

SECTION 23 63 13
AIR COOLED REFRIGERANT CONDENSERS

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 to this section.

1.2 SCOPE

- A. Provide material, equipment, labor, and supervision necessary to install air-cooled condensing units.
- B. Unit ratings, capacities, and characteristics shall be as scheduled on Mechanical Drawings.

1.3 REFERENCES

- A. AHRI 210/240 – Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment
- B. ASHRAE 14 - Measurement of Energy and Demand Savings
- C. ASHRAE 15 - Safety Standard for Refrigeration Systems
- D. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings
- E. STM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus
- F. Performance shall be in accordance with the applicable ARI Standards.
- G. Compressor motors, starters, wiring, and control wiring shall all conform to NEMA, UL, NEC, and local utility requirements.

1.4 SECTION INCLUDES

- A. Condensing unit package
- B. Charge of refrigerant and oil
- C. Controls and control connections
- D. Refrigerant piping connections
- E. Motor starters
- F. Electrical power connections

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Submit shop drawings indicating components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections.
- C. Submit shop drawings indicating components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections.
- D. Include schematic layouts showing condensing units, cooling coils, refrigerant piping, and accessories required for complete system.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 01 77 00.
- B. Include start-up instructions, maintenance instructions, parts lists, controls, and accessories.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00.
- B. Store and protect products under provisions of Section 01 60 00.
- C. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- D. Protect units on site from physical damage.

The School District of Palm Beach County

Project Name:

SDPBC Project No.:

1.8 WARRANTY

- A. Provide 5-year extended replacement warranty (parts and labor) on compressor, condenser coils, fans, controls, electrical devices and related system components.

1.9 COMMISSIONING

- A. Commissioning of a system or systems specified in this section is part of the construction process.
- B. Documentation and testing of these systems, as well as training of the Owner's operation and maintenance personnel, is required in cooperation with the Owner's Representative and the Commissioning Authority.
- C. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure.
- D. Refer to Section 01 77 00 - Contract Closeout, for substantial completion details.
- E. Refer to Section 01 91 00 - Commissioning, for detailed commissioning requirements

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide products by one of the following:
 - 1. Trane
 - 2. York
 - 3. Daikin
 - 4. Engineer and Owner approved equal.

2.2 MANUFACTURED UNITS

- A. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver, and screens.
- B. Construction and Ratings in accordance with ARI 210/240
 - 1. Testing shall be in accordance with ASHRAE 14
- C. Provide energy Efficiency Rating EER of not less than 10.3 or as prescribed by ASHRAE 90A and the FBC: Energy Conservation, whichever is highest.
- D. See Schedule on Drawings for unit capacities, electrical characteristics, and performance criteria.
- E. Provide unit with a holding charge of refrigerant and oil.

2.3 CASING

- A. House components in welded frame with steel panels with weather resistant, baked enamel finish.
- B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors.
- C. Provide removable access doors or panels with piano hinges and quick fasteners.

2.4 CONDENSER COILS

- A. Coils
 - 1. Aluminum plate fins mechanically bonded to seamless copper tubing.
 - 2. Provide sub-cooling circuits.
 - 3. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of refrigerant
- B. All condenser coils shall have corrosion protective coating.
 - 1. Provide condenser coil coating as specified in design documents.
 - 2. Approved coil coating materials and methods shall include one of the following:
 - a. Blygold PoluA1 XT by Bygold of Florida HVAC Corrosion Protection

