

# ENGINEERING NOTES

**C**ustom air handling units are exactly that...custom made. When your project is requiring a custom unit, you're receiving a unit that is unique, never having been built before, specifically designed to meet your project needs. Since the design is unique, factory performance test verification can be very important. ClimateCraft offers the following factory testing options to be specified:

## FAN ASSEMBLY VIBRATION TESTING

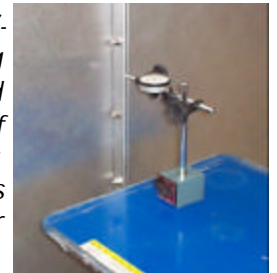


Each assembled fan shall be test run at the factory at the specified fan RPM and vibration signatures shall be taken on each bearing in the horizontal, vertical, and axial direction. The maximum allowable fan vibration shall be 0.157 in./sec peak velocity, filter-in reading as measured at the fan RPM. Testing to be performed at the fan manufacturer's factory and witnessed by the project engineer and/or owner's representative. Factory certified test reports shall be provided to the project engineer and/or owner's representative.

$$\text{Velocity} = \text{mils} \times \text{RPM} / 19100 \quad \text{or} \quad \text{mils} = 19100 \times \text{Velocity} / \text{RPM}$$

## CABINET DEFLECTION TESTING

Panel deflection testing shall be conducted using a dial indicator with an accuracy of +/- 0.001". Dial indicator will be set and calibrated on an un-pressurized panel, registering 0.000" deflection. The unit will be pressurized to the test pressure and the associated panel deflection measured and recorded. Panel deflection shall not exceed 1/200th of the panel span at design operating pressure. Testing to be performed at the unit manufacturer's factory and witnessed by the project engineer and/or owner's representative. Factory certified test reports shall be provided to the project engineer and/or owner's representative.



## CABINET LEAKAGE TESTING

Cabinet leakage testing shall be conducted by measuring leakage airflow in or out of the unit cabinet at a desired testing pressure. Unit openings such as outside air, supply air, etc. to be sealed, isolating the unit. The airflow measurement station shall be ducted to the unit and to a high pressure variable air volume supply system. The airflow measurement station shall incorporate AMCA calibrated nozzles in accordance with AMCA Standard 210. Measurement orifices not AMCA qualified such as a non-qualified sharp edge orifice shall not be acceptable. The variable volume system is ramped up until the cabinet has reached the desired testing pressure. Pressure drop shall be measured across the AMCA qualified nozzle and the associated cabinet leakage airflow recorded. Cabinet leakage shall not exceed SMACNA Class 6.

Testing to be performed at the unit manufacturer's factory and witnessed by the project engineer and/or owner's representative. Certified test report shall be provided to the project engineer and/or owner's representative.

$$\text{Leak Class} = (\% \text{ Leakage}) \times (\text{Supply CFM}) \times 100 / \{ (\text{Area sq.ft.}) \times (\text{Test Pressure}) ^{0.65} \}$$

## UNIT AIRFLOW TESTING

Unit airflow testing shall be conducted by measuring the supply airflow when running the unit supply fan at design total static pressure. Unit inlets and/or outlets shall be throttled as required to simulate field installed external static pressure. Throttling will be adjusted until measured total static pressure across the supply fan reaches design total static pressure. Airflow measurements shall be taken with a vane anemometer in accordance with ASHRAE Technical Paper No. 3359. Testing to be performed at the unit manufacturer's factory and witnessed by the project engineer and/or owner's representative. Factory certified test reports shall be provided to the project engineer and/or owner's representative.



## UNIT SOUND TESTING

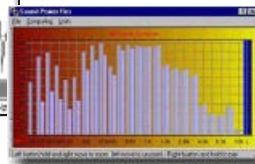
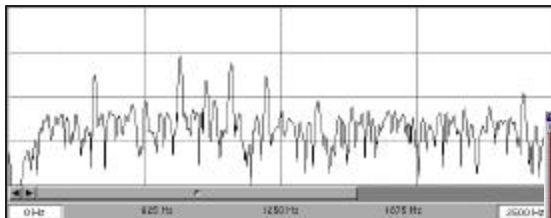


Unit sound power testing shall be measured using methods described in ANSI S12.12-1992 engineering method for the determination of sound power levels of a noise source using sound intensity. The unit shall be tested in an area with minimal background noise. All systems associated with the unit shall be inactive including fan(s), coils, heaters and dampers. Required filters shall be installed in the unit.

Ambient sound power levels shall be measured and recorded at the desired locations. The unit supply and return openings and the cabinet shall be probed with quality sound intensity measuring equipment. Measured intensity data shall be gathered real time and reduced to actual sound power levels at the various test locations.



A calibrated noise source (RSS) shall be placed in the unit cabinet at the fan location. The unit supply and return openings and the cabinet shall again be probed with quality sound intensity measuring equipment. Measured intensity data shall be gathered real time and reduced to actual sound power levels at the various test locations. The sound power from the RSS measurement shall then be corrected for the ambient levels measured and applied against the AMCA sound power levels of the supply and return fans to arrive at the final unit supply, return and cabinet radiated sound power levels.



Testing to be performed at the unit manufacturer's factory and witnessed by the project engineer and/or owner's representative.

Factory certified test report shall be provided to the project engineer and/or owner's representative.

**S**pecifying factory certified and customer witnessed testing provides the project engineer and/or owners representative an added level of quality assurance



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ClimateCraft reserves the right to continually improve its products and to change the design and specifications without notice.