

NASA GLENN RESEARCH CENTER: THE THERMAL VACUUM TESTING FACILITY 5

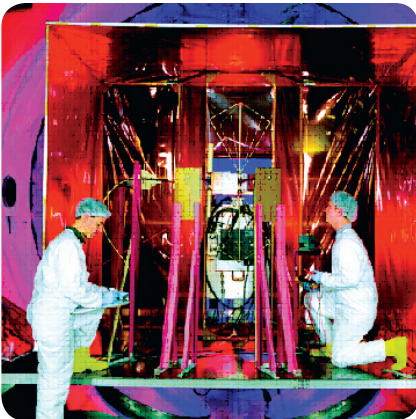
A Part of NASA's Strategic Capabilities Assets Program



Vacuum Facility 5 (VF5) is a 15-foot diameter thermal vacuum facility located at NASA Glenn Research Center in Cleveland, Ohio. The test chamber and supporting infrastructure serve as a valuable resource in space simulation ground testing. Some unique facility capabilities include a large chamber volume (15 feet in diameter by 60 feet long) and, depending on test requirements, the option of using the internal helium/liquid nitrogen cryogenic pumping system or a nitrogen, cold-trapped, oil diffusion pumping train.

The clean, cryogenic vacuum system provides a no-load base pressure of 1×10^{-7} Torr at a theoretical pumping speed of 3 500 000 l/sec on air. Approximately 40 m² of helium surface removes 750 W at 20 K. A baffled, diffusion pump system provides 250 000 liters/second pumping supporting noncondensable gases.

The 16-ton, closed-loop helium refrigeration system provides cryogenic temperatures conducive to maintaining hard vacuum while testing high-power test articles. This system also provides the option of an inexpensive and a continuous supply of helium for test article exposure. The test chamber has an internal rail system and an overhead beam for hoist operations. The facility is oriented horizontally with an attached 5 feet in diameter by 6 feet long valved test port. Additional test capabilities consist of a large staging area, access to a class 1000 clean room, a machine shop, and automatic, unattended vacuum operations. The VF5 is one of more than 25 chambers included in the unique suite of vacuum facilities supporting space simulation ground testing at Glenn.



CHARACTERISTICS

Overall dimensions	
Main chamber	15 feet in diameter x 60 feet long
Test port	5 feet in diameter x 6 feet long
Internal working dimensions	
Main chamber	13 feet in diameter x 30 feet long
Test port	5 feet in diameter x 6 feet long
Vacuum system	
Cryopanel	750 W at 20 K, 40 m ² of helium surface providing a no-load pressure of 1×10^{-7} Torr with a pumping speed of 3 500 000 liters/second on air
Diffusion pumps	20 each 32-inch pumps with nitrogen cold traps providing a no-load base pressure of 1×10^{-7} Torr with a pumping speed of 250 000 liters/second on air
Thermal simulation	
Cold	Liquid nitrogen and helium surfaces available upon request
Heat	Configurable lamps available upon request
Instrumentation	Thermocouples, RGA, TQCM, cameras, and other necessary test equipment
Additional	Multiple test port and feed throughs, automatic and unattended vacuum operation, large staging area, class 1000 clean room, and machine shop



FACILITY APPLICATIONS

- Thermal vacuum testing of flight experiments
- Spacecraft hardware development
- Plasma interaction effects on spacecraft hardware and materials
- Advanced materials applications
- Electric propulsion research development
- Integration of space power systems

CONTACT INFORMATION

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