TORONTECH

THERMAL VACUUM (TVAC) TEST CHAMBER - TORONTVAC™ 3600

Thermal Vacuum (TVAC) Test Chamber - ToronTVAC™ 3600

TVAC testing verifies complete satellites and large space systems under high vacuum and controlled thermal loading. ToronTVAC™ 3600 is designed for full-satellite and subsystem thermal balance testing and thermal vacuum (TVAC) validation before launch.

The system combines a large vacuum chamber, high-capacity heat sink, contamination control, and external heat flux simulation to reproduce space-like heat transfer conditions. It supports deep cold operation using a closed-cycle LN2 cooling approach. This configuration is intended for programs that require high channel count control and data acquisition for complex test articles.

ToronTVAC™ 3600 is a large-scale thermal vacuum (TVAC) test chamber engineered to verify in-orbit performance of complete satellites and major assemblies. The chamber provides a controlled vacuum environment while the heat sink system establishes stable cold boundaries to support thermal balance and thermal cycling work.

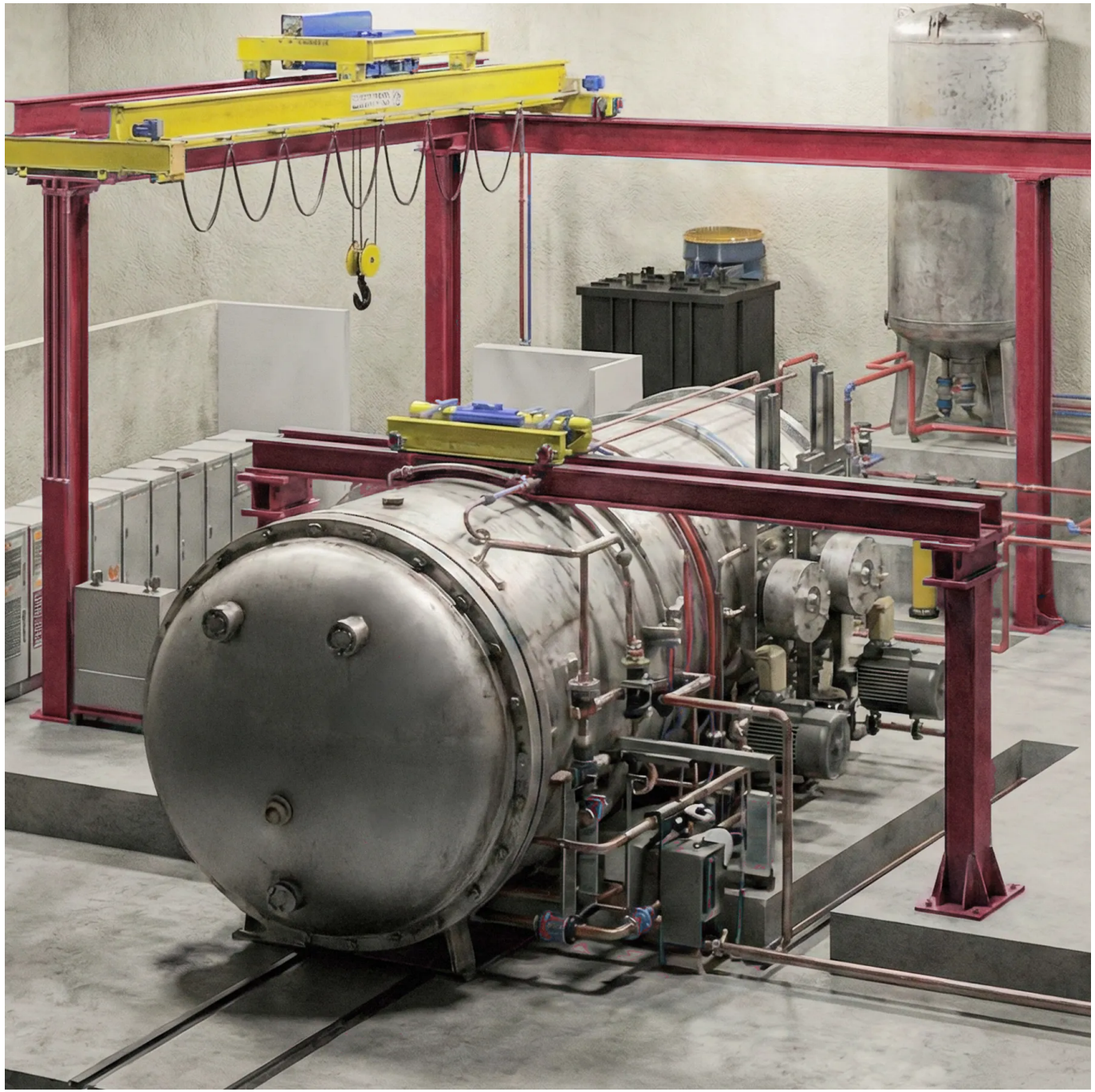
External heat flux simulation enables controlled heating across multiple zones to reproduce mission-like thermal inputs. Contamination control features support outgassing evaluation during extended pump-down conditions, helping protect sensitive satellite surfaces and optics. The system is built to support qualification and acceptance testing where repeatability, traceability, and high channel density are required.

APPLICATIONS

Thermal Vacuum (TVAC) Test Chamber - ToronTVAC™ 3600 Applications

- Full-satellite TVAC testing to verify reliable in-orbit operation before launch
- Subsystem and integrated assembly thermal balance testing under high vacuum
- Thermal vacuum qualification and acceptance testing for satellite platforms and payloads

- Contamination and outgassing evaluation for contamination-sensitive space hardware
- External heat flux simulation to replicate mission thermal inputs and boundary conditions
- High-channel-count instrumentation tests for complex satellite configurations



FEATURES

Thermal Vacuum (TVAC) Test Chamber - ToronTVAC™ 3600 Key Features

- S30408 stainless steel chamber construction supports corrosion resistance and long service life
- Large chamber envelope supports full-satellite TVAC testing and integrated subsystem setups
- High-vacuum capability supports space-environment simulation for qualification programs
- Closed-cycle LN2 cold boundary supports deep cold operation to ≤ 100 K
- Contamination control supports outgassing evaluation with low-mass-loss targets during extended runs
- External heat flux simulation supports multi-zone thermal input control for mission-like profiles
- High channel capacity supports complex control and measurement needs for full satellite testing

TECHNICAL SPECIFICATIONS

Thermal Vacuum (TVAC) Test Chamber - ToronTVAC™ 3600 Technical Specification

Specification	Details
Chamber Dimensions	Φ 3600 mm × 5000 mm
Heat Sink Dimensions	Φ 3000 mm × 5000 mm
Operating Pressure	≤ 1.3×10^{-3} Pa
Ultimate Pressure	≤ 5.0×10^{-5} Pa
Heat Sink Temperature	≤ 100 K (Closed-Cycle LN2)

Specification	Details
Heat Sink Temperature Uniformity	≤ ±5 K
Contamination Control	Outgassing (24 h, no load) < 1.0×10^{-7} g/cm²
External Heat Flux Simulation	100 heating channels
Data Acquisition Capacity	400 data channels

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