



The space simulation system or thermal vacuum chamber at Just Vacuum can be used for the custom simulation of the extreme environmental conditions of space.

During these tests, the conditions of space are simulated as realistically as possible in a completely enclosed system. Both environmental parameters are simulated via the simultaneous control of pressure and temperature. Our system is suited for testing components, system subunits and complete satellites.

Basic data

- Chamber volume: approx. 14.9 m³
- Doors with differential pump system between both Viton gaskets:
 - swivel-mounted front door
 - detachable back door
- Shroud: Ø 2000 mm x 2800 mm
- Temperature control table with M6 threaded hole grid: 1200 mm x 2350 mm
- Rack for removing the table and preparing the test object in the clean room
- Max. test volume of a cuboidal test object: L2500 x B1200 x H1400 mm
- Max. mass test object: 250 kg
- Inspection glass at the top: 200 x 1500 mm² made of borosilicate glass
- Temperature range: -180°C to +180°C
- Vacuum quality: up to 5 x 10⁻⁸ mbar
- Cooling: liquid nitrogen (LN2)
- Heating: electric
- Cooling down thermal cycle gradient: approx. 0,5 K/min
- Heating up thermal cycle gradient: approx. 2 K/min
- Data acquisition: power and data ports
- Clean room class (ISO 14644-1): ISO 7



Control

- Fully automated sequence of different pressure and temperature scenarios
- Easy operation via a 19" touch panel or remote in the control room
- Data storage of pressure, temperature, and other parameters in real time
- Data processing as .csv file

Fine vacuum

- Dry compressing screw pump
 - Connecting flange: ISO-K DN100
 - Final pressure: 5 x 10⁻³ mbar
 - Pumping speed: 450 m³/h
- Dry compressing roots pump
 - Connecting flange: ISO-K DN100
 - Final pressure: 3 x 10⁻² mbar
 - Pumping speed: 55 m³/h

High vacuum

- Turbomolecular pump
 - Connecting flange: ISO-F DN250
 - Final connection: 5 x 10⁻⁶ mbar
 - Pumping speed: 2.100 l/s
- Cryogenic pump (large pendulum valve)
 - Connecting flange: ISO-F DN500
 - Final pressure: 5 x 10⁻⁸ mbar
 - Pumping speed H₂: 9.100 l/s
 - Min. temperature: 20 K



Pressure measurement

- Pre-vacuum gauge Pirani up to 1 x 10⁻⁴ mbar
- High vacuum gauge hot cathode up to 1 x 10⁻¹⁰ mbar

Mass spectrometry and RGA

- Quadrupole mass spectrometer
 - Measuring range 1-200 amu
 - Detector Faraday / EM
 - Ion source: open, 2 cathodes, tungsten
 - Connecting flange DN40 ISO-K

Temperature measurement

- Several temperature sensors PT100
- Separate monitoring of the shrouds and the temperature control table

Linear thermal expansion

- Interferometer
 - Resolution < 1 x 10⁻⁸ m
 - Several attachments with different sensors
 - Vibrations up to 10 MHz

SERVICE - We offer:

- Full support for your tests in our thermal vacuum chamber
- Custom simulation cycles
- Final pressure of 5 x 10⁻⁸ mbar
- Wide temperature range from -180 °C to +180 °C
- Wide range of available measuring devices, e.g., quadrupole mass spectrometer (200 amu) as well as measuring devices for determining the linear thermal expansion
- Power and data ports for data acquisition
- Individually customizable feedthrough configurations
- Cold trap for the detection and absorption of contamination and outgassing
- Contamination control through test part integration in the ISO 7 class clean room (ISO 14644-1)
- Silent mode (vibration-free measuring cycles)