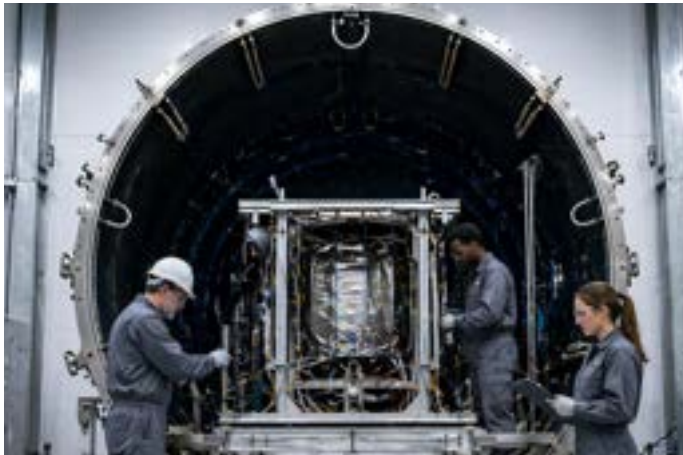


NEWSLETTER



SPACE SIMULATION TEST PLATFORMS BUILT AROUND YOUR MISSION PROFILE

Thermal Vacuum (TVAC) Testing measures reliability by eliminating convective heat transfer, focusing on radiation and conduction. This testing identifies temperature-driven drift, thermal interface issues, and vacuum-related failures before deployment.

Torontech's ToronTVAC™ and electric propulsion platforms are **scalable systems for various testing needs**, including full-satellite thermal balance and Hall thruster performance.

They can be configured based on chamber size, pressure, thermal range, uniformity, ramp rate, and instrumentation requirements.

Thermal Vacuum Test System

ToronTVAC™ 800



- **Unit-level TVAC verification** for thermal cycling and functional checks under vacuum with stable thermal interfaces (heat sink + cold plate).
- **Defined Vacuum & Thermal Performance:** Operating pressure $\leq 1.3 \times 10^{-3}$ Pa, ultimate pressure $\leq 5.0 \times 10^{-5}$ Pa, heat sink/cold plate -70°C to $+150^{\circ}\text{C}$.
- **Repeatable Thermal Exposure:** Heat sink temperature uniformity $\leq \pm 2^{\circ}\text{C}$ and ramp rate $\geq 1.5^{\circ}\text{C}/\text{min}$.

Thermal Vacuum (TVAC) Test Chamber

ToronTVAC™ 1500



- **Stable Thermal Control for TVAC Profiles:** Controlled heat sink + cold plate for thermal cycling/thermal stress, with uniformity to reduce variation across the interface.
- **Vacuum Capability for Space-Simulation Style Testing:** Low operating pressure and deeper ultimate pressure capability for vacuum-driven behaviors and outgassing sensitivity.
- **Multiple 1500 configurations (O / W / C)** with listed chamber, heat sink, and cold plate sizes—supporting different fixture/instrumentation needs.

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Large-Scale TVAC Test Chamber

ToronTVAC™ 3600



- **Built for full-satellite TVAC testing** and integrated subsystem setups in a large chamber envelope.
- **Deep Cold Boundary:** Closed-cycle LN2 cold boundary to ≤ 100 K to support thermal balance/cycling work.
- **High-Capacity Program Support:** External heat flux simulation (100 heating channels) and data acquisition capacity (400 data channels) listed for complex programs.

Electric Propulsion Performance Test System

ToronEPP™ 1000



- Designed for **Hall thruster evaluation** with controlled vacuum conditions and performance benchmarking workflows.
- **Stable Vacuum During Propellant Flow:** Operating pressure capability maintained during xenon/krypton flow for repeatable testing.
- **Defined Chamber Platform:** Chamber $\phi 1000 \times 2000$ mm; ultimate pressure (6 h) $\leq 5.0 \times 10^{-5}$ Pa.

ToronFact Corner

In TVAC, convection is largely removed—so **radiation and conduction dominate heat flow**. That's why cold plates, heat sinks, and stable thermal interfaces matter so much for repeatable thermal cycling and thermal balance runs.



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Electric Propulsion Ground Ignition System

ToronEP™ 3000 G



- › A dedicated platform for **repeatable Hall thruster ignition tests** under controlled vacuum and thermal conditioning.
- › **Flexible Instrumentation & Diagnostics Access:** Large chamber/platform for fixturing and test development.
- › **Cold Plate Thermal Conditioning:** Cold plate control -40°C to $+50^{\circ}\text{C}$ (500 W) to support ignition-related studies.

Why Choose Torontech

- **Scales Across Program Stages:** From unit-level verification to full-satellite thermal balance with heat flux and high channel-count capability.
- **Workflow-Fit System Selection:** Model choice is guided by chamber envelope, pressure targets, thermal specs, and real fixture/instrumentation needs.
- **Broader Test Plan Coverage:** TVAC validation plus propulsion testing and micro-force measurement for more complete space hardware verification.

Actuator Measurement System

ToronAMS™ 2500



- › Combines **vacuum simulation + vibration isolation + high-accuracy thrust evaluation** for micro-thrust devices and actuator behavior.
- › **Micro-Newton Performance:** Micro-thrust range $0.1\ \mu\text{N}$ to $100\ \mu\text{N}$, resolution $\leq 0.1\ \mu\text{N}$, response time 100 ms.
- › **Low-Noise Isolation:** Natural frequency $\leq 1\ \text{Hz}$ with isolation efficiency targets to stabilize micro-force data.

CUSTOMIZATION CALL-OUT

Built to Match Your System Requirements

Torontech platforms are **selected and configured** around your chamber envelope, pressure targets, thermal range, uniformity, and ramp rate, plus real-world needs like fixturing layout, instrumentation density, and cable routing for **repeatable setups and consistent pass/fail decisions**.

Ready to **Build A Space-Simulation Test Setup** That Matches Your Mission Profile?

Torontech's ToronTVAC™ and electric propulsion test platforms support repeatable thermal vacuum validation, thruster performance testing, ignition verification, and micro-force measurement—configured around your chamber size, instrumentation, and program requirements. Explore the full category here: <https://www.torontech.com/product/thermal-vacuum-tvac-test-chambers-and-space-simulation-systems/>

For expert guidance on selecting the right system configuration for your test article and workflow, please contact us: sales@torontech.com