

SECTION 15812 - SMALL SPLIT-SYSTEM HEATING AND COOLING (2 TON)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air-source heat pumps.
- B. Indoor air handler (fan & coil) units for duct connection.
- C. 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. ASHRAE Std 90.1 - Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2004.
- D. ASHRAE Std 90.2 - Energy-Efficient Design of New Low-Rise Residential Buildings; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2007.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2002.
- F. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association; 2006.

1.03 SUBMITTALS

- A. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
- 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. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- D. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.05 WARRANTY

- A. Provide ten year manufacturers warranty for compressors.
- B. Provide five year manufacturers warranty for indoor coil and electric heating element.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Carrier Corporation; Model 25HCB5024 outdoor unit with FX4CNF024-005 indoor unit: www.carrier.com.
- B. Trane Inc; Model 4TWB4024E1 outdoor unit with 4TEB30C05A1: www.trane.com.
- C. Rheem; Model RPQL-024JAZ outdoor unit with RHKL-HM2417JA indoor unit: www.rheem.com.

2.02 SYSTEM DESIGN

- A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
 - 1. Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator coil in central ducted indoor unit; auxiliary electric heat.
 - 2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.
 - 3. Refrigerant suction lines shall be insulated with a thermal resistivity of at least R-4 and have external surface permeance not exceeding 0.05 perm when tested in accordance with ASTM E96.
 - 4. Refrigerant: R410A.
- B. Performance Requirements:
 - 1. Efficiency:
 - a. Seasonal Energy Efficiency Ratio: 14, minimum.
 - b. Heating Seasonal Performance Factor: 9.0, minimum.
 - 2. Air Handling:
 - a. Air Flow (ARI): 850 cfm (378 L/s).
 - 3. Heating Performance Requirements (ARI):
 - a. Heating Output (Low temp): 13,900 Btuh (4100 W).
 - b. Outdoor air temperature: 17 degrees F (-8.5 degrees C).
 - c. Indoor air temperature: 70 degrees F (21 degrees C).
 - 4. Cooling Performance Requirements (ARI):
 - a. Evaporator Cooling Output: 24,200 Btuh (7.1 kW).
 - b. Air Temperature Entering Evaporator:
 - 1) Dry Bulb: 80 degrees F (26.5 degrees C).
 - 2) Wet Bulb: 67 degrees F (19.5 degrees C).
 - c. Outdoor Unit Rated Cooling Output: 24200 Btuh (7.1 kW).
 - d. Condenser Ambient Air Temperature: 95 degrees F (35 degrees C).
- C. Electrical Characteristics:
 - 1. 5 kW auxiliary electric heater on indoor unit, 28 MCA, 30 MOCP.
 - 2. 240 volts, single phase, 60 Hz.
 - 3. Outdoor unit: 18 MCA, 30 MOCP.
 - 4. Indoor unit blower motor: 4.0 MCA, 15 MOCP.
 - 5. Verify minimum circuit ampacity and maximum overcurrent protection with actual equipment provided. Coordinate requirements with electrical contractor and field conditions.
 - 6. Disconnect switches provided by Electrical Contractor.

2.03 INDOOR UNITS FOR DUCTED SYSTEMS

- A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating and cooling element(s), controls, and accessories.
 - 1. Air Flow Configuration: As required for specific installation.

2. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, 1" glass fiber insulation with reflective liner.
- B. Supply Fan: Centrifugal type rubber mounted with direct or belt drive with adjustable variable pitch motor pulley.
1. Motor: NEMA MG 1; 1750 rpm single speed, permanently lubricated, hinge mounted.
 2. Motor Electrical Characteristics:
 - a. 1/3 hp (.249 kW).
 - b. 240 volts, single phase, 60 Hz.
- C. Air Filters: 1 inch (25 mm) thick glass fiber, disposable type arranged for easy replacement.
- D. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
1. Construction and Ratings: In accordance with ARI 210/240 and UL listed.
 2. Manufacturers: System manufacturer.

2.04 OUTDOOR UNITS

- A. Outdoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, with compressor and condenser.
1. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
 2. Construction and Ratings: In accordance with ARI 210/240 with testing in accordance with ASHRAE Std 23 and UL listed.
- B. Compressor: ARI 520; hermetic, 3600 rpm, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.
- C. Air Cooled Condenser: ARI 520; Aluminum fin and copper tube coil, with direct drive axial propeller fan resiliently mounted, galvanized fan guard.
- D. Accessories: Filter drier, outdoor thermostat, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gage ports, thermometer well (in liquid line).
1. Provide thermostatic expansion valves.
 2. Provide heat pump reversing valves.
- E. Operating Controls:
1. Control by room thermostat to maintain room temperature setting.
 2. 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).

2.05 ACCESSORY EQUIPMENT

- 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. Refrigerant Line Sets: Soft-annealed copper suction and liquid lines, factory cleaned, dried, pressurized and sealed; factory-insulated suction line with flared fittings at both ends.
- C. External Filter Base: Provide accessory filter base for 1" filters for installations without filter return grilles.
- D. Provide condensate pump and auxiliary condensate drain pan with moisture switch wired to switch off system in the event of condensate overflow. Route all condensate piping according to the 2006 International Residential Code or 2006 International Mechanical Code, whichever is applicable for the installation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
- B. Verify that proper power supply is available and in correct location.

3.02 INSTALLATION

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

END OF SECTION