

Tunnel 9 Testing Capabilities

Mach 7

- Nominal Core Size: 8 inches
- Reynolds Number Range: 1.8 to 16.7 million per foot
- Run Time: 1 to 6 seconds

The Mach 7 Thermal/Structural Facility is located in one of the two test legs at Tunnel 9. This test leg provides a controlled ground test environment that duplicates actual Mach 7 flight conditions for altitudes as low as 34,000 feet for test times up to 6 seconds. Tunnel 9 is able to duplicate the thermal shock, peak heating, and thermal heat soak of actual flight for assessing the thermal and structural response of full-size seeker windows and radomes prior to flight testing. This capability is particularly important to endo-interceptor programs where sensor window survivability, cooling, mounting, and aero-optical performance are critical.

Mach 8

- Nominal Core Size: 24 inches
- Reynolds Number Range: 8.7 to 55.7 million per foot
- Run Time: 0.2 to 0.75 seconds

The Mach 8 test environment provides duplication of flight dynamic pressures up to 90 psia and maximum Reynolds Numbers of 56 million per foot. These test conditions are held constant for test times up to 0.75 seconds. The high dynamic pressures and long run times available at Mach 8 provide a critical testing capability in a controlled environment for interceptors and other programs utilizing shroud separation technologies.

Mach 10

- Nominal Core Size: 40 inches
- Reynolds Number Range: 0.86 to 21.9 million per foot
- Run Time: 0.23 to 15 seconds

Mach 10 is a high Reynolds Number testing environment which provides naturally occurring turbulent boundary layers on the models. Computer-controlled pitching of the model and programmable blowing systems allow variations in test parameters during a single wind tunnel run.

Mach 14 & Mach 16.5

- Nominal Core Size: 35 inches
- Reynolds Number Range: 0.072 to 6.2 million per foot
- Run Time: 0.7 to 15 seconds

The Mach 14 and Mach 16.5 test environments achieve both high Reynolds Numbers and high Mach Numbers coupled with long run times to provide critical altitude simulations needed by reentry and hypersonic technology programs. Parametric testing can be performed during a single wind tunnel run by utilizing the programmable blowing and computer-controlled pitching systems.

Tunnel 9 Capabilities Summary

Contoured Nozzle	Reynolds Number Range (millions/ft)	Supply Pressure Range (atm)	Nominal Supply Temp (Rankine)	Usable Run Time (seconds)
7	3.7 to 15.8	180 to 815	3460	1 to 5
8	8.7 to 55.7	135 to 815	1660	0.2 to 0.75
10	0.86 to 21.9	35 to 955	1810	0.2 to 15
14	0.072 to 6.2	7 to 1295	3160	0.7 to 15
16.5	2.65 to 3.2	1295 to 1430	3260	3.0 to 3.5