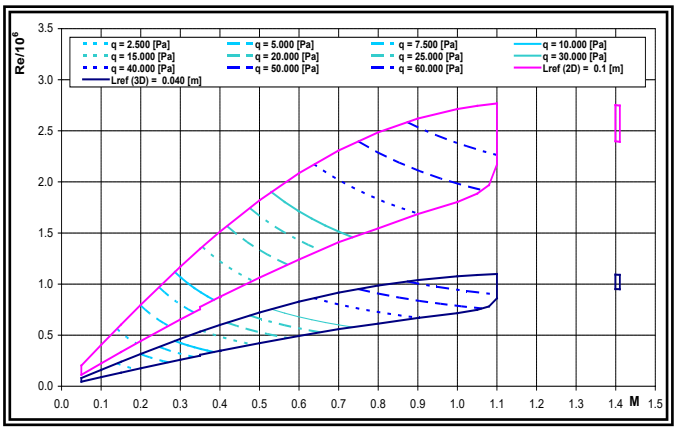
Pilot Tunnel (PT-1)

Type of Infrastructure

Wind tunnel

Main technical features

CIRA's PT-1 is a pressurized wind tunnel, geared to operate in subsonic, transonic, and supersonic regimes. The system can operate continuously in subsonic mode up to M=0.35. In transonic regimes, up to M=1.1, it operates intermittently by means of a compressed air injection system. In the case of continuous operation, a fan with variable pitch and rpm of 145 kW power is used. The tunnel also allows a supersonic operating point at M=1.4. The maximum total operating pressure is 1.85 bar.
The operation envelope of the tunnel in terms of Mach and Reynolds numbers is shown in the figure below.



PT-1 operation envelope of the tunnel

The PT-1 is equipped with two test sections, used for 2D and 3D models, which allow the entire operational envelope of the plant to be covered. All test chambers have a section of 0.35m high and 0.45m wide and a length of 0.6m. The incidence of the upper and lower walls of the test chambers is adjustable to compensate for the growth of the boundary layer (maximum angle of variation ±0.5°).
The test section used in subsonic conditions has 4 solid walls. In these conditions the maximum Mach achievable is 0.6-0.7 depending by the model dimension in terms of frontal area. In the transonic configuration, the test chamber is equipped with 4 porous walls with holes inclined at 60° and covering an area of 6%. The porosity value can be modified along the test chamber.

Application Domains

Fluid physics

a. Unsteady aerodynamics
b. Flow control
c. High lift systems

d. Aerodynamic design (2D,3D models)

Integrated design and validation (tools and methodologies)

a. Flight tests/tunnel tests

Innovative scenarios

a. New technologies with a high innovative content

Main measuring instruments/techniques

- Pressure
- Loads (3/6 Componets internal balance)
- High Frequency Pressure Acquisition System
- Schlieren System
- Infrared Camera
- Wake Rake
- Technical sublimation

Operational Status

The PT-1 plant is fully operational

Model installed into the PT-1 test chamber