

1 **GENERAL**

1.1 **REFERENCES**

- .1 American National Standards Institute (ANSI)
 - .1 ANSI/AMCA 210-2007, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
 - .2 ANSI/NFPA 90A-2012, Standard for the Installation of Air Conditioning and Ventilating Systems.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 International Organization of Standardization (ISO)
 - .1 ISO 3741-2010, Acoustics-Determination of Sound Power Levels of Noise Sources Using Sound Pressure – Precision Methods for Reverberation Rooms.
- .4 Underwriter's Laboratories (UL)
 - .1 UL 181-2005, Factory-Made Air Ducts and Air Connectors.

1.2 **SYSTEM DESCRIPTION**

- .1 Performance Requirements:
 - .1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from certified ADC (Air Diffusion Council) testing agency signifying adherence to codes and standards.

1.3 **SUBMITTALS**

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 00 10 – General Instructions. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 00 10 – General Instructions.
 - .2 Test data: to ANSI/AMCA 210.
 - .1 Submit published test data on DIN (Direct Internal Noise), in accordance with ISO 3741 made by independent testing agency for 0, 2.5 and 6 m/s branch velocity or inlet velocity.
 - .2 Sound power level with minimum inlet pressure of 1.5 kPa in accordance with ISO 3741 for 2nd through 7th octave band.
 - .3 Pressure loss through silencer shall not exceed 60% of inlet velocity pressure maximum.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 10 – General Instructions.
 - .2 Indicate the following:
 - .1 Capacity.

- .2 Pressure drop.
 - .3 Noise rating.
 - .4 Leakage.
- .3 Quality assurance submittals: submit following in accordance with Section 01 00 10 – General Instructions.
- .1 Instructions: submit manufacturer's installation instructions.
- .4 Closeout Submittals:
- .1 Provide maintenance data for incorporation into manual specified in Section 01 00 10 – General Instructions.
- 1.4 **QUALITY ASSURANCE**
- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.
- 2 **PRODUCTS**
- 2.1 **MANUFACTURED UNITS**
- .1 Terminal units of the same type to be product of one manufacturer.
- 2.2 **VARIABLE AIR VOLUME BOXES**
- .1 Provide single duct, variable volume air distribution assemblies of the sizes and capacities as shown on the plans.
 - .2 The assemblies shall be pressure independent and shall reset to any air flow between zero and the maximum cataloged air volume.
 - .3 At an inlet velocity of 10 m/s, the differential static pressure for any unit with attenuator section, sizes 4 through 16, shall not exceed 27 Pa.
 - .4 Sound ratings of air distribution assemblies shall not exceed 30 NC at 250 static pressure drop across the unit.
 - .5 Performance shall be ARI certified.
 - .6 The air flow sensor shall be of a cross configuration located at the inlet of the assembly. The sensor shall have multiple total pressure sensing ports and a center average the flow across the inlet of the assembly. Sensors shall provide accuracy within 5 % with a 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal.
 - .7 The assembly casing shall be constructed of 0.91 mm zinc-coated steel, internally lined with 12 mm thick, fiber-glass insulation which complies with UL-181, ASTM C 1071 and NFPA-90A. Any cut edges of fiberglass exposed to the airstream shall be coated with NFPA-90A approved sealant.
 - .8 The casing shall be constructed to maintain leakage rates no exceeding 1.4 L/s at 250 Pa.

- .9 The primary air valve dampers shall be heavy gauge metal, with peripheral gasket and solid shaft, pivoted in self-lubricating bearings. In the full closed position, air leakage past the closed damper shall not exceed 2 % of the nominal catalog rating at 3"w.g. inlet static pressure, when tested in accordance with ASHRAE 130.
- .10 The terminal unit controller flow transducer and damper actuator shall be supplied by the controls contractor for field installation on the terminal. All controls components shall be mounted and wired per the control contractors documentation. The control components shall be installed within a controls enclosure provided by the terminal manufacturer. An 24 Volt transformer shall be provided by the controls contractor.

2.3 ELECTRICAL COILS

- .1 Electric heating coils shall be provided of the capacity scheduled on the drawings. Terminal assembly shall be ETL certified to meet UL 1995. Overall length of assembly from inlet panel to discharge shall be 900 mm maximum. The heater frame and cabinet shall be constructed of heavy gauge galvanized steel. Heating elements shall be constructed of High Grade wire. Elements shall be low density and designed to minimize hot spots and nuisance cycling of the thermal protectors. Elements shall be installed from the steel frame by floating ceramic brushings. An automatic reset thermal cut-out shall be provided as primary protection against overheating. Heaters shall be equipped with a manual reset cut-out for secondary protection. Fused secondary thermal devices are not acceptable. A differential pressure switch shall be provided to ensure that there is adequate airflow before heater is energized. Heater controls to be accessible from the same side as the primary air controls.

2.4 SCR CONTROLS

- .1 Heater shall be capable of providing proportional controls using an analog input signal (0-10VDC) from a room thermostat or other device. The SCR shall pulse the coil on and off in proportion to the thermostat demand matching the heating capacity to the room load. The SCR controller shall employ solid state switching with zero cross-over for silent operation. Mechanical contractors are not acceptable.

3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install in accordance with manufacturers recommendations.
- .2 Support independently of ductwork.
- .3 Install with at least 1000 mm of flexible inlet ducting and minimum of four duct diameters of straight inlet duct, same size as inlet.
- .4 Locate controls, dampers and access panels for easy access.
- .5 Coordinate provisions of controls with controls contractors.

.6 Coordinate provisions of power wiring with electrical contractor.

3.3 CLEANING

.1 Proceed in accordance with Section 01 00 10 – General Instructions.