

**SECTION 23 8113**  
**PACKAGED TERMINAL AIR-CONDITIONERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air conditioning units.
- B. Cabinet.
- C. Evaporator fan.
- D. Compressor.
- E. Evaporator coil.
- F. Condenser.
- G. Heating coil.
- H. Air filters.
- I. Controls.

**1.02 RELATED REQUIREMENTS**

- A. Section 22 0513 - Common Motor Requirements for Plumbing Equipment: Evaporator and condenser fan motors.
- B. Section 22 3000 - Plumbing Equipment: Cooling condensate removal pumps.
- C. Section 23 0513 - Common Motor Requirements for HVAC Equipment: Evaporator and condenser fan motors.
- D. Section 23 0913 - Instrumentation and Control Devices for HVAC: Installation and wiring of thermostats and other control components.
- E. Section 23 2300 - Refrigerant Piping.
- F. Section 23 6313 - Air Cooled Refrigerant Condensers.
- G. Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. NEMA MG 1 - Motors and Generators; 2014.
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Cooling:
  - 1. Cooling Capacity: \_\_\_\_ Btu/hr.
  - 2. Air Flow: \_\_\_\_ cfm.
  - 3. Air Entering Evaporator: \_\_\_\_ degrees F DB and \_\_\_\_ degrees F WB.
  - 4. Air Leaving Evaporator: \_\_\_\_ degrees F DB and \_\_\_\_ degrees F WB.
  - 5. Water Entering Condenser: \_\_\_\_ degrees F.
  - 6. Evaporator Fan Motor: \_\_\_\_ hp, \_\_\_\_ volts, single phase, 60 Hz.
- B. Heating:
  - 1. Heating Capacity: \_\_\_\_ Btu/hr.
  - 2. Water Flow: \_\_\_\_ gpm.
  - 3. Water Entering: \_\_\_\_ degrees F.
  - 4. Water Leaving: \_\_\_\_ degrees F.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for manufactured products and assemblies. Indicate water, drain, thermostatic valves, and electrical rough-in connections with electrical characteristics and connection requirements.

- C. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.
- D. Sustainable Design Documentation: Submit manufacturer's product data on refrigerant used, showing compliance with specified requirements.
- E. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

#### **1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigeration compressors.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Daikin Industries Co, Ltd; \_\_\_\_\_: www.daikin.com.
- B. Trane Inc; \_\_\_\_\_: www.trane.com.
- C. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 AIR CONDITIONING UNITS**

- A. Description: Packaged, self-contained, factory assembled, prewired unit, consisting of cabinet, compressor, condensing coil, evaporator fan, evaporator coil, discharge plenum, outside air connection, heating coil, air filters, and controls; fully charged with refrigerant and filled with oil.
- B. Assembly: Up flow air delivery, in draw-through configuration as indicated.
- C. Energy Efficiency:
  - 1. Cooling Capacity: Less than 7000 Btu/h:
    - a. Energy Efficiency Ratio: 8.88, minimum.
    - b. Coefficient of Performance: 3.6, minimum.
  - 2. Cooling Capacity: Greater than or equal to 7000 Btu/h and less than or equal to 15000 Btu/h:
    - a. Energy Efficiency Ratio: 10.0, minimum.
    - b. Coefficient of Performance: 3.6, minimum.
  - 3. Cooling Capacity: Greater than 15000 Btu/h:
    - a. Energy Efficiency Ratio: 7.60, minimum.
    - b. Coefficient of Performance: 3.6, minimum.
- D. Electrical Characteristics:
  - 1. Refer to Section 26 2717.
  - 2. Disconnect Switch:
    - a. Factory mount in control panel.

#### **2.03 CABINET**

- A. Frame and Panels: Galvanized steel with baked enamel finish, easily removed access doors or panels with quick fasteners.
- B. Insulation: Minimum 1/2 inch thick acoustic duct liner for lining cabinet interior.
- C. Drain Pan: Galvanized steel with corrosion-resistant coating.

#### **2.04 EVAPORATOR FAN**

- A. Fan: Direct drive, double width, double inlet, forward curved centrifugal fan, statically and dynamically balanced, resiliently mounted.
- B. Motors: \_\_\_\_ hp, \_\_\_\_ volts, single phase, 60 Hz.
  - 1. Refer to Section 23 0513.

## **2.05 COMPRESSOR**

- A. Hermetically sealed, 3600 rpm maximum, resiliently mounted with positive lubrication and internal motor protection.

## **2.06 EVAPORATOR COIL**

- A. Direct expansion coiling coil of seamless copper tubes expanded into aluminum fins.
- B. Refrigeration circuit with externally equalized thermal expansion valve, filter-drier, and charging valves.

## **2.07 CONDENSER**

- A. Co-Axial: Copper tube in copper tube or shell and tube with finned copper tubes in steel shell with water temperature actuated water regulