



## PSYCHROMETRIC TEST ROOMS



**Psychrometric Test Rooms** are designed for use in the research and development of unitary air conditioners and heat pumps.

The psychrometric test facility consists of two rooms, in an end to end configuration where dry bulb temperature and humidity are independently controlled. One of the two rooms simulates indoor temperature and humidity conditions while the second room simulates outdoor temperature and humidity conditions. Airflow measurements are provided by Code Testers (Air Enthalpy Tunnels) as specified in the ASHRAE Standard 37. One code tester is located in the indoor room for indoor Unit Under Test (UUT) airflow measurement and for smaller systems, an outdoor code tester is located in the outdoor room for outdoor airflow measurement. As system tonnage increases, a refrigerant flow meter is provided in lieu of the outdoor tunnel to provide a confirming method for capacity calculation.

Air conditioning plenums are provided for both the Indoor and the Outdoor Rooms. The plenums will include full heating, cooling, dehumidification and humidification capabilities so that heat pump and air conditioner testing can be accomplished without having to reverse the UUT direction in the common partition wall between the test rooms.

A cost effective central refrigeration system is used to provide cooling capability to both rooms. During normal testing, one room is cooling while the other room is primarily heating. In addition, only one side at a time will be dehumidifying.

A microprocessor controlled variable voltage transformer is supplied to control the voltage to the UUT.

A central operator station/operator console provides all required operator interface. Instrumentation devices such as PID controllers, alarm indicators and other operator switches are located at the operator station. This console also houses the system computer and the DAQ hardware.

### Key Features at a Glance

- Indoor/Outdoor Room Design
- Full Conditioning Capability in each room, removing need for reversal of UUT in partition wall
- Cost efficient central refrigeration system
- Re-circulating air blowers in each room to maintain temperature uniformity during low airflow testing
- Indoor Room Code Tester
- Outdoor Room Code Tester
- Microprocessor Controlled Variable Voltage Transformer to control power to UUT
- Computerized Data Acquisition and Control System using LabView
- Conformance with ASHRAE 37 and ARI 210/240

## Psychrometric Room Typical Performance Specifications

Indoor Room Dry bulb Temperature	
Dry Bulb Temperature Range	40 to 104 °F (4 to 40°C)
Control	± 0.2°F (0.1°C)
Indoor Room Dew Point Temperature	
Dew Point Temperature Range	35 to 86°F (2 to 30°C)
Control	± 0.2°F (0.1°C)
Indoor Room Airflow	
Indoor room UUT airflow	Up to 20,000 CFM (Up to 34,000 m <sup>3</sup> /hr)
Control Parameter	UUT ΔP
Control Range	-1.0 to +1.0 inch of WC (-250 to +250 Pa)
Control	±0.02 inch of WC
UUT Airflow measurement	ASHRAE Nozzles with pneumatic selector switches
Outdoor Room Dry bulb Temperature	
Dry Bulb Temperature Range	-20 to 131°F (-26 to 55°C)
Control	± 0.2°F (0.1°C)
Outdoor Room Wet bulb Temperature	
Dew Point Temperature Range	5 to 95°F (-15 to 35°C)
Control	± 0.2°F (0.1°C)
Outdoor Room Airflow	
Outdoor room UUT airflow	Up to 20,000 CFM (Up to 34,000 m <sup>3</sup> /hr)
Control Parameter	UUT ΔP
Control Range	-1.0 to +1.0 inch of WC (-250 to +250 Pa)
Control	±0.02 inch of WC
UUT Airflow measurement	ASHRAE Nozzles with pneumatic selector switches
UUT Voltage Transformer	
UUT Voltage Range	90 to 600V
Voltage Control	±2.0 VAC
Control Type	Micro-Processor
Transformer Type	Motorized

Software Features	Performance Measurement
<ul style="list-style-type: none"> <li>Editing of test programs</li> <li>Automatic test sequencing</li> <li>Loop calibration and calibration reports</li> <li>Hardware checkout routine</li> <li>Stability monitoring</li> <li>Real Time tolerance adjustments</li> <li>Real time-history graphing capability</li> <li>Automatic Test Report Generation</li> <li>Data File Management</li> </ul>	<ul style="list-style-type: none"> <li>3% agreement or better, indoor side to outdoor side</li> <li>1% repeatability of test results</li> </ul>