

Sirius Thermal Vacuum Systems

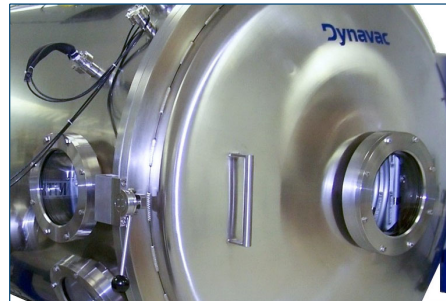
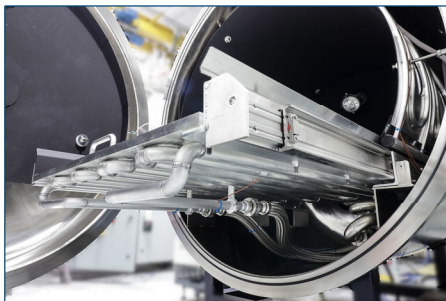
Turnkey thermal vacuum systems to subject your spacecraft, systems, and components to the rigors of the space environment

Dynavac distills forty years of space simulation expertise into our Sirius line of thermal vacuum systems optimized for testing small and mid-sized spacecraft and flight hardware.

The Sirius line of standard TVAC systems in three to eight foot diameters brings Dynavac's unmatched product quality, leading control system, and highly-responsive field support to customers at an affordable price.

These standard platforms are highly configurable with a range of options. Dynavac also offers fully custom systems to meet unique test requirements.

Dynavac is the leader in thermal vacuum systems for space simulation and a trusted partner of aerospace companies, universities, and government agencies. Customers rely on Dynavac for their testing needs from benchtop units to massive field-constructed facilities.



Systems overview

Chamber size

- Cylindrical chambers in 3 to 8 foot diameters; standard lengths cover most test article sizes
- Other sizes and shapes available as options

Environmental

- 10^{-6} Torr working pressure
- -180 to +150C with liquid nitrogen or gaseous nitrogen cooling
- -60 to +125C with standard mechanical chiller; other ranges available
- Active thermal platens and shrouds; shrouds standard for LN2 and GN2 thermal systems and optional for mechanical chiller
- Nitrogen repressurization

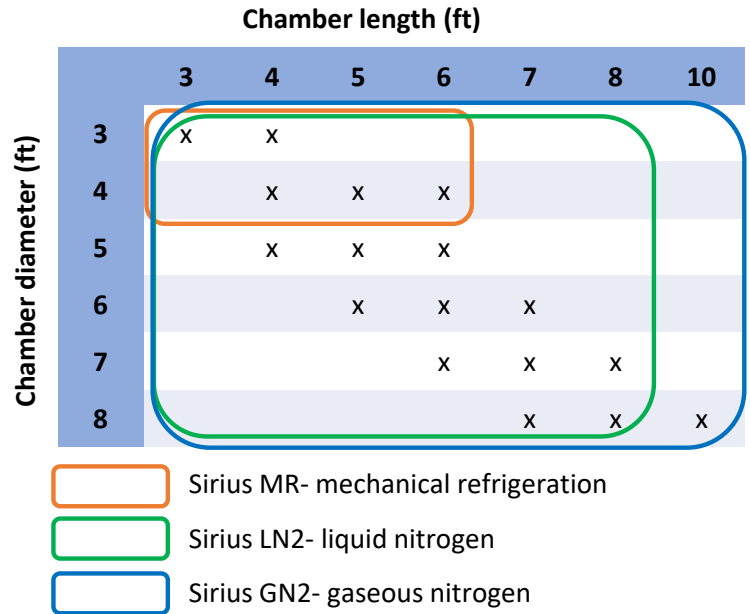
Controls

- Full operator control of chamber and thermal profiles through LabView-based HMI
- PLC controls chamber systems providing safety interlocks and fail-safe operation

Sirius Thermal Vacuum Systems

Standard chambers

- Cylindrical; chambers constructed from Type 304 stainless steel with #4 finish
- Helium leak performance $<1 \times 10^{-9}$ std/cc/sec
- Domed head hinged chamber door
- Optional 6" door viewport
- Multiple ports available for users- see individual spec sheets for port configurations
- Cover plates supplied for all user ports
- Optional vibration isolation available
- Dynavac can provide any chamber size and/or user port configurations as customized systems. Please contact sales with your needs.



Dynavac can provide any chamber size, shape, and user port configurations as customized systems. Please contact sales with your needs.

