

**SECTION 23 80 00 - TERMINAL HVAC EQUIPMENT****PART 1 - GENERAL****DESCRIPTION**

Provide Heating, Cooling, and Ventilating Equipment as specified herein and shown on the Drawings.

Equipment capacity and size shall be as indicated on the Drawings.

Related Work: The requirements of Section 23 05 00, Common HVAC Materials and Methods, also apply to this section.

**QUALITY ASSURANCE**

Air Handling Equipment: Rated in accordance with AMCA certified rating procedures and AMCA labeled.

Air Conditioning and Refrigeration Equipment Rating: Rated in accordance with ARI certified rating procedures and ARI labeled.

See Commissioning specification for additional requirements.

**SUBMITTALS**

Submit catalog data, construction details and performance characteristics for each HVAC unit.

Submit operating and maintenance data.

**PART 2 - PRODUCTS****UNIT VENTILATORS**

General:

Unit ventilators shall be constructed of 16-gauge furniture quality steel, with exposed edges rounded and metal top.

Front panels shall be retained by a minimum of three Allen wrench operated camlocks. The camlock heads shall be surrounded by a plastic inset to prevent paint damage.

All steel unit ventilator surfaces shall be cleaned, phosphatized, polished, rinsed and dried before application of final finish coat. The final finish shall be applied by an electrocoat paint system. Paint film shall be at a dry film thickness of 7/10 mil with no visible run marks. Units shall be supplied in one of eight decorator colors as selected by the architect.

Unit ventilator discharge grilles shall be constructed of heavy steel bars welded in place as an integral part of the unit structure. Easily cleaned sight blockoffs shall be installed below the grille in the end pockets.

Unit inlet grilles shall be easily removable for easy filter access by loosening two camlocks.

Installation: Unit ventilator end pockets shall be at least 13" wide and provided with removable outside ends to allow fullest access for easy field installation of valves and piping. The unit shall have large pipe access openings in the bottom of both end pockets and large knockouts for piping and electrical connection in the back of both ends. Pipe chase across the back of the unit for field installation of crossover piping or running of electrical wiring as required.

**Dampers:**

Unit ventilators shall be equipped with dual blade type mixing dampers to ensure proper modulation and mixing of return and outdoor air. A continuous divider shall be placed between the damper blades to separate the fresh air and return air compartments and positively prevent blow-thru.

Ultra Low Leak Dampers: Ultra low leak damper option on vertical classroom units shall be provided by utilizing medium density closed cell EPDM material seals. The seal shall be fixed and not part of the damper assembly. The outside air damper blade shall close into the closed cell EPDM material, providing a positive pressure seal. Leakage shall be less than one percent against 0.5 inches external static pressure.

**Fan Board Assembly:**

The unit ventilator fan board assembly shall be a single, rigid assembly and include the fans, fan housings, bearings, fan shaft and motor. The fan motor shall be mounted on the fan board.

The wrap around portion of the fan housings shall be constructed of six-pound density molded fiberglass, at least 3/4" thick, and vinyl coated on the exterior surface.

Motors: Motors shall be EC type. Unit shall have 3 fan speeds **with local switch for occupant operation**. Motor speed shall not be affected by damper positions or filter loading. The motor shall be easily removable without removing the fan board.

**Coils:**

Certification: Acceptable water coils shall be certified in accordance with AHRI Standard 410 and bear the AHRI label. Coils exceeding the scope of the manufacturer's certification and/or the range of AHRI's standard rating conditions will be considered provided the manufacturer is a current member of the AHRI Forced Circulation Air-Cooling and Air-Heating Coils certification programs and that the coils have been rated in accordance with AHRI Standard 410. Manufacturer must be ISO 9002 certified.

Provide Drain pan for cooling coil. Construct drain pans from stainless steel with cross break and double sloping pitch to drain connection. Provide drain pans under cooling coil section. Drain connection centerline shall be a minimum of 3" above the base rail to aid in proper condensate trapping. Drain connections that protrude from the base rail are not acceptable. There must be a full 2" thickness of insulation under drain pan.

Provide access to coil(s) for service and cleaning. Enclose coil headers and return bends fully within unit casing. Unit shall be provided with coil connections that extend a minimum of 5" beyond unit casing for ease of installation. Drain and vent connections shall be provided exterior to unit casing. Coil connections must be factory sealed with grommets on interior and exterior panel liners to minimize air leakage and condensation inside panel assembly. If not factory packaged, Contractor must supply all coil connection grommets and sleeves. Coils shall be removable through side and/or top panels of unit without the need to remove and disassemble the entire section from the unit.

Headers shall consist of seamless copper tubing to assure compatibility with primary surface. Headers to have intruded tube holes to provide maximum brazing surface for tube to header joint, strength, and inherent flexibility. Header diameter should vary with fluid flow requirements.

Fins shall have a minimum thickness of 0.0075 inch aluminum plate construction. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.

Coil tubes shall be 5/8 inch OD seamless copper, 0.020 inch nominal tube wall thickness, expanded into fins, brazed at joints.

Coil connections shall be carbon steel, threaded connection. Vent and drain fittings shall be furnished on the connections, exterior to the air handler. Vent connections provided at the highest point to assure proper venting. Drain connections shall be provided at the lowest point to insure complete drainage and prevent freeze-up.

Filters: Each unit shall be equipped with a single 1" thick replaceable media filter frame with MERV 8 polyester media.

Sound:

Sound data for the unit shall be based on tests in a sound laboratory reverberant room strictly conforming to ANSI S1.32-82. The test procedures for determining the unit sound level shall be in accordance with ARI Standard 350-86. Sound data must be accurate to within +3 db in the first and second octave bands and +2 db in the third through eighth octave bands.

Where the manufacturer's sound data is not published, the company must certify that sound data conforms with the above requirements. If the manufacturer cannot provide acoustical data in accordance with the requirements given above, the Contractor must submit certified data that the specified units have been tested in an independent acoustics laboratory, capable of testing equipment at specified operating conditions, to determine sound power level by octave band.

Where units do not meet the specified maximum sound power level given, they must operate at reduced rpm so as to comply. In this case, the units will be sized so as to provide the specified cfm at the reduced rpm.

Controls: Controls shall be field installed. See control specification section and drawings for more information.

Approved Manufacturers: Daikin, Johnson Controls, or approved equal.

## **PART 3 - EXECUTION**

### **INSTALLATION**

Install and arrange equipment as shown on the Drawings and as recommended by the equipment manufacturer.

Piping: Refer to applicable sections for piping, ductwork, insulation, painting, etc.

Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to A/E in writing. Inspection must include a complete startup checklist to include (as a minimum) the following:  
Completed Start-Up Checklists as found in manufacturer's IOM.

Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary and clean filters. Measure and record electrical values for voltage and amperage. Refer to Division 23 "Testing, Adjusting and Balancing" and comply with provisions therein.

Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain the unit. Refer to Division 01 Section Closeout Procedures and Demonstration and Training.

### **AIR HANDLING INSTALLATION**

Installation and Arrangement: Air handling equipment shall be installed and arranged as shown on the Drawings. Comply with the manufacturer's recommendations for installation connection and start-up.

Filters: Specified filters or approved temporary construction filters shall be installed in supply units prior to start-up or used for drying and/or temporary heat.

### **CONTROLS**

Wiring: All wiring shall be in accordance with the National Electrical Code and local electrical codes.

**END OF SECTION 23 80 00**