

Battery Systems Testing and Engineering Services

IDIADA offers first-class facilities and engineering **services for the testing and development of battery systems**. Our approach is function-oriented, by merging our design engineering capabilities with expert technical proficiency in traction batteries.



Battery systems testing and validation

Ageing and performance testing:

- End-of-Life testing
- Calendar and cycling ageing
- Endurance tests with customized profiles
- Durability standard cycles such as: HTOE, PTCE, ...

We execute a full design validation plan (DVP) at cell, module and battery system level, including pre-damaged samples.

- Charging and discharging performance
- Real driving cycles at different temperatures
- Electrochemical impedance spectroscopy (EIS)
- Validation of BMS functions

Abuse testing and safety validation:



Full validation services including BEV and FCEV traction components. Adapted to various **worldwide standards and regulations** such as ECE R100,03, UN 38,3 and FreedomCAR, among others.

- Electrical abuse testing: Short-circuit, overcharge, over discharge, insulation resistance, over current
- Thermal testing: Over-heating, thermal shock, thermal propagation
- Mechanical abuse testing: Drop test, nail penetration, vibration, mechanical shock
- Water immersion

Facilities

IDIADA's state-of-the-art facilities are designed to handle pre-damaged samples, battery failures and other unexpected events.

Battery lab for ageing and performance testing:

- 4 Climatized test benches from -45°C up to 75°C
- Coolant conditioner of 15kW @ 0°C
- High power cyclers up to 500kW/1000V/1000A
- Low power battery cyclers up to 50kW/800V/150A
- More than 500 data channels
- Water immersion
- Voltage, current, temperature (thermocouples and NTCs), strain gauges, gas sensors and video cameras
- Thermal testing: over-heating, thermal shock, thermal propagation
- Mechanical abuse testing: drop test, nail penetration, vibration, mechanical shock

Battery Safety Laboratory:

More than 2,000m² for battery abuse testing procedures including over-heating, thermal propagation, fire resistance, drop test, nail penetration. It equips safety measures such as gas scrubbing and water treatment systems in case of battery unexpected events.

Engineering

IDIADA's battery engineering services, combined with our complementary services in the electric (EV) and hybrid (HEV, PHEV) vehicle field, place IDIADA in a leading position to support your battery systems development, **from concept to full vehicle validation.**

Battery system design:

- Cell selection and cell integration to module architecture definition
- Battery architecture definition
- Battery design: housing and thermal system
- BMS integration, power box and junction box design
- Battery system design validation plan definition and execution
- Full engineering support in HV safety and battery safety

Virtual development:

From virtual design to virtual validation, our experimental validation processes can be **replicated to all virtual test models.**

- Reduction of manufacturing costs through the implementation of battery optimization strategies
- Battery modelling conducted through our characterization methodology provides extensive data on battery behaviour
- Virtual validation approach through thermal and electrical simulation, from which we gather valuable data on systems' reliability

Benchmarking analysis:

Functional evaluation.

Failsafe testing:

Obtaining exhaustive data on system response to induced failures.

Battery teardown:

Identifying battery component parts, circuits, sensors and system functionality, and providing information on component costs.