive Safety

Validated to UN ECE R100 and UN 38.3 standards through mechanical, thermal, and electrical safety testing.



Multi-Level Protection

Advanced BMS monitors and prevents unsafe conditions like overcharge, temperature, current, and discharge.



Ingress & Thermal Protection

Validated to withstand -40°F to 140°F exposure, comprehensive corrosion resistance, and protected to IP6k9k.



Proven Durability

Validated to withstand 10 years/2,000 cycles of use through mechanical, thermal, and electrical abuse tests.



Battery Pack Safety and Abuse Testing

Mechanical Testing

Random Vibration	Validated to meet industry-standard SAE J2380 and Harbinger-developed road load profiles to ensure at least 10 years of mechanical durability
Shock Loading	Validated to withstand 18 consecutive 25G shock loads (typical of repairable crash) with no impact to function or safety
Ingress Protection	Validated to meet IP requirements for protection against dust ingress (IP6x), 1 meter water submersion (IPx7), and high-pressure hot water spray (IPx9k)
Shipping And Transportation Testing	Validated to meet all required UN 38.3 shipping and transportation testing requirements

Thermal/Environmental Testing

Thermal Cycle/Thermal Shock	Validated to meet UN ECE R100 thermal cycle/thermal shock (-40°F to 140°F/-40°C to 60°C) with no impacts to performance or serviceability
Coolant System Durability	Validated to ensure leak-free operation of battery cooling components through the entire life of the battery pack
Corrosion Testing	Validated per ASTM B117 and GMW 14872 to withstand 20 years of salt spray corrosion with no impacts to performance or serviceability

Electrical Testing

Battery Management System (BMS) Validation	BMS validated to safely respond during overcharge, over-discharge, over-temperature, and over-current conditions per UN ECE R100
High Voltage Isolation	Validated to continuously ensure proper isolation of the high voltage system from the rest of the vehicle
Short Circuit Protection	Validated to meet UN ECE R100 short circuit protection through cell, module, and pack-level fusing and switching

Fire Safety Testing

Thermal Runaway Prevention	Validated to passively resist thermal runaway through extensive testing, including hundreds of cell-level evaluations, dozens of multi-cell cluster trials, and 30 full battery pack assessments
External Fire Resistance	Validated to meet external fire resistance testing per UN ECE R100, with no safety concerns through the entire 130-second duration of flame exposure

Specifications are subject to change without notice.

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Discover how our solutions can revolutionize your fleet.
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