

Battery Safety for e-Mobility

LITHIUM-ION BATTERIES: ACCUMULATORS OF THE FUTURE

In the state-of-the-art battery test centre CTC advanced supports battery and car manufacturers in the safety qualification of high-capacity Li-Ion battery systems. CTC advanced employs highly qualified battery specialists; the test facilities consist of separately secured premises, equipped to face the most extreme cases. The lab and test areas are continuously enhanced following the latest standards.

AUTOMOTIVE BATTERY SAFETY

The safety of lithium-ion batteries, especially for use in electric vehicles and energy storage systems is very important. In particular, the high energy density in form of chemical elements and the usually high electric charge must be controlled, even in extreme situations in order to avoid hazards.

SAFETY TESTS

In our battery test centre, all safety-related disciplines and events which can occur during the use of lithium-ion batteries are available for testing at CTC advanced:

- Mechanical Stress (Nail-Penetration, Crush-Tests, Crash-Test bench, Vibration; if required under various climatic conditions)
- Electrical Stress (Overcharge, Short Circuit)
- Climatic Stress
- Artificial Aging
- EMC - Electromagnetic Compatibility of the Battery Management System (BMS)
- LVD - Electrical Safety for High Voltage devices in Battery Systems
- Immersion / Flooding
- Recording system to display the test results (Highspeed camera, Infrared video camera, Data recording)

UN TRANSPORTATION TESTS

Before a Li-Ion-Battery may be released for transportation via normal shipping ways, it must be established that the battery system behaves safely in typical situations as they may occur during transportation. CTC advanced tests according to the UN Transportation Test rules ST-SG-AC.10-11, 38.3. These have been defined by the United Nations and are internationally recognized:

- T1: Altitude Simulation, T2: Thermal Test, T3: Vibration, T4: Shock, T5: External short circuit, T6: Impact / Crush, T7: Overcharge, T8: Forced discharge

ABUSE TESTS

CTC advanced offers stress tests to ensure the flawless operation of high capacity batteries - even under extreme conditions:

- Electrical (Overcharge, Discharge, Short Circuit)
- Mechanical (Vibration-, Shock-, Crush Tests, Penetration)
- Crash Test Bench (High speed impact acceleration)
- Climatic (Heat, Cold, Temperature cycling, Humidity, Corrosion)

ECE R100

ECE R100 compiles unified requirements with regard to the homologation of cars considering the specific requirements for the electric power train. CTC advanced's Battery Test Centre is able to conduct extensive stress testing according to test cases defined for ECE R100 or, if required, also following customized test schemes:

- Vibration test, Thermal shock and cycling test, Mechanical shock, Mechanical integrity, External short circuit protection, Overcharge protection, Over-discharge protection, Over-temperature protection.

BATTERY ASSEMBLING

The development of advanced lithium-ion battery packs requires expertise and experience in order to strike a balance between the demanded system load and the required reliability and safety. CTC advanced supports assembler of battery packs in the development of safer battery systems, no matter which application area. Our solutions for battery assembler comprise among others:

- UN Transportation Tests, IEC 62133:2012 (specifying the safety requirements for portable sealed secondary cells for use in portable applications)
- UL 1642, 2054