

Battery Pack Testing & Analysis Overview

SEI offers tailored battery pack testing for capacity, rate, cycle life, temperature, BMS and safety, built on 1,000+ experiments and 20+ collaborative projects and customers. The team and data pipeline behind SEI's semi-solid cells and semi-solid/solid-state battery packs run every program. Pack ratings, BMS access, sample format and fixtures are reviewed before quotation, so the test scope matches each application.

Testing Capabilities

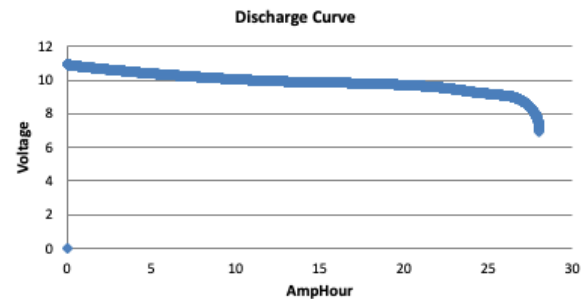
- **Performance:** capacity, delivered energy, efficiency, and rate and pulse response under application load profiles (0.05C – 10C).
- **Durability:** cycle life and capacity retention under agreed operating conditions.
- **BMS and system behavior:** protection trip points, balancing, state of charge and CAN/SMBus/RS485 data, where interfaces permit.
- **Thermal and environmental:** temperature mapping and hot/subzero testing within approved pack limits.
- **Safety and pre-compliance:** crush, nail penetration, overcharge or thermal soak, and UN 38.3 pre-compliance, subject to scope and facility review.
- **Fixtures and teardown:** custom pack and pouch-cell fixtures; cell-level diagnosis and materials analysis.

Data Processing, Analysis and Reporting

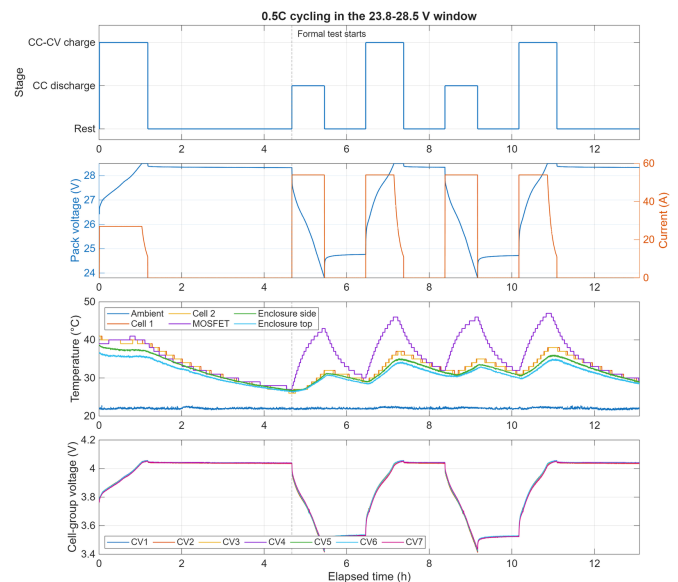
- **KPI evaluation:** measured performance compared with agreed acceptance criteria.
- **Custom plotting:** voltage, current, energy, temperature and capacity-retention trends in your format.
- **Data management and ML:** traceable records and ML-assisted modeling where suitable data are available.

Why Choose SEI?

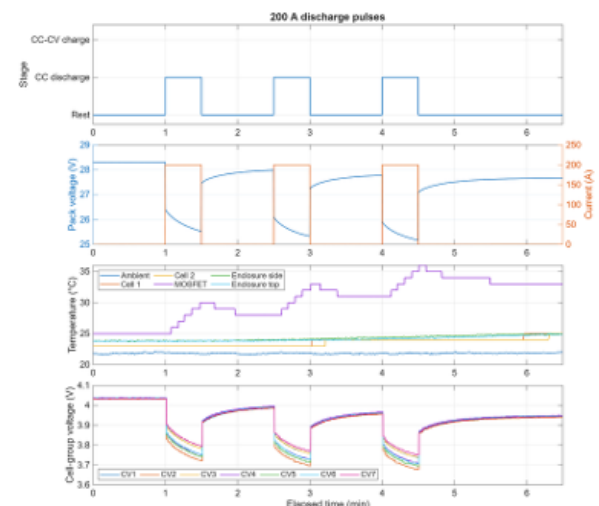
- Cells to packs, one lab, one data pipeline: SEI designs semi-solid cells and Solid Master drone packs (22–48 V, up to 1.76 kWh).
- Drone, defense and energy-storage pack experience, tested with real mission load profiles.
- BMS and safety checks before formal certification; root-cause analysis down to cell materials.
- High-throughput testing on 100+ cell channels; R&D lab and pilot production line.
- Research funding from the U.S. DoD, DOE, NASA and the CEC; 10+ patents.



