

SECTION 15781
PACKAGED ROOF TOP AIR CONDITIONING UNITS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The other Contract Documents complement the requirements of this section. The General requirements apply to the work in this section.

1.2 SUMMARY

- A. The Contractor shall provide the labor, materials, equipment, appliances, services and transportation, and perform operations in connection with the construction and installation of the work. Work to be as herein specified and as denoted on the accompanying drawings.
- B. This section of the work includes the providing of the roof curb mounted, weather tight, penthouse type, air conditioning units of the size, capacity, and configuration as denoted and schedule on the drawings.
- C. The units, completely factory assembled and tested, piped, internally wired, shall be fully charged with R-410A (or equal), compressor oil and shipped in one piece.
- D. The Contractor shall provide a structurally sound, weather tight, level roof curb with nailer and seal as detailed on the drawings.

1.3 SUBMITTALS

- A. Manufacturer shall prepare schedule for approval, listing, and identifying the rooftop unit numbers, noting size, capacity, and other requirements.

1.4 QUALITY ASSURANCE

- A. Air handling performance data shall be certified for assurance of rating accuracy. Coils shall be ARI certified, Standard 360.
- B. Unit wiring shall be in accordance with the latest edition of the National Electric Code.
- C. Equipment and components other than that specified shall meet and exceed the requirements and quality of the items herein specified and as scheduled on the drawings.

1.5 WARRANTY

- A. Provide 5-year coverage for compressor and sealed refrigerant system to include evaporator and condenser coils.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. This specification is based on products as manufactured by Trane, acceptable equivalent products manufactured by:
 - 1. Carrier
 - 2. York
 - 3. Or Owner approved equal.

2.2 UNIT CASING

- A. Exterior surfaces of unit shall be phosphatized, zinc-coated steel (1.25 oz. per square foot minimum), with baked enamel finish. Screws shall be coated with zinc-plus-zinc chromate and with neoprene washers where sealing is required.
- B. Hinged access doors shall provide access to control components, filters, outside/return air dampers, evaporator coil, and supply and exhaust fan sections. Access doors and removable panels shall be double wall construction with 2 lb density insulation sandwiched between galvanized steel panels and complete with neoprene gaskets.
- C. Roof assembly shall have modified lock seam joints filled with sealant.
- D. Drain shall be provided on each side of the evaporator section.
- E. Unit base shall be a one-piece welded assembly with 14-gauge formed, load bearing members, having a formed recess with factory-installed base to roof curb sealing gasket, and shall overhang to facilitate water runoff.
- F. Interior surfaces and exterior casing members shall have ½", 1 lb density foil-faced insulation liner.
- G. Unit lifting lugs shall accept chains or cables for rigging and shall also serve as unit tie-down points. Tie-down points must not conflict with air openings in down-flow or horizontal discharge units.

2.3 ELECTRICAL CONTROL PANEL

- A. Wiring shall be installed and tested in individual component assemblies, then rechecked during final factory run test. Main control panel shall have oil safety controls; supply and exhaust fan overload protectors; fuses for supply, exhaust air, and condenser fans; compressor fuses and dead front panel. Factory wiring shall be complete to load side. Electrical control identification shall be stenciled in control panels and wiring numbered for identification.

2.4 REFRIGERATOR SYSTEM

- A. Refrigeration: Refrigeration controls shall operate condenser fan and evaporator fan, and shall include compressor contactors, and a 24-volt transformer. Each circuit of the unit shall have a separate set of refrigeration controls. Compressor safety controls shall be as outlined in this specification and as required.
- B. Compressors: Compressor shall be scroll design installed without suction and discharge valve. Reciprocating compressors are also acceptable. Compression chamber shall be completely enclosed, allowing refrigerant liquid to pass through without damage to the compressor. Each compressor shall include a direct drive, 3600 rpm, suction gas-cooled hermetic motor, centrifugal oil pump, oil level sight glass and oil charging valve. Motors shall have a protective temperature sensor located directly on motor windings. Compressor safety controls shall include high and low pressure cutouts and reset relay. Reset relay shall protect compressor against cycling by automatically locking out system operation, which is interrupted by high-pressure cutout. Relay shall be manually reset from within the building.
- C. Evaporator Coil: Each coil shall be constructed with seamless copper tubing of ½" OD mechanically bonded to heavy-duty aluminum fins and shall be factory pressure and leak tested at 300 psi. Expansion valves shall be included.
- D. Condenser Coil: The primary surface shall be ¾" OD seamless tube. Secondary surface shall be mechanically bonded heavy configured aluminum fins. Sub-cooling circuits shall be incorporated as an integral part of condenser coils. Coil shall be factory pressure and leak tested at 450 psi and completed dehydrated under vacuum.
- E. Condenser Fans and Motors: Unit shall have balanced, direct-drive fans mounted in full length, bell-mouth orifices. Fan motors shall be permanently lubricated ball bearings and built-in thermal

overload protection. Motors shall be line voltage, and shall be equipped with rain shields to eliminate moisture.

