

SECTION 15800 - AIR HANDLING UNIT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Basic Requirements: Provisions of Section 15010, BASIC MECHANICAL REQUIREMENTS, and Section 15030, ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT, are a part of this Section.

1.02 SUMMARY

- A. General: Provide air handling units as indicated, including appurtenances, accessories and service connections.

1.03 ADDITIONAL REQUIREMENTS

- A. Related Sections: Other Sections of Division 15 which relate to the requirements of this Section may include but are not limited to the following:
 - 1. 15050, BASIC MECHANICAL MATERIALS AND METHODS
 - 2. 15060, PIPE AND FITTINGS
 - 3. 15250, THERMAL INSULATION
 - 4. 15240, VIBRATION ISOLATION
 - 5. 15510, HYDRONIC PIPING SYSTEM
 - 6. 15885, AIR FILTER
 - 7. 15890, DUCTWORK
 - 8. 15950, BUILDING CONTROL SYSTEM
 - 9. 15990, PERFORMANCE VERIFICATION
- B. Related Divisions: Other Divisions of these specifications which relate to the requirements of this Section may include but are not limited to the following:
 - 1. Division 16, ELECTRICAL

1.04 SUBMITTAL

- A. General: Refer to paragraph entitled "SUBMITTAL" in Section 15010. Include the following data:
 - 1. Manufacturers Literature:
 - a. Dimensional outline drawing for each air handling unit indicating the location of all connections including the drain pan connection.
 - b. Operating weight and vibration isolators for each unit.
 - 2. Performance Data:

- a. Provide the following information for each air handling unit:
 - (1)Coil capacity at design conditions including air entering and leaving temperatures.
 - (2)Coil descriptions, rows and fins per inch, and face velocity.
 - (3)Air flow and airside pressure loss at design conditions.
 - (4)Water flow and waterside pressure drop at design conditions.
 - (5)Fan curve indicating design flow and brake-horsepower at scheduled static pressure, including drive losses.
 - (6)Motor horsepower, voltage and phase.

3. Installation Instructions:

- a. Manufacturer's printed instructions for the assembly and installation of each air handling unit including copies shipped with the equipment.

4. Maintenance Instructions:

- a. Manufacturer's printed instructions for the maintenance of each air handling unit.
- b. Exploded parts list for air handling unit fan drive and assembly.

1.05 APPLICABLE STANDARDS

- A. General: All equipment, material, accessories, methods of construction and reinforcement, finish quality, workmanship and installation shall be in compliance with the paragraph entitled "Code Compliance" in Section 15010.
- B. Comply: With the National Fire Protection Association (NFPA) Standards and other Codes and Standards as adopted by the Local Authority having Jurisdiction.
- C. NFPA: All materials and adhesives used shall conform to the requirements of NFPA 90A, 1993 Revision, and NFPA 255, 1990 Revision, with flame spread not exceeding 25 and smoke developed ratings not exceeding 50.

- D. Performance: Supply fan performance shall be certified as complying with ARI Standard 430-89. Coil capacities, pressure drops and selection procedure shall be certified in accordance with ARI Standard 410-91.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Single Source: All air handling units shall be of the same manufacturer. All components in factory-furnished air handling units shall be factory-assembled and factory-tested prior to shipping.
- B. Condensate Drain Pan: Each unit shall have an insulated, 16 gauge stainless steel double wall drain pan for condensate drainage. The insulation shall be a minimum of 1 inch thick. Threaded pipe drain connections shall be provided on one side only and the pan shall slope toward the connection, allowing no standing water. The drain connection shall be on the side of the unit that has the condensate drain plumbing connection. If the selected air handling units have more than one drain connection, each connection shall be provided with a trap and an individual drain line piped to discharge at the nearest condensate hub/floor drain. The discharge of the individual condensate traps shall not be connected together.
- C. Sound Power Levels: Sound power levels in each band shall not exceed those indicated.
- D. Fan Motor: Fan motors shall be an open drip proof ball bearing specifically designed for fan applications, unless otherwise indicated. Refer to paragraph entitled "ELECTRIC MOTOR" in Section 15030 for motor efficiency requirements. Unless specifically indicated otherwise air handling unit fan motors shall be selected as follows:
 - 1. Less than 5 HP; 135 percent of bHP
 - 2. 5 Hp through 25 HP; 125 percent of bHP
 - 3. Greater than 25 HP; 115 percent of bHP

2.02 CENTRAL STATION AIR HANDLING UNIT

- A. Manufacturer: Refer to paragraph entitled "MANUFACTURERS" in Section 15010.
 - 1. Trane Company
 - 2. Carrier
 - 3. McQuay
 - 4. York
 - 5. Weatherking
 - 6. Mammoth
 - 7. Temtrol

B. General:

1. Unit Casing: Units shall be of the sectional, unitized, bolt-together construction with gasketing where modules are joined. Units shall have a separate fan section and coil section. All enclosure panels on the units shall be fabricated from minimum 18 gauge galvanized steel which has been chemically cleaned, phosphatized and factory-painted with an enamel finish.
2. Access Doors: Hinged insulated access doors shall provide access to the inlet and outlet of each coil, the drain pan, and both sides of the internal fan drive and filter section.. Latches for doors shall be industrial cam-lock type. Removing bolted sections of the air handling unit casing is not acceptable.
3. Fans: Fans shall be double width, double inlet, multiblade type constructed in accordance with the American Fan Manufacturers' Association Standards. Fan wheels shall be forward curve or backward inclined air foil type as indicated. Fan blades shall be galvanized steel and shall be finished with baked enamel for corrosion protection. Fan shafts shall not pass through their first critical speed at any cataloged rpm.
4. Sound Power Levels: Sound power levels in each band shall not exceed those indicated.
5. Bearings: Fans shall be equipped with self-aligning, anti-friction pillow block ball type bearings with a minimum life of 100,000 hours.

C. Multizone:

1. General: Multizone type air handling units shall have front or top discharge or any combination of front and top duct connections.
2. Solid Double Wall Construction: Units shall be double wall construction with 2 inch thickness, 1-1/2 pound density fiberglass insulation. Insulation shall be continuous throughout the entire unit, including all panels, sections, spacers, seams and connections. The insulation shall be sandwiched between a minimum 20 gauge galvanized solid interior wall and the exterior wall.

D. Fan Drive:

1. General: Refer to paragraph entitled "V-BELT DRIVE" in Section 15050.

- a. Internal: Fans shall be dynamically balanced at the factory as a complete fan assembly (fan wheel, motor, drive and belts). Bearings shall be re-greaseable and supplied with copper grease lines and fittings extending to the interior of the access door to allow for lubrication without entering the interior of the unit.

E. Dampers:

1. Face and Bypass: Dampers shall be of airfoil design and shall be opposed blade type. Both dampers shall be mechanically linked together and shall rotate on stainless steel or nylon sleeve bearings. Unless otherwise indicated, the bypass damper shall be at least 18 percent of the entire face and bypass damper area. Leakage rate shall not exceed 8 cfm per square foot at 1 inch Wg.

F. Multizone Dampers:

1. Multizone: Multizone damper section shall be designed as a single assembly. Blades shall be airfoil type and shall rotate on stainless steel or nylon sleeve bearings. Leakage rate shall not exceed 11 cfm per square foot at 1 inch Wg. Parallel acting dampers shall be interconnected by a single rod and field adaptable to the number of zones required.

2.03 COILS

- A. Water Coils: Coils shall be leak tested to 200 psig air pressure underwater and designed for 300 psig working pressure. The coils shall be continuous seamless copper tube with aluminum plate fins bonded by mechanical expansion of the tubes, unless otherwise indicated. Fin spacing shall not exceed 12 per inch. Frames shall be constructed of 16 gauge galvanized steel casing with copper headers brazed to tubes and threaded connections. Both supply and return headers shall be provided with 1/8 inch NPT vent connection at top and bottom for venting and draining coil. The coils shall be arranged for the water to counterflow in the direction of the air flow. Tube sheets shall be 16 gauge galvanized steel, located on each end and at a maximum of 80 inch intermediate spans with drain collars to support tubes. Return bends shall be die-formed, brazed to tubes and header and shall be seamless hard-drawn copper tubing. Casing channels shall be free-draining, without depressions to collect moisture and contaminants or to block fin area, and with an air bypass/water carryover arrester between the casing bottom channel and the fins.

2.04 FILTERS

- A. General: Filters and filter frames shall be as indicated and described in Section 15885, AIR FILTER.

PART 3 - EXECUTION

3.01 GENERAL

- A. Clearance: Layout and carefully install units with sufficient clearances to permit proper maintenance. The space required shall be as recommended by the manufacturer including the space required for removal of the coil and for filter maintenance.
- B. Control Interlock: Interlock the air handling units with their associated exhaust fans such that when the air handling unit is de-energized for any reason the exhaust fans are also de-energized; when the air handling unit starts, the associated exhaust fans shall also start.
- C. Piping: Isolation valves and flanges or unions shall be so arranged that the removal of the coil piping shall provide unobstructed access for the removal of the coil.
- D. Fins: Straighten fins for each coil, using a fin comb, prior to final acceptance. Coils having tubes with broken fins shall be replaced at no additional cost to the Owner.
- E. Dampers: All air handling units with a direct unconditioned outside air connection shall be provided with a damper in the outside air duct that closes whenever the unit fan is not energized.

3.02 VIBRATION ISOLATION

- A. Equipment Mounting:
 - 1. Installed units shall be free of vibration and shall not produce excessive noise. Refer to Section 15240, VIBRATION ISOLATION. Isolators shall be sized for a maximum static deflection of 2 inches.
 - 2. Internal fan drive units shall be installed using Type EVS-2 isolation pads unless spring isolators with thrust restraint are recommended and provided by the unit manufacturer.
- B. Duct Connections:
 - 1. Internal fan drive units shall be provided with flexible duct connection inside the unit as required to prevent transmission of vibration into the duct system.

C. Piping Connections:

1. Provide a P-trap in the condensate pan drain connection. The distance of the outlet of the P-trap below the bottom of the condensate drain pan shall be at least 1-1/2 times the suction static pressure at the inlet of the coil to insure complete drainage of the pan.

D. Electrical and Control Connections:

1. Internal fan drive units may have the rigid portion of the raceway attached to the unit. The internal motor wiring connection shall be made with seal-tight flexible conduit.

3.03 EQUIPMENT SUPPORT

- A. Installation: Install each unit on a housekeeping pad. Refer to paragraph entitled "HOUSEKEEPING PAD AND EQUIPMENT SUPPORT" in Section 15050.
- B. Pad Height: The height of the housekeeping pad under the air handling unit with a cooling coil drain pan shall be high enough to provide a condensate trap with required trap seal, 8 inches minimum.

END OF SECTION 15800