Thermal

Dynavac's Sirius family offers three thermal platforms designed for stable, uniform temperatures. Mechanical chillers are a good option for smaller chambers in facilities without liquid nitrogen. Direct injection of liquid nitrogen (LN2) gives robust performance in small and mid-sized chambers. Larger chambers benefit from the thermal uniformity of a thermal control unit supplying gaseous nitrogen (GN2/TCU) to a shroud.

Dynavac thermal shrouds are coated with high emissivity paints carefully selected for high-vacuum environments.

| | | Chamber diameter (ft) | | | | | |
|------------------------------------|--|-----------------------|---|---|---|---|---|
| | | 3 ft | 4 | 5 | 6 | 7 | 8 |
| Mechanical chiller -60 to 125C | | | | | | | |
| LN2 with shroud -180 to 150C | | | | | | | |
| GN2/TCU and shroud -180 to 150C | | | | | | | |

Thermal systems can be customized to provide temperature ranges meeting specific requirements.

Sirius Thermal Vacuum Systems

Pressure

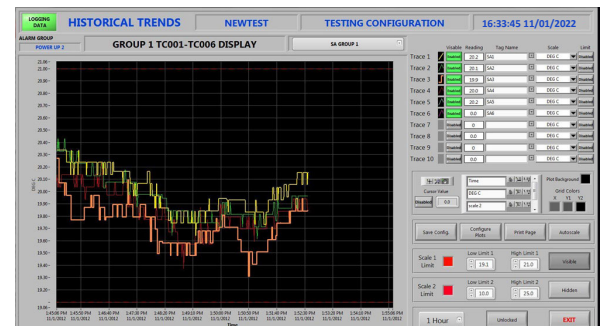
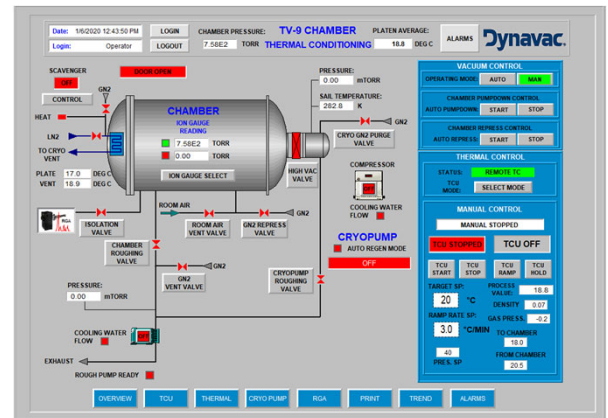
- Base pressure $<1 \times 10^{-6}$ Torr
- Dry mechanical roughing pump
- High-vacuum cryopumps standard
 - Turbomolecular pumps optional
- Cryopanel option for increased water vapor pumping and contaminant control

Platen

- Platens fully integrated into the thermal system and actively controlled
- Thermocouples monitor platen temperature for system control
- Aluminum construction
- $\frac{1}{4}$ -20 Nitronic threaded mounting holes on 4x4" grid
 - Metric options available
- Platen is on telescopic sliding rails to aid test article loading and unloading

Controls and Instrumentation

- Comprehensive and intuitive user interface hosted on PC running LabVIEW
 - 24" HD LCD operator display
- User interface located adjacent to chamber or in remote control room
- User can define and store thermal profiles
- System and component states displayed and controlled through status screens
- Pressure and temperature readings stored and available for user data analysis
- Optional Type-T thermocouples available for user
 - 1 sample/second minimum sample rate
 - Thermocouple data captured and displayed by control software
- Chamber pumping and thermal systems controlled by embedded PLC to protect equipment and operator; provides fail-safe operation
- Remote diagnostic capability included
- No ongoing license or subscription fees



Sirius Thermal Vacuum Systems

Utilities

- Electrical:
 - 208-240VAC three phase or 480VAC three phase depending on configuration and available site utilities
- Liquid nitrogen for LN2 systems
- Gaseous nitrogen and water supply needed for GN2/TCU systems
- Dry gaseous nitrogen for chamber repressurization where required
- Contact sales for detailed utility and floor space requirements



Sirius-MR platform with optional thermal shroud



Accessories

- A wide range of accessories are available, including:
 - Cold plates and cold fingers
 - Signal and power feedthrough plates
 - Thermal data acquisition system (TDAS)
 - Auxiliary thermal control system (ATCS)
 - Test article loading carts
- Contact Dynavac for a full list of accessories

Dynavac support

- Systems are fully tested prior to shipping
- System documentation includes Operation and Maintenance Manual, as-built mechanical drawings, and electrical schematics
- On-site installation and start-up service available
- Covered by Dynavac warranty (see web site)
- Annual maintenance contracts available

Custom sizes, configurations, and performance available on request

Dynavac- creating the environment for your mission success