

BATTERY THERMAL RUNAWAY TESTER



Battery Thermal Runaway Tester - ToronFT™ BTR

ToronFT™ BTR is a comprehensive Battery Thermal Runaway Tester designed for initial thermal runaway performance tests, post-cycling thermal runaway performance tests, and thermal runaway propagation performance tests of lithium battery cells and packs. As an all-in-one battery thermal runaway test platform, the ToronFT™ BTR provides the triggering capability, real-time monitoring, and multi-cell heating pad architecture required to evaluate and compare the thermal runaway behavior of prismatic, pouch, and cylindrical lithium battery cell formats.

The ToronFT™ BTR addresses the critical need for standardized, reproducible battery thermal runaway triggering and measurement, providing the safety data required for lithium battery product certification, electric vehicle battery safety compliance, and energy storage system safety qualification in North American and international markets.

APPLICATIONS

Battery Thermal Runaway Tester - ToronFT™ BTR Applications

- Initial thermal runaway performance testing of lithium battery cells for product qualification and certification
- Post-cycling thermal runaway performance evaluation of aged or cycled lithium battery cells
- Thermal runaway propagation testing of lithium battery packs and modules
- Battery thermal runaway assessment for electric vehicle (EV) battery safety compliance
- Energy storage system (ESS) battery safety qualification for NFPA 855 and UL 9540A programs
- Comparative thermal runaway performance ranking of different lithium battery chemistries and cell designs
- Research and development testing of thermal runaway mitigation strategies and fire-resistant battery designs



Standards

- UL 9540A — Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
- IEC 62619 — Safety Requirements for Secondary Lithium Cells and Batteries for Use in Industrial Applications
- IEC 62133-2 — Safety Requirements for Portable Sealed Secondary Lithium Cells and Batteries: Lithium Systems
- UN/ECE Regulation 100 — Uniform Provisions Concerning the Approval of Vehicles with Regard to Specific Requirements for the Electric Power Train (battery thermal runaway provisions)
- SAE J2464 — Electric and Hybrid Electric Vehicle Rechargeable Energy Storage System (RESS) Safety and Abuse Testing

FEATURES

Battery Thermal Runaway Tester - ToronFT™ BTR Key Features

- Dual thermal runaway triggering capability: overcharging method and external heating method — selectable based on the applicable standard or hazard scenario
- Real-time recording of voltage, temperature, and temperature rise rate (dT/dt) at high resolution throughout the battery thermal runaway event
- Multiple heating pads architecture for triggering thermal runaway in individual cells within a battery pack, enabling systematic thermal runaway propagation performance testing
- Compatible with all primary lithium battery cell formats: prismatic cells, pouch cells, and cylindrical cells
- Supports initial thermal runaway testing, post-cycling thermal runaway testing, and thermal runaway propagation performance testing in a single integrated instrument
- Suitable for qualification testing of lithium batteries for electric bicycles, electric vehicles, and stationary energy storage systems
- High-resolution real-time data acquisition provides complete thermal runaway performance curves for quantitative safety assessment and comparative product ranking

THEORY & METHOD

Theory and Method

The ToronFT™ BTR triggers thermal runaway in lithium battery specimens using two independently selectable methods: (1) overcharging — applying an excessive charge current beyond the cell's rated capacity until thermal runaway is initiated by electrochemical overstress; and (2) heating — applying controlled heat from multiple heating pads to raise the cell temperature above its thermal stability threshold, inducing thermal runaway by external thermal abuse. The dual-trigger architecture allows the test engineer to select the triggering method most relevant to the specific safety standard or hazard scenario under evaluation.

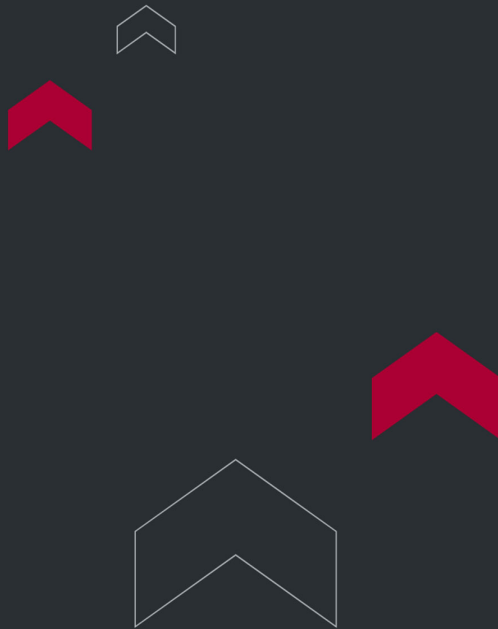
Throughout the thermal runaway event, the system records voltage, temperature, and temperature rise rate (dT/dt) in real time at high sampling rates, capturing the full thermal runaway signature from onset through peak temperature and beyond. For propagation testing, multiple heating pads can be applied to adjacent cells within a battery pack, enabling systematic evaluation of thermal runaway propagation behavior from cell to cell across prismatic, pouch, and cylindrical cell formats.

TECHNICAL SPECIFICATIONS

Battery Thermal Runaway Tester - ToronFT™ BTR Technical Specifications

Parameter	Specification
Product Name	Battery Thermal Runaway Tester
Brand	ToronFT™ BTR
Triggering Methods	Overcharging or external heating (selectable)
Real-Time Measurements	Voltage, temperature, temperature rise rate (dT/dt)

Parameter	Specification
Heating System	Multiple heating pads (cell-level and pack-level)
Compatible Cell Formats	Prismatic, pouch, cylindrical
Test Types	Initial thermal runaway, post-cycling thermal runaway, propagation testing
Application Scope	Lithium battery cells, modules, and packs (EV, ESS, e-bike)
Applicable Standards	UL 9540A, IEC 62619, IEC 62133-2, UN/ECE R100, SAE J2464



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