NASA Plum Brook Station Spacecraft Propulsion Research Facility (B–2)

The largest hydrogen-compatible thermal vacuum test facility in the United States.

The world's largest space simulations facility capable of full-scale rocket engine and stage testing.
B–2 Facility Capability Summary

Hydrogen/Oxygen Rocket
Test Capability With Vacuum Start
- 30K lbf thrust engine for 400 sec test duration
- 100K lbf thrust engine for 270 sec test duration
- 300K lbf thrust engine for 15 sec test duration

Space Simulation
B–2’s test chamber is capable of reproducing space environment temperatures and vacuum.
- Vacuum pressure: 5x10^{-7} torr
- LN₂ chamber temperature: -320 °F
- Infrared radiation intensity: 130 W/ft²

Control and Data Systems
- Test operations are controlled by a fully redundant computerized control system via a remote control room located 2400 ft from the test site.
- A state-of-the-art data acquisition system records all parameters associated with the test. Features include 600 channels at direct current to 1 kHz per channel and a high-speed system capability up to 115 kHz per channel.

Spray Chamber
- 67 ft diameter by 120 ft deep underground chamber holds 1.7 million gallons of chilled water.
- Four 2000-hp water pumps recirculate 224,000 gal of chilled water per minute to condense engine exhaust.
- Three propellant dump tanks are available for enhanced safety.

Electrical Systems
Facility is rated Class 1, Div. 2, Group B to enable testing of hydrogen/oxygen propellant systems.

Test Chamber Facts
- Test chamber: 38 ft diameter by 65 ft tall
- Test volume: 33 ft diameter by 55 ft tall
- Top access opening: 27 ft diameter
- Liquid nitrogen (LN₂) is used in the chamber’s interior cold wall to simulate the low temperatures of space. Infrared lamps simulate solar heating.

Exhaust Systems
Two three-stage intercondensing steam ejector trains remove rocket exhaust during hot fire tests and maintain the spray chamber vacuum environment.

* All values are approximate and for reference only.