Battery Safety Testing

TEST EQUIPMENT

Thermal Hazard Technology EV+ Accelerating rate calorimeter (ARC)

ARC system for cell level thermal and electrical abuse testing.

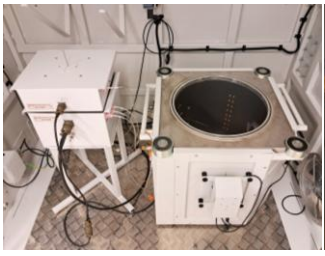
EV+ calorimeter assembly

- For cylindrical, pouch and prismatic cells up to approx. 100 Ah / 360 Wh
- Chamber diameter 40 cm and depth 44 cm
- Operating temperature: ambient to 300 °C
- Pressure range: 0 – 200 bar
- Sensitivity: 0.02 °C/min
- Integrated video camera
- Nail penetration extension
- External short circuit extension
- Gas collection system

Standard calorimeter assembly

- For small cylindrical and pouch cells
- Chamber diameter 9 cm and depth 10 cm
- Operating temperature: ambient to 600 °C
- Sensitivity: 0.005 °C/min

THT EV+ Accelerating rate calorimeter system at VTT.



Standard calorimeter (left) and EV+ calorimeter (right).

Cylindrical cell stand inside the EV+ calorimeter.

Digatron MCT 250-06-3 RE: 3 channels

Mobile cell tester that can be used with ARC for electrical abuse testing.

Voltage:	−6 V up to 6 V
Current:	250 A / 300 A (peak)
Parallel:	Can be paralleled up to 750 A / 900 A (peak)
EIS-Meter:	Electrochemical impedance spectroscopy for three channels

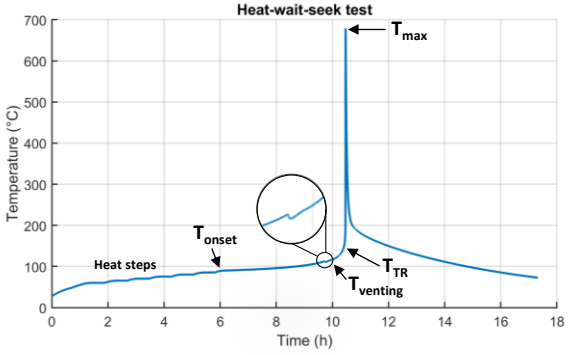
Keysight 34980A data acquisition system

Multiple cell temperature and voltage measurements.

BATTERY SAFETY TESTS

Heat-wait-seek test

Thermal abuse test to study battery thermal runaway characteristics.



Example of a heat-wait-seek test.

Nail penetration test

Industry standard method to simulate internal short circuit by penetrating the cell with conductive nail.

External short circuit test

Investigation of the behaviour of a cell when its terminals are short-circuited by an external circuit.

Overcharge / overdischarge test

Electrical abuse test where the cell is charged or discharged outside the specified voltage range or with a current greater than the maximum specified for the cell.

Exhaust gas analysis

Collection and composition analysis of the exhaust gases released during battery fire.

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