

## **SECTION 15741 - PACKAGED HEAT PUMP UNITS (2 TON)**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Packaged heat pump unit.
- B. Unit controls.

#### **1.02 REFERENCE STANDARDS**

- A. ARI 210/240 - Standard for Performance Rating of Unitary Air Conditioning and Air-Source Heat Pump Equipment; Air-Conditioning, Heating, and Refrigeration Institute; 2006.
- B. ARI 270 - Sound Rating of Outdoor Unitary Equipment; Air-Conditioning, Heating, and Refrigeration Institute; 2008.
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilation Systems; National Fire Protection Association; 2002.

#### **1.03 PERFORMANCE REQUIREMENTS**

- A. Heat Pump Heating:
  - 1. Rated heating output (Low temp): 12,900 Btu/hr (3780 W).
  - 2. Rated outdoor air temperature: 17 degrees F (-8.8 degrees C) DB and 15 degrees F (-9.4 degrees C) WB.
  - 3. Rated air temperature entering indoor coil: 70 degrees F (21 degrees C).
  - 4. Coefficient of performance (at low temperature): Minimum 2.24.
  - 5. Heating seasonal performance factor: Minimum 8.0
- B. Cooling Capacity:
  - 1. Rated cooling output (ARI): 23,800 Btu/hr (6970 W).
  - 2. Air entering evaporator coil: 80 degrees F (27 degrees C) DB, 67 degrees F (19 degrees C) WB.
  - 3. Condenser ambient air: 95 degrees F (35 degrees C).
  - 4. Energy efficiency ratio (ARI): Minimum 12.
  - 5. Seasonal energy efficiency ratio at ARI conditions: Minimum 14.
- C. Supply Air:
  - 1. Air flow (ARI): 850 cfm (401 L/sec).
- D. Return Air:
  - 1. Air flow: 850 cfm (401 L/sec).
- E. Unit Sound Rating: Maximum 76.
- F. Refrigerant: R410A.

#### **1.04 SUBMITTALS**

- A. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- B. Buy American documentation: Provide documentation to owner which certifies that the equipment is manufactured in America in accordance with the Buy American Requirements of the Owner and the American Recovery and Reinvestment Act of 2009.
- C. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and

include start-up instructions.

- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- E. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from physical damage by storing off site until the system and site is ready for immediate installation of units.

### 1.07 WARRANTY

- A. Provide a 10 year warranty to include coverage for refrigeration compressors.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Carrier Corporation - [www.carrier.com](http://www.carrier.com)
- B. Trane Inc - [www.trane.com](http://www.trane.com)
- C. Rheem - [www.rheem.com](http://www.rheem.com)
- D. York - [www.york.com](http://www.york.com)
- E. Tempstar - [www.tempstar.com](http://www.tempstar.com)
- F. Heil - [www.heil-hvac.com](http://www.heil-hvac.com)
- G. Goodman - [www.goodmanmfg.com](http://www.goodmanmfg.com)
- H. Ruud - [www.ruud.com](http://www.ruud.com)

### 2.02 AIR CONDITIONING UNITS

- A. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, electric heating elements, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.
- B. Electrical Characteristics:
  - 1. 10 KW auxiliary electric heater kit and single point wiring.
  - 2. 240 volts, single phase, 60 Hz.
  - 3. 46 minimum circuit amps.
  - 4. 50 amperes maximum overcurrent protection.
  - 5. Verify minimum circuit ampacity and maximum overcurrent protection with actual equipment provided. Coordinate requirements with Electrical Contractor and actual field conditions.
  - 6. Disconnect switch provided by the Electrical Contractor.

### 2.03 FABRICATION

- A. Cabinet: Steel with baked enamel finish, including access panels with screwdriver operated flush cam type fasteners. Structural members shall be minimum 18 gage (1.20 mm), with access doors or panels of minimum 20 gage (0.90 mm).
- B. Insulation: one inch (25 mm) thick neoprene coated glass fiber with edges protected from erosion.

- C. Supply Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, and rubber isolated hinge mounted motor or direct drive as indicated. Isolate complete fan assembly.
- D. Air Filters: 1 inch (25 mm) thick glass fiber disposable media in metal frames.
- E. Filter kit: Provide unit mounted filter housing accessory where applicable and when filter return grilles are not installed.

#### **2.04 ELECTRIC HEATING COIL**

- A. Supplemental electric heat strip: easily accessible with automatic reset thermal cut-out, built-in magnetic contactors, galvanized steel frame, control circuit transformer and fuse, manual reset thermal cut-out, airflow proving device, load fuses.
- B. Controls: Start supply fan before electric elements are energized and continue operating until air temperature reaches minimum setting, with switch for continuous fan operation.

#### **2.05 EVAPORATOR COIL**

- A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.
- B. Provide capillary tubes or thermostatic expansion valves for units of 6 tons (21 kw) capacity and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons (26 kw) cooling capacity and larger.

#### **2.06 COMPRESSOR**

- A. Provide hermetic compressors, 3600 rpm maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves and gage ports, and filter drier.
- B. Five minute timed off circuit to delay compressor start.
- C. Outdoor thermostat to energize compressor above 35 degrees F (2 degrees C) ambient.
- D. For heat pump units, provide reversing valve, suction line accumulator, flow control check valve, and solid-state defrost control utilizing thermistors.

#### **2.07 CONDENSER COIL**

- A. Provide copper tube aluminum fin coil assembly with subcooling rows and coil guard.
- B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor.

#### **2.08 OPERATING CONTROLS**

- A. Thermostat: Provide low voltage, electronic, non-programmable thermostat for two stage heating, single stage cooling. Include fan "ON-AUTO" and system selector (COOL-OFF-HEAT-EMERGENCY).
- B. Low Ambient Kit: Provide refrigerant pressure switch to cycle condenser fan on when condenser refrigerant pressure is above 285 psig (1965 kPa) and off when pressure drops below 140 psig (965 kPa) for operation to 0 degrees F (-18 degrees C).

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that proper power supply is available.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.
- B. Install in accordance with NFPA 90A and NFPA 90B.
- C. Provide service clearances per manufacturer's recommendations.
- D. Mount unit on 4" concrete pad.

### **3.03 SYSTEM STARTUP**

- A. Prepare and start equipment. Adjust for proper operation.

### **3.04 CLOSEOUT ACTIVITIES**

- A. Demonstrate operation to Owner's maintenance personnel.

**END OF SECTION**

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