- F. Low Ambient Operation: Standard refrigeration system shall operate to 35°F ambient.

2.5 AIR HANDLING SYSTEM

- A. Indoor air fan unit shall have two, double-inlet, forward-curved, centrifugal-type fans mounted on a common shaft. Fans shall be statically and dynamically balanced and tested at the factory. Supply fan shall test run in the unit as part of unit run test. Fan shaft shall be mounted on two, grease-lubricated ball bearings designed for 200,000 hours average life.
- B. Fan motor and fan assembly shall be mounted on common base to eliminate belt slippage at startup and to reduce unit vibration.
- C. Drives shall be adjustable, with OSHA guard. If belt drives are used, sheaves shall be cast iron, heavy-duty type. The v-belt shall be static free and sized for 150% of BHP. Motor bases shall be adjustable.
- D. All motors shall be high-efficiency type.

2.6 FILTERS

- A. Two-inch, high efficiency media filters shall fit in slide-in racks for ease of change-out and provide 35% efficiency by NBS dust spot test.

2.7 OUTSIDE AIR

- A. Standard low leak dampers with 1.5% leakage rate at ½" WG. Damper performance shall meet requirements of AMCA Test Standard 575.
- B. Outside air damper shall be automatically controlled for the outside quantities stipulated on the drawings.
- C. If applicable, for economizer control provide required dampers, and damper actuators.

2.8 ROOF CURB

- A. Curb shall mate with rooftop units to provide support and complete weather tight installation when properly installed. Curb shall meet the local wind loading requirements currently in effect for the location. Curb shall ship knocked down for field assembly. Curb shall be approved by National Roofing Contractors Association.

2.9 CENTRAL CONTROL PANEL

- A. Panel shall include system operation switches and signal lights for central station control and monitoring. Signal lights shall indicate fan operation, heating malfunction, cooling malfunction, and dirty filters.
- B. Rooftop unit shall be indexed "ON" from microprocessor based time controller specified in Section 15900, "CONTROLS AND INSTRUMENTATION."

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install per manufacturer and code requirements.

- B. The Contractor shall provide and install a structurally sound, weather tight, level roof curb with nailers, seals and tie-downs rated to meet current wind load requirements.
- C. The unit manufacturer shall provide spring-type vibration isolation sized to match the specific unit and be suitable for installation by the Contractor.

3.2 CHECK-TEST-START PROCEDURES

- A. The Contractor shall provide labor to accomplish the check, test, and start procedure as recommended by unit manufacturer.
- B. At time of check-test-start, Contractor shall leak test the factory pre-charged system. If necessary the Contractor shall evacuate, and charge units in accordance with equipment manufacturer's instructions. The Contractor shall supply refrigerant.
- C. The unit manufacturer shall provide the manufacturer's check, test, and start forms. One copy shall be sent to the Engineer and one copy sent to the installation contractor.

- 3.3 When the work is completed and at a time directed by the Owner or A/E, the Contractor shall carefully adjust parts of the equipment and systems. This includes adjustment of automatic controls and safety devices, proper setting of adjustable devices, dampers and valves, and other necessary operations so the systems are fully operable and automatic in operation.

Upon completion of this work, notify the Owner and A/E that system is ready for final tests and inspection.

- A. At the time of final inspection, a person of authority shall represent this Contractor. He shall demonstrate, as directed by the A/E, that his work fully complies with the purpose and intent of the specifications and drawings. The Contractor shall provide Labor, services, instruments, and tools necessary for demonstrations and tests. Moving parts of apparatus shall be lubricated and adjusted.
- B. The Contractor shall test and adjust each instrument specialty and equipment furnished by him prior to final acceptance. The Contractor shall demonstrate that subsystems operate as a coordinated and properly functioning integrated system to the approval of the A/E.
- C. The Contractor shall furnish labor; provide adjustments, and incidentals necessary to obtain the desired and intended results.

END OF SECTION