- b. Coating process by Eisenheiss
 - c. Field applied Oxiguard.
 - d. HVAC Armor by ECM Group of South Florida
 - C. All coating materials and methods must pass a minimum of 10000 hours of salt spray exposure in a testing performed by an independent laboratory in accordance with ASTM B117.
 - 1. The company providing coating process shall also provide a five-year coil limited warranty.
- 2.5 FANS AND MOTORS
 - A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge.
 - 1. Equip with roller or ball bearings with grease fittings extended to outside of casing.
 - B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3-phase, with permanent lubricated ball bearings and built in thermal overload protection.
 - C. High efficiency motors as indicated.
- 2.6 COMPRESSORS
 - A. Construction: Hermetic, scroll and reciprocating type with heat-treated forged steel or cast iron shafts, aluminum alloy connecting rods, automotive type pistons, rings to prevent gas leakage, suction and discharge valves, and sealing surface immersed in oil.
 - B. Mounting:
 - 1. Statically and dynamically, balance rotating parts and mount on spring rubber-in-shear vibration isolators.
 - 2. Internally isolate hermetic units on springs.
 - C. Lubrication System: Reversible, positive displacement oil pumps with oil charging valve, oil level sight glass, oil filter, and magnetic plug or strainer.
 - D. Motor: Constant speed suction gas cooled with electronic sensor and winding over temperature protection, designed for across-the-line starting, furnish with starter.
 - E. Crankcase Heater:
 - 1. System evaporates refrigerant returning to crankcase during shut down.
 - 2. Energize heater continuously even when compressor is not operating.
- 2.7 REFRIGERANT CIRCUIT
 - A. Provide each unit with two speed compressors or dual refrigerant circuit, factory supplied and piped.
 - B. If dual refrigerant circuits are used, circuit the AHU evaporator coil to provide individual circuits and expansion valves for each compressor, and individual piping runs installed.
- 2.8 CONTROLS
 - A. On unit, mount weatherproof steel control panel, NEMA 250, containing power and control wiring, factory wired with single point power connection.
 - B. For each compressor, provide across-the-line starter with dual pole contactor, minimum 3-minute (or manufacturer standard) anti-cycling time delay compressor overload relay, and control power transformer or terminal for controls power.
 - 1. Provide manual reset current overload protection.
 - 2. For each condenser fan, provide across-the-line starter with starter relay.
 - C. Provide the following safety controls arranged so that operating any one will shut down machine and require manual reset:
 - 1. High discharge pressure switch (manual reset) for each compressor.
 - 2. Low suction pressure switch (manual reset) for each compressor.
 - 3. Oil Pressure switch (manual reset).
 - D. The installing contractor shall perform any control field wiring required.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The Contractor shall install equipment in accordance with manufacturer's instructions.
- B. Provide for connection to electrical service. (Refer to Division 26)
- C. Install units on concrete base as indicated.
- D. Provide connection to refrigeration piping system and evaporators.
 - 1. The Contractor shall provide and install the following for each refrigerant circuit:
 - a. Suction and liquid line filter dryer replaceable core type.
 - b. A liquid line sight-glass and moisture indicator.
 - c. Thermal expansion valve for maximum operating pressure.
 - d. Insulated suction line
 - e. Suction and liquid line service valves and gage ports.
 - f. Charging valves
 - g. Refrigerant and oil
- E. Refer to Section 23 23 00. Comply with ASHRAE 15

3.2 CONTRACTOR'S FIELD SERVICES

- A. Test refrigerant system for leaks including lines connecting the condensing unit with air handling unit.
- B. Prepare and start systems.
- C. Supply initial charge of refrigerant and oil for each refrigerant circuit.
 - 1. Replace losses of refrigerant and oil.
- D. Inspect and test for refrigerant leaks quarterly during first year of operation.
 - 1. Repair all leaks and replace losses of refrigerant and oil to meet manufacturer's specifications.

3.3 FUNCTIONAL PERFORMANCE TESTING

- A. System Functional Performance Testing is part of the Commissioning Process.
 - 1. The Contractor shall perform the Functional Performance Testing and the Commissioning Authority shall witness and document the test.
 - 2. Refer to Section 01 91 00, Commissioning, for functional performance tests and commissioning requirements.
- B. Systems Readiness Checklists shall be completed and submitted for each piece of equipment included in this section.
- C. Include the functional performance testing of Condensing Units as part of the Air-Cooled Split System Functional Performance testing.

3.4 DEMONSTRATION AND TRAINING

- A. Training of the Owner's operation and maintenance personnel is required in cooperation with the Owner's Representative.
- B. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems.
- C. Schedule the instruction in coordination with the Owner's Representative after submission and approval of formal training plans.
- D. Refer to Section 01 91 00, Commissioning, for further contractor training requirements
- E. Provide demonstrations and training for all types of Air-Cooled Split Systems installed in this project.

The School District of Palm Beach County

Project Name:

SDPBC Project No.:

END OF SECTION