

SECTION 23 75 13 - PACKAGED OUTDOOR AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes outdoor air handling units with coils, filters and other components and accessories, designed for exterior installations. Refer to the contract drawings for accessories and components required for the various units.

1.3 SUBMITTALS

- A. Product Data: Include manufacturer's technical data for each RTU, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Operation and Maintenance Data: For RTUs to include in emergency, operation, and maintenance manuals.
- D. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.
- B. Unit shall be safety certified by ETL and ETL US listed. Unit nameplate shall include the ETL/ETL Canada label.

1.5 WARRANTY

- A. Provide a written warranty in which the contractor agrees to repair or replace any unit component that fails for a period of one year from the date of Substantial Completion.
- B. In addition to the above, the unit manufacturer shall provide the following warranties:
 - 1. A 5-year warranty for the unit compressors. The warranty period will begin at the date of shipment and will not include labor.

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1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: Two sets of filters for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide units manufactured by Aaon, Inc. Subject to review, equipment meeting the full requirements of the specifications and project installation limitations (i.e., physical size and weight) and manufactured by one of the following will be considered by alternate bid:

1. Trane.

- B. Manufactures other the basis of design manufacturer shall carefully review the contract drawings, prior to bidding to verify the equipment will meet all requirements, including installation clearances, electrical power, and structural support. Any change in cost required for alternate bid manufacturers shall be included in the alternate bid price.

2.2 DESCRIPTION

- A. Packaged Outdoor Air Handling unit shall include filters, supply fans, dampers, chilled water coils, heating coils, exhaust fans, and unit controls when required.
- B. Unit shall be factory assembled and tested including leak testing of the coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the controls compartment's literature pocket.
- C. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's access door.

2.3 CONSTRUCTION

- A. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
- B. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D1929-11 for a minimum flash ignition temperature of 610°F.
- C. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, reduces heat transfer through the panel, and prevents exterior condensation on the panel.
- D. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI

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Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.

- E. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.
- F. Access to filters, dampers, cooling coils, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.
- G. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
- H. Units with cooling coils shall include double sloped 304 stainless steel drain pans.
- I. Unit shall be provided with base discharge and return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.
- J. Unit shall include lifting lugs on the top of the unit.
- K. Unit base pan shall be provided with 1/2-inch-thick foam insulation.

2.4 FANS

A. Supply Fans:

- 1. Unit shall include direct drive, unhooded, backward curved, plenum supply fans.
- 2. Blowers and motors shall be dynamically balance and mounted on rubber isolators.
- 3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
- 4. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.

B. Exhaust Fans:

- 1. Exhaust dampers shall be sized for 100% relief.
- 2. Fans and motors shall be dynamically balanced.
- 3. Unit shall include barometric relief dampers.
- 4. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
- 5. Access to exhaust fans shall be through double wall, hinged access doors with quarter turn lockable handles.
- 6. Unit shall include belt driven, forward curved exhaust fans.
- 7. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.

2.5 CHILLED WATER COILS

- A. Coils shall be certified in accordance with AHRI Standard 410 and be hydrogen or helium leak tested.

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- B. Coil shall be constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.
- C. Coil shall have half serpentine circuitry, 6 rows and 12 fins per inch.

2.6 HEATING COILS

- A. Hydronic heating coils shall be provided in the pre-heat position.
- B. Coils shall be certified in accordance with AHRI Standard 410 and be hydrogen or helium leak tested.
- C. Coils shall be constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.
- D. (RTU-4) Coil shall have half serpentine circuitry, one row and 10 fins per inch.
- E. (RTU-5) Coil shall have single serpentine circuitry, two rows and 12 fins per inch.
- F. Unit shall include mixed air preheat coils.

2.7 FILTERS

- A. Unit shall include 4-inch thick, pleated panel filters with an ASHRAE MERV rating of 8, upstream of the cooling coil.
- B. Unit shall include 1 inch aluminum mesh pre-filters upstream of the outside air opening.
- C. Unit shall include a clogged filter switch.

2.8 OUTDOOR AIR

- A. Units shall have a 0-100% economizer consisting of a motor operated outdoor air damper and return air damper assembly constructed of extruded aluminum, hollow core, airfoil blades with rubber edge seals and aluminum end seals. Damper blades shall be gear driven and designed to have no more than 15 CFM of leakage per sq. ft. of damper area when subjected to 2" w.g. air pressure differential across the damper. Damper motor shall be spring return to ensure closing of outdoor air damper during periods of unit shut down or power failure. Barometric relief damper shall be provided as part of the economizer option.

2.9 ELECTRICAL POWER CONNECTION

- A. Unit shall have a 5k AIC SCCR.
- B. Unit shall be provided with a factory installed and factory wired 115V, 12-amp GFI outlet disconnect switch in the unit control panel.
- C. Unit shall be provided with power block for connecting power to the unit.
- D. Unit shall be provided with a safety shutdown terminal block for field installation of a smoke detector which shuts off the unit's control circuit.

2.10 CONTROLS

- A. Unit shall be provided with a low voltage terminal strip for field supplied DDC controls By Others.
- B. Isolation relays shall be factory installed.

2.11 ROOF CURBS

- A. Refer to drawings for the type of curb required for the specified roofing system and the required curb height. Furnish curbs with an integral metal cant, stepped integral metal cant raised the thickness of roof insulation or as required to suit the details.
- B. Curbs shall to be fully gasketed between the curb top and unit bottom with the curb providing full perimeter support, cross structure support and air seal for the unit. Curb gasket shall be furnished within the control compartment of the rooftop unit to be mounted on the curb immediately before mounting of the rooftop unit.
- C. Solid bottom curb shall be factory assembled and fully lined with curb rated 1-inch fiberglass insulation and include a wood nailer strip.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.
- B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.
- C. Examine roofs for suitable conditions where RTUs will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Roof curb: provide a roof curb for all roof mounted units. Install the roof mounted air handling unit(s) on the roof curb immediately after the curb is installed. If immediate installation is not performed provide temporary watertight covering, for all curb openings, consisting of minimum 3/4" exterior grade plywood and watertight rubber or plastic cover.
- B. At the direction of the Owner's Representative the contractor shall remove and dispose of filters from the respective units and install a new filter obtained from the Extra Materials required in Part 1 of this specification. If additional filter installation is not required, forward filters to the owner as extra stock, at the completion of the project.

3.3 CONNECTIONS

- A. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain.

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- B. Install piping adjacent to RTUs to allow service and maintenance.
- C. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate the general arrangement of ducts.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing. Remove and replace malfunctioning units and retest as specified above.

3.5 DEMONSTRATION AND STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service and to train Owner's maintenance personnel to adjust, operate, and maintain RTUs.

END OF SECTION 23 75 13