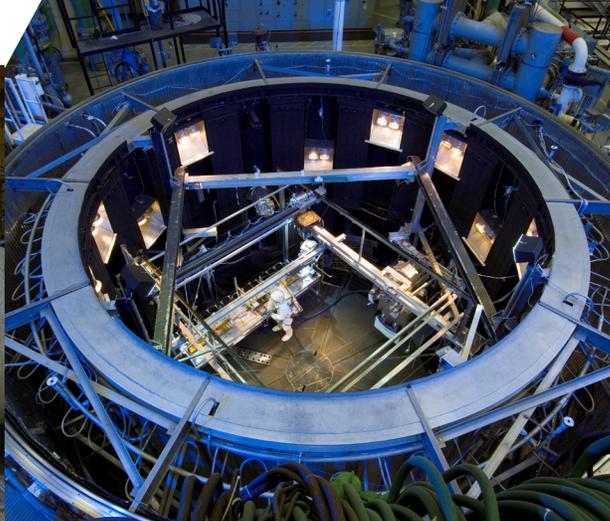
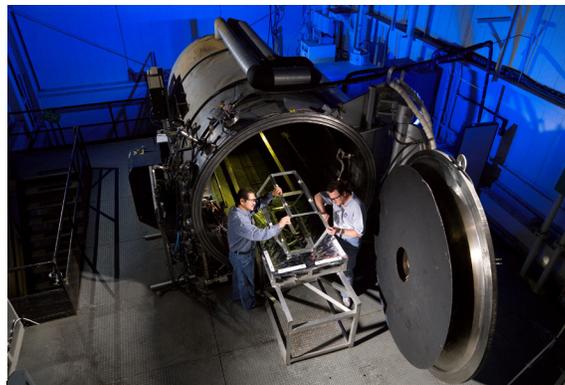


## Thermal Testing

Johnson Space Center (JSC) Thermal-Vacuum Test Facilities provide thermal-vacuum chamber test operations for both manned and unmanned test environments. The facilities offer a wide range of performance capability, which can be matched to the individual test requirements of smaller test articles or large test article components and subsystems. Typical uses of these chambers have included development, engineering evaluation, and qualification testing of spacecraft components, subassemblies, and experiments; preflight thermal-vacuum conditioning of flight hardware; development and calibration of instruments for use in the large chambers or in-flight; spacecraft seal studies; photographic film emulsion studies; and optical surface contamination studies.

### Services Provided

- Human-rated space environmental testing
- Materials outgassing evaluations
- Accelerated electrical and electronic component burn-ins and life-cycle testing
- Environmental cycling (thermal and humidity) for materials survivability
- Materials and hardware testing in extreme environments (manned and unmanned)
  - Determination of design factors
    - Operating temperatures
    - Combined thermal and pressure-load distortions of dimensionally critical structural elements
    - Fluid and gas leak rates
    - Changes in absorptive or emissive properties of thermal coating
    - Evolution of harmful or undesirable off-gassing products
    - Presence of conditions conducive to electrical-arc or corona discharge



## Services Provided

### Chamber A

Chamber A is the largest of the thermal-vacuum test facilities at JSC. The chamber's usable test volume and high-fidelity space simulation capabilities are adaptable for thermal-vacuum testing of a wide variety of test articles, including entire space vehicles. Additional test support equipment includes mass spectrometers, infrared cameras, and television cameras. The numerous flanges at all levels provide ample pass-throughs for electrical, instrumentation, and gasses to support large systems.

### Chamber B

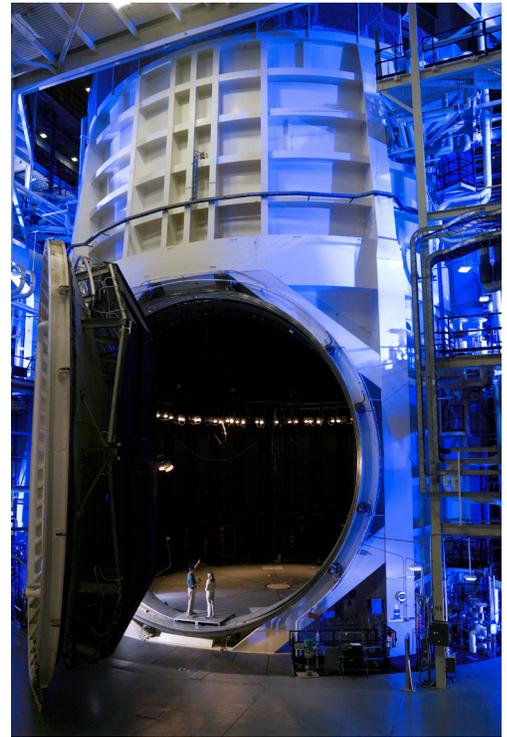
Chamber B is used for human testing in a vacuum environment and for crewed space operations testing. Chamber B is a human-rated chamber equipped with a traversing monorail that provides weight relief to one suited crewmember at a time. The chamber also has dual crew-locks to provide easy access to the test articles as well as a means of transporting test crewmembers to the test environment and back during tests.

### Chamber E

Chamber E is a thermal vacuum chamber designed for relatively large gas loads at high vacuum. It is equipped with cold walls, an on-axis filtered xenon solar simulator, and pumping systems suitable for trace-contaminant sensitive tests.

### 15-Foot Chamber

The 15-Foot Chamber is a spherical chamber designed to test advanced concepts for battery power systems, space vehicle actuators, and auxiliary power units.



Chamber A

Facility	Internal Volume	Temperature Range	Pressure Range
Chamber A	55' Dia x 90' H	-300 °F – *	1 x 10 <sup>-6</sup> – 760 torr
Chamber B	25' Dia x 26' H	-300 °F – *	1 x 10 <sup>-6</sup> – 760 torr
Dual Glove Box	4.5' W x 3.5' H x 1.3' D	-300 – 300 °F	1 x 10 <sup>-5</sup> – 760 torr
Chamber E	4.6' Dia x 9.5' L	-280 °F – *	1 x 10 <sup>-6</sup> – 760 torr
Chamber N	3' Dia x 3' L	-280 °F – *	1 x 10 <sup>-6</sup> – 760 torr
Chamber P	5' Dia x 4' L	Ambient – 400 °F	1 x 10 <sup>-6</sup> – 760 torr
Chamber G	1.4' Dia x 2' L	-280 °F – *	1 x 10 <sup>-6</sup> – 760 torr
15-Foot Chamber	12.5' diameter	-300 – 300 °F	1 x 10 <sup>-6</sup> – 760 torr
Tenny Chamber	43" W x 60" H x 26" D	-300 – 350 °F	5 x 10 <sup>-5</sup> – 760 torr

\* Maximum temperature is dependent on characteristics of the test article and associated test buildup

We have developed customer-friendly agreements to streamline business relationships and are eager to share our unique facilities and expertise with new customers. We invite your inquiries regarding application or adaptation of our capabilities to satisfy your special requirements. Briefings on general or specific subjects of mutual interest can be arranged at JSC or at your business site.



For the benefit of all

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