

Lithium Ion Battery Test Equipment



Thermotron has proven solutions to test your lithium ion batteries. Whether testing cells, modules, or battery packs, Thermotron has high performance, high reliability testing equipment that exceeds industry standard testing specifications. A variety of safety features are available to ensure technicians are never in harm's way.



Equipment for Lithium Ion Battery Testing

The following environmental testing equipment is the most popular for Lithium Ion Battery testing. The features listed with each chamber, along with performance enhancements can be custom built to meet individual needs.



XS-10 CHAMBER

This chamber is perfect for testing battery cells. Its compact size and mobility makes it easy to integrate into any lab environment. Hermetically sealed compressors provide moderate temperature change rates while allowing the chamber to consume less power than comparable chambers. The 8200 programmer controller with its 7-inch wide touch screen color display makes program entry and product monitoring simple.

SPECIAL FEATURES

- Door Chain with Proximity Switch
- Sheath Heaters
- Explosion Proof Interior Light
- Minimal Spark Package

Workspace Volume	Temperature Range	Humidity Range
10 cu ft. (283 L) 24 in. x 24 in. x 28 in. (61 cm x 61 cm x 71 cm)	+180°C to -70°C +356°F to -94°F	Optional



SE-1400 CHAMBER

Thermotron's SE-Series of environmental test chambers provides higher performance so customers can experience higher productivity and more accurate results. An optimized airflow system provides conditioning in the center of the workspace where you need it most, providing more consistently repeatable test results. Improved gradient control produces tighter uniformity and greater accuracy.

SPECIAL FEATURES

- Sheath Heater
- Dry Air Purge
- Fire Suppression System
- Intrinsic Barriers
- Remote Air-Cooled Condenser

Workspace Volume	Temperature Range	Humidity Range
48 cu ft. (1,366 L) 48 in. x 39 in. x 44 in. (122 cm x 100 cm x 112 cm)	+220°C to -70°C +428°F to -94°F	10 to 98% RH



Equipment for Lithium Ion Battery Testing



SE-2000 CHAMBER

Ideal for testing hybrid battery packs and transmission fluid. Compressor sizes range from 2 Hp to 20 Hp. As compressor sizes increase, temperature change rates can rise from 5°C/min to 20°/min. Higher stress levels identify product design flaws and process weaknesses more effectively.

SPECIAL FEATURES

- Blow Off Port
- Chamber Relief Vent
- Explosion Proof Interior Light
- Isolation Barriers

Workspace Volume	Temperature Range	Humidity Range
69 cu ft. (1,965 L) 48 in. x 48 in. x 52 in. (122 cm x 122 cm x 132 cm)	+180°C to -70°C +356°F to -94°F	10 to 98% RH

COMBINED ENVIRONMENT SYSTEMS



Capable of testing small to large products, Thermotron's AGREE systems are able to simulate a combination of temperature, humidity and vibration. To ensure high quality standards of the AGREE system, Thermotron manufactures and designs all components in-house.

OPTIONS AVAILABLE

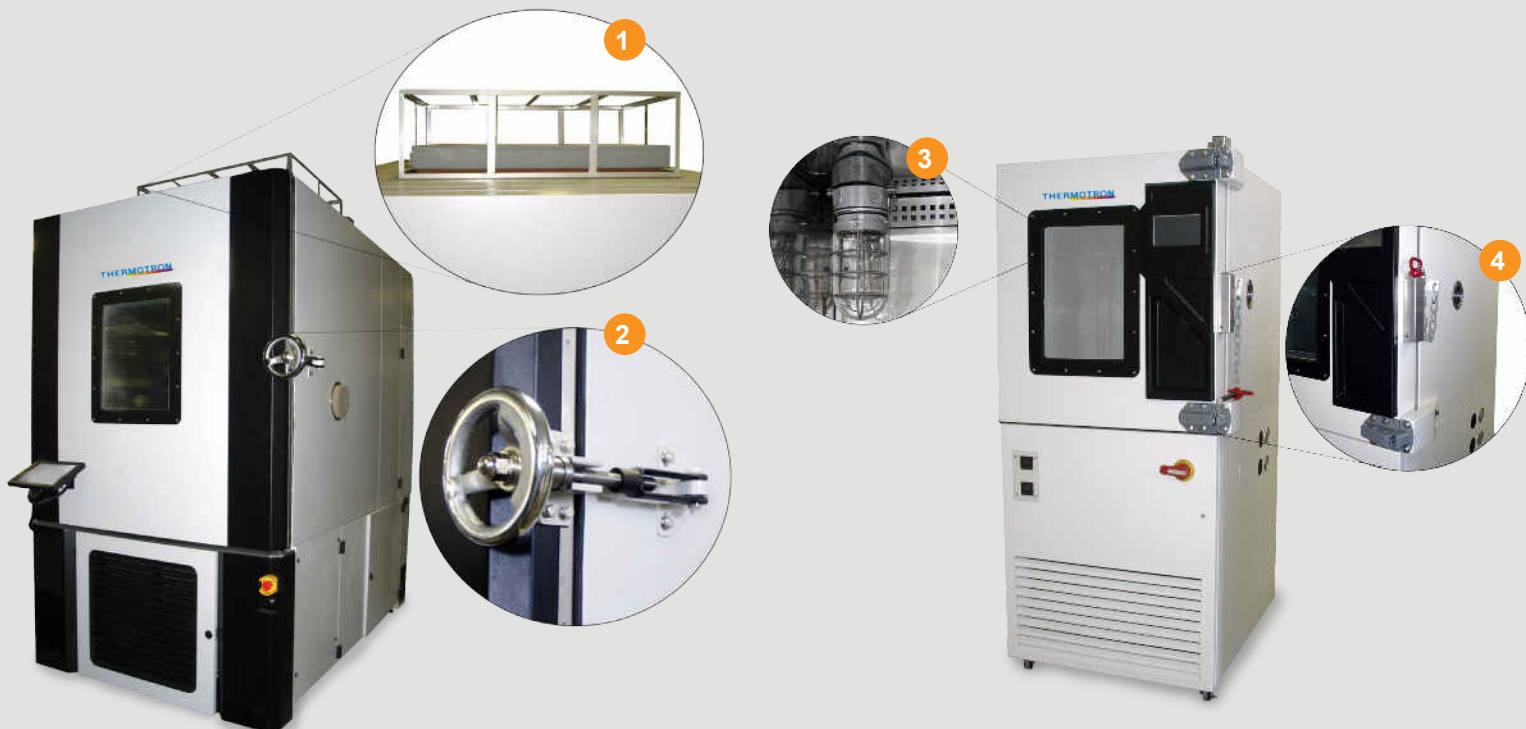
- Data Acquisition (DAQ)
- Dry Air Purge
- Remote Refrigeration
- Air-Cooled Condenser & much more...

Workspace Volume	Temperature Change Rate	Humidity Range	Vibration
12 cu ft. (340L) to 168 cu ft. (4,758L)	5°C to 30°C per minute	20 to 95% RH	5 to 2,000 Hz Up to 12,000 FLB (53 kN)



Safety Features to Consider

FEATURE	BENEFIT
1 Blow Off Top	Releases when pressures are too great. A metal cage houses the blow off top to block particulates from escaping.
2 Hand Wheel Door Latch	Heavy-duty door handle to insure that pressures will not blast door open.
3 Explosion Proof Interior Light	Special configuration of the light bulb protects it from damage inside the chamber.
4 Handle/Latch	Latch holds door shut while a proximity switch detects whether the door is properly locked, acts as a blow-out option.
Exterior Light	A light source mounted on the outside of the chamber guarantees that the bulb will not explode due to extreme conditions.
Gas Detector/Monitor	Monitors/detects any imbalances in hazardous gas levels.
Intrinsic Safety Isolation Barrier	Protection for safe operation in dangerous atmospheres and under irregular operation conditions.
Non-Sparking Fan Blade	Ensures the fan will not act as a starting agent if gas is present
Reinforced Floor	Ideal for testing heavy or multiple battery modules or packs.
Sheath Heater	Temperatures cannot increase higher than auto ignition temperature.
Nitrogen Purge	Reduces oxygen content inside the chamber.





Lithium Ion Battery Testing Standards

The following standards are used to specify environmental tests for testing safety, reliability, abuse and transportation of lithium ion batteries. Tests such as thermal cycling, altitude, vibration, and heat resistance can all be performed in a Thermotron chamber.

STANDARD	APPLICATION
IEC 61960	Safety standards for secondary lithium ion batteries
IEC 62660-2	Reliability and abuse testing for Secondary lithium-ion cells for the propulsion of electric road vehicles
SAE J2464	General guidelines for rechargeable energy storage system safety and abuse testing on electric and hybrid electric vehicles
UL 1642	General Safety Testing of Lithium-Ion Batteries
UL 2580	Batteries for use in Electric Vehicles & its ability to safely withstand simulated abuse conditions
IEC 62281	Safety of primary and secondary lithium cells and batteries during transport Must pass UN T1-T8 transport tests (includes thermal cycling, altitude, vibration and shock tests)
UN/DOT 38.3	Standards for shipping lithium batteries, either alone or as part of a device. Must pass UN T1-T8 transport tests (includes thermal cycling, altitude, vibration and shock tests)

HAZARD LEVELS AND DESCRIPTION¹

The hazard levels shown in the table below are based on the technology's response to abuse conditions. Considering these levels when evaluating the abuse response is important in some testing specifications.

HAZARD LEVEL	DESCRIPTION	CLASSIFICATION CRITERIA & EFFECT
0	No Effect	None
1	Passive Protection Activated	Cell reversibly damaged. Repair of protection device needed.
2	Defect/Damage	Cell irreversibly damaged. Repair needed.
3	Leakage	Weight loss <50% of electrolyte weight
4	Venting	Weight loss ≥50% of electrolyte weight
5	Fire or Flame	No flying parts
6	Rupture	Flying parts of the active mass
7	Explosion	Disintegration of the cell

¹FreedomCAR: Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Vehicle Applications: SAND 2005-3123.

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