Discharge curve of a 10.8V/20Ah pack



0.5C cycling between 23.8 V and 28.5 V (6T battery pack)



200 A pulse test with three 30-second discharges separated by one-minute rests (6T battery pack)

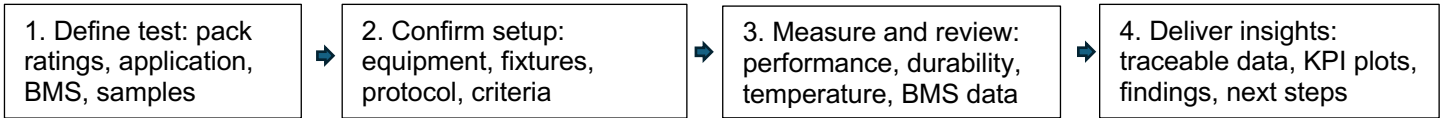
Battery Pack Testing & Analysis Service — Service Details

Test Menu and Turnaround

Test	Scope and Typical conditions	Lead time
Capacity, energy and rate	Customer profile; Ah, Wh, efficiency and rate (0.05C–10C)	4–6 weeks*
Cycle life and aging	Agreed protocol; typically up to 1,000 cycles	Setup + test duration*
Temperature performance	Hot/subzero cycling within approved pack limits	Setup + test duration*
BMS and load response	Accessible BMS data, balance and duty-cycle behavior	Project quotation
Safety evaluation	Impact/crush, thermal soak, nail penetration or overcharge; scope/facility review	Scope-dependent
Teardown and failure analysis	Cell extraction, cell tests; materials characterization	4–6 weeks
Data analysis and reporting	KPI evaluation, custom plots, ML modeling	4–6 weeks

*Estimated lead time after test setup and protocol are confirmed; cycle-life and aging programs add the test duration.

Pack testing workflow



Equipment, Test Setup and Compatibility

Area	Equipment
Pack test setup	Testing stations up to 200A output.
Cell testing support	100+ cell channels on SEI-designed stations; up to 5 V and up to 500 A for pouch cells
Environment	Environmental chambers from –80 °C to +150 °C
Data acquisition	Multi-channel temperature and voltage logging; accessible BMS data and communications
Material characterization	XRD, BET, TGA, SEM with EDS, particle-size analyzer
Fixtures	Custom pouch-cell and pack fixtures for a range of form factors

Quality, Data and Engagement

- Quality management system and internal QA policy modeled on ISO 9001; ISO 9001 implementation in progress.
- Each milestone is planned, executed and documented with the customer: test procedures and conditions, data package, interpretation and go/no-go criteria.
- Calibrated equipment; data held in SEI’s electronic data management system; all work under NDA. Engagement per test, per channel-month or project-based.

Customer Deliverables

- Raw and processed pack and cell data; BMS and safety test records; KPI-based evaluation and custom plots; technical analysis and summary reports in customer-defined formats.

Track Record

- Solid Master drone battery packs (22–48 V) designed and tested in-house; more than 1,000 cell experiments across more than 20 collaborative projects and customers.
- Semi-solid-state pouch cell engineering prototypes (samples and test results) delivered to defense and aerospace customers, including Airbus Defence and Space (Feb. 2026) and Leonardo DRS (Aug. 2026).

Contact for R&D Service Inquiries

- For a quote, provide pack specifications, samples and test objectives.

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