



LITHIUM BATTERY FIRE TESTING EQUIPMENT

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ToronFT™ Lithium Battery Fire Testing Equipment series by Torontech offers a complete, integrated platform for evaluating the fire safety, thermal behavior, and hazard characteristics of lithium-ion and lithium polymer battery systems. As energy storage technology advances and batteries are deployed in increasingly demanding environments, the need for rigorous, standards-compliant fire and safety testing has never been greater.

Torontech's battery fire testing instruments span the full lifecycle of risk evaluation — from cell-level thermal runaway characterization and accelerating rate calorimetry to large-format pack-level heat release rate (HRR) testing and enclosure-level safety assessments. The series also includes environmental simulation chambers for altitude, pressure, and temperature extremes, as well as mechanical abuse testers for drop, vibration, crush, and nail penetration scenarios.

Trusted by battery manufacturers, aviation authorities, and safety testing labs globally, the ToronFT™ battery fire testing platform enables organizations to meet UN 38.3, IEC 62133, UL 9540A, and other critical international standards with confidence.

APPLICATIONS

Applications & Industries

- Lithium-ion and lithium polymer battery cell and pack manufacturers
- Electric vehicle (EV) and hybrid vehicle OEMs and Tier-1 suppliers
- Consumer electronics — smartphones, laptops, wearables, and portable devices
- Energy storage systems (ESS) — grid-scale and residential battery solutions

- Aerospace and aviation — battery-powered aircraft and drone manufacturers
- Defense and military — high-performance battery systems for field applications
- Medical devices — implantable and portable medical battery systems
- Independent testing laboratories and certification bodies
- Research institutions studying electrochemical safety and fire behavior

FEATURES

Why Choose Torontech ToronFT™ ?

- End-to-end battery fire and safety testing from cell to system level
- Compliance with UN 38.3, IEC 62133, UL 9540A, and SAE J2464
- Adiabatic calorimetry with industry-leading temperature and pressure resolution
- Integrated thermal runaway gas analysis with real-time hazardous gas detection
- Environmental chambers with precise altitude, temperature, and pressure simulation
- Comprehensive mechanical abuse test systems: drop, vibration, crush, and penetration
- Scalable platforms for coin cells, cylindrical cells, pouch cells, and large battery packs
- Expert technical support with battery safety specialists and application engineers
- Custom configurations available for emerging battery chemistries and new safety standards

TECHNICAL SPECIFICATIONS

Product Overview

#	Product Name	Key Function
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1	Battery Fire Exposure Tester	Subjects battery cells or packs to direct flame exposure to evaluate fire propagation behavior, combustion characteristics, and compliance with safety burning test standards.
2	Lithium Battery Fire Prevention (Fire Jet) Machine	Simulates fire jet impingement on battery systems to assess fire-resistance performance of enclosures, thermal barriers, and protective coatings against high-intensity flame attack.
3	Large-Scale Lithium Battery HRR Test Platform	Measures heat release rate, total heat, smoke production, and combustion gas outputs for large battery modules or packs using oxygen consumption calorimetry at full-scale test conditions.
4	Battery Thermal Characterization System	Characterizes thermal properties — including heat generation, heat capacity, and conductivity — of battery cells and materials across a range of temperatures to support thermal management design.
5	Vapor and Gas Flammability Limit Tester	Determines the lower and upper flammability limits (LFL/UFL) of gases and vapors vented during battery thermal events, supporting hazard zone classification and ventilation system design.
6	Thermal Runaway Gas Burning Speed Tester	Measures the laminar and turbulent burning velocity of gas mixtures produced during lithium battery thermal runaway, providing data critical for explosion risk modeling and safety standard compliance.
7	Battery Thermal Runaway Tester	Triggers and characterizes thermal runaway events in battery cells or modules via heating, overcharge, or short-circuit abuse, measuring temperature propagation, gas venting, and energy release.
8	Battery Adiabatic Accelerating Rate Calorimeter	Performs adiabatic calorimetry on battery samples to measure self-heating onset temperature, heat generation rate, and thermal runaway severity under fully adiabatic conditions.
9	Battery Enclosure Thermal Runaway Tester (BETR)	Evaluates the ability of battery enclosures and housings to contain thermal runaway events, prevent fire spread to adjacent cells, and limit hazardous gas release to safe levels.
10	Cell Thermal Runaway Pressure Tester	Provides a sealed, instrumented pressure vessel environment for triggering and monitoring thermal runaway in individual cells, enabling precise gas pressure, temperature, and vent behavior analysis.
11	High-Altitude Low-Pressure Test Chamber	Simulates high-altitude low-pressure environments to assess battery electrical performance, safety behavior, and seal integrity under reduced atmospheric pressure conditions per UN 38.3 T1.
12	Dynamic Pressure & Variable Temp Test Chamber	Applies dynamically controlled pressure profiles combined with programmable temperature cycling to battery samples, replicating ascent/descent profiles and thermal stress conditions in service.
13	Altitude Test Chamber	Evaluates battery charge/discharge performance, thermal regulation, and safety responses under high-altitude low-pressure conditions while maintaining full electrical test capabilities.

14	Large Multi-Altitude Environment Tunnel System	Provides a walk-in tunnel environment for large battery packs or systems, simulating a range of altitude and pressure conditions for full system-level safety and performance validation.
15	Battery Drop Tester	Subjects battery cells, modules, or packs to controlled free-fall drop impacts onto hard surfaces at defined heights and orientations to assess mechanical integrity and post-impact safety.
16	3-Axis Battery Vibration Tester	Applies multi-axis vibration profiles (X, Y, Z) to battery specimens to simulate transportation and operational vibration environments, assessing structural durability and electrical stability.
17	Battery Crush and Nail Penetration Machine	Performs controlled mechanical abuse tests — including flat plate crush and nail penetration — on battery cells and modules to evaluate short-circuit response, fire, and venting behavior.
18	Liquid Cooling Pipeline Pressure Resistance Tester	Tests the pressure resistance, burst strength, and leak integrity of liquid cooling pipelines and connectors used in battery thermal management systems under sustained and pulsed pressure loads.



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