

## Airflow Induction Test Facility Building 204

**The Airflow Induction Test Facility, Building 204, is located in the Safety Research and Development area of the FAA William J. Hughes Technical Center.**

The facility contains a 5 1/2-foot-diameter subsonic wind tunnel and a low-turbulence, low-speed wind tunnel as described below.

**5 1/2-Foot-Diameter Subsonic Wind Tunnel**  
The 5 1/2-foot wind tunnel is an induction type nonreturn design. The induction drive is provided by two Pratt & Whitney J-57 turbine engines exhausting into the diffuser cone. The high-speed exhaust from the two engines provides the primary flow that induces a secondary flow through the test section(s). The nonreturn design allows a continuous supply of fresh air to the facility, which is essential for combustion type work. This design is very rugged and unaffected by debris passing through the drive section. Tunnels of this design simulate an increase in altitude as the airspeed is increased.



**Test Section (high speed):** The test section (shown above) is 5 1/2 feet in diameter and 16 feet in length. Maximum airspeed in this section is limited to approximately 0.9 Mach. The entire lower lobe of the section swings away to allow for the installation of the test



article. A 5- x 16-foot elevator deck makes raising the test article into position simple and safe.

**Test Section ( low speed):** This test section (shown below) is 9 feet in diameter and 20 feet in length and is located upstream of the high-speed section and operates at a lower speed. Maximum airspeed in this section is limited to approximately 150 miles per hour.



The 5 1/2-foot wind tunnel has been used for a variety of research applications including the testing of runway signs, development of a blast-resistant Soft Ground Arresting Material, Coast Guard certification of inflatable life rafts, and simulated in-flight testing of hand-held fire extinguishers used in general aviation aircraft.

**Low-Turbulence, Low-Speed Wind Tunnel**  
This wind tunnel was originally designed to provide an environment to calibrate wind



speed instruments. The highly accurate airspeed measurement capability, in conjunction with the six component force balance system, make this facility ideal for model testing. The facility also contains a model shop and a data acquisition system.

The low-turbulence, low-speed wind tunnel consists of an Aerolab low-speed open circuit type wind tunnel and force balance. The dimensions of the test section are 20 x 28 x 48 inches. The electrically driven wind tunnel can achieve speeds ranging from 0 to 160 mph in the test section. The six component balance system can accurately measure lift, yaw, pitch, drag, side force, and rolling moment.

The low-speed wind tunnel has been used to accurately calibrate air flow and velocity devices including the prototype Low-Level Wind Shear (LLWAS) acoustic anemometers.

#### **Environmental Test Chamber**

The environmental test chamber is designed to simulate preset temperature, humidity, and air pressure (altitude) conditions. Chamber controllers can be programmed to simulate an entire flight from takeoff to climb-out, cruise, approach, and landing. The test chamber measures 72 x 71 x 93 inches.

The environmental chamber has been used to study the behavior of in-flight fires at altitude, to evaluate the performance of wing ice detectors, and to calibrate various environmental sensors.



The 5 1/2-Foot-Diameter Subsonic Wind Tunnel, the Low-Turbulence, Low-Speed Wind Tunnel and the Environmental Test Chamber are available for outside test work, both private and public, through the Cooperative Research and Development Agreement (CRDA) program. To find out more about the Airflow Induction Test Facility, contact:

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