

SECTION 23 74 16.12
PACKAGED VAV ROOFTOP A/C SYSTEM

PART 1 - GENERAL

1.1. SUMMARY

- A. This section includes units with integral heating and cooling for outdoor installation. Integral heating and cooling source shall be a packaged DX Heat Pump. Airflow arrangement shall be Outdoor Air with Recirculation.
- B. Related Sections include the following:
 - 1. Section 23 01 00: General Provisions
 - 2. Section 23 07 10: Insulation
 - 3. Section 22 05 00: Plumbing
 - 4. Section 26 00 00: Electrical

1.2. SUBMITTALS

- A. Product Data: For each type or model include the following:
 - 1. Complete fan performance curves for both Supply Air and Exhaust Air, with system operating conditions indicated, as tested in an AMCA certified chamber.
 - 2. Sound performance data for both Supply Air and Exhaust Air, as tested in an AMCA certified chamber.
 - 3. Motor ratings, electrical characteristics and motor and fan accessories.
 - 4. Performance ratings for all chilled water or DX coils.
 - 5. Dimensioned drawings for each type of installation, showing isometric and plan views, to include location of attached ductwork and service clearance requirements.
 - 6. Estimated gross weight of each installed unit.
 - 7. Installation, Operating and Maintenance manual (IOM) for each model.
 - 8. Microprocessor Controller (DDC) specifications to include available options and operating protocols.

1.3. QUALITY ASSURANCE

- A. Product Options: Drawings must indicate size, profiles and dimensional requirements of unit and are to be based on the specific system indicated. Refer to Division 1 Section "Product Requirements".
- B. End of line test with full report available upon request.
- C. Certifications
 - 1. Entire unit shall be ETL Certified per U.L. 1995 and bear an ETL sticker.
 - 2. Coils shall be Recognized Components for ANSI/UL 1995, CAN / CSA C22.2 No 236.05.
 - 3. AHRI 210 / 240 - Performance Rating of Unitary Air Conditioning and Air-Source Heat Pump Equipment
 - 4. AHRI 340 / 360 - Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat pump Equipment
 - 5. ASHRAE 90.1 - Energy Standard for New Buildings Except Low-Rise Residential Buildings
 - 6. AHRI 270 or 370 Sound Rating of Outdoor Refrigeration and Air Conditioning Equipment, as applicable.

1.4. COORDINATION

- A. Coordinate size and location of all building penetrations required for installation of each unit and associated plumbing and electrical systems.
- B. Coordinate location of water system fittings to ensure correct positioning for connection to the condensate drain pipe.
- C. Coordinate sequencing of construction of associated plumbing, HVAC, electrical supply, roofing contractor.

1.5. HANDLING

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- B. Protect units from physical damage. Leave factory shipping covers in place until installation.

1.6. WARRANTY

- A. Provide a full parts and labor warranty for five years from start-up.

PART 2 - PRODUCTS

2.1. CASING

- A. Unit casing shall be zinc coated, heavy gauge, galvanized steel.
- B. Weather resistant painted metal with galvanized substrate.
- C. Meets ASTM B117, 672 hour salt spray test.
- D. Removable single side maintenance access panels.
- E. Exposed vertical panels and top covers in the indoor air section insulated with a cleanable foil-faced, fire-retardant permanent, odorless glass fiber material.
- F. Base pan with no penetrations within the perimeter of the curb other than the raised 1-inch downflow supply/return openings to provide an added water integrity precaution, if the condensate drain backs up.
- G. Base of the unit insulated with 1/8-inch, foil-faced, closed-cell insulation.
- H. Unit base provisions for forklift and/or crane lifting on three sides of unit.

2.2. FIN AND TUBE COILS

- A. Heat pump units shall have internally finned, 5/167-inch copper tubes, mechanically bonded to a configured aluminum plate fin.
- B. Assembled coil shall be factory leak tested to 600 psi.
- C. Assembled unit shall be leak tested to 465 psi.

2.3. COIL GUARDS

- A. Provide condenser coil protection.

2.4. COMPRESSORS

- A. All units have direct-drive, hermetic, scroll type compressors with centrifugal type oil pumps.
- B. Suction gas-cooled motor with voltage utilization range of plus or minus 10 percent of unit nameplate voltage.
- C. Internal overloads shall be standard with scroll compressors.
- D. Crankcase heaters shall be standard on all compressors.
- E. All 6-17.5 ton unit shall have 3 stages of cooling.

2.5. FILTERS

- A. 2-inch MERV 13 filters.

2.6. FAN

- A. The unit shall have direct drive plenum fans with ECM motors. Plenum fan shall be backward-curved fan wheel along with an external rotor direct drive variable speed indoor motor.
- B. Supply fan speed adjustments can be made using the unit controller or using a manufacturer supplied app. The connection between the unit control and the app shall be Bluetooth.
- C. Motors are electronically protected.

2.7. STAINLESS STEEL DRAIN PAN

- A. Provide a factory installed stainless steel drain pan.

2.8. THROUGH THE BASE ELECTRICAL WITH DISCONNECT SWITCH

- A. Provide a 3-pole, molded case, disconnect switch with provisions for through-the-base electrical connections.
- B. Disconnect switch installed within unit and shall be protected from outdoor elements.
- C. Wiring shall be provided from the switch to the unit high voltage terminal block.
- D. Switch shall be UL recognized.

2.9. ECONOMIZER

- A. A comparative enthalpy economizer shall be available with or without barometric relief. It shall be fully modulating from 0 to 100 percent and shall include provision for a minimum position setting. Assembly also includes, preset linkage, wiring harness with plug, and spring return actuator.
- B. A standard discharge air sensor shall be included on all units with economizers.

2.9. ROOF MOUNTING CURB

- A. Roof mounting curb shall be heavy gauge zinc coated steel with nominal two-inch by four-inch nailer setup. Supply/return air opening gasketing shall be provided. Curb shall ship knocked down for easy assembly. Channel shall be provided to allow for adjustment of return air opening location. Curb shall be manufactured to National Roofing Contractors Association guidelines.

PART 3 - EXECUTION

3.1. EXAMINATION

- A. Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. See unit IOM.
- B. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. See unit IOM.
- C. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.2. INSTALLATION

- A. Installation shall be accomplished in accordance with these written specifications, project drawings, manufacturer's installation instructions as documented in manufacturer's IOM, Best Practices and all applicable building codes.

3.3. CONNECTIONS

- A. In all cases, industry Best Practices shall be incorporated. Connections are to be made subject to the installation requirements shown above.
- B. Piping installation requirements are specified in Division 22 (Plumbing). Drawings indicate general arrangement of piping, fittings and specialties.
- C. Duct installation and connection requirements are specified in Division 23 of this document.
- D. Electrical installation requirements are specified in Division 26 of this document.

3.4. FIELD QUALITY CONTROL

- A. Inspect field assembled components and equipment installation, to include electrical and piping connections. Inspection must include a complete startup checklist to include the following: Completed Start-Up Checklists as found in manufacturer's IOM.

3.5. START-UP SERVICE

- A. Clean entire unit, comb coil fins as necessary, install clean filters. Measure and record electrical values for voltage and amperage. Refer to Division 23 "Testing, Adjusting and Balancing" and comply with provisions therein.

END OF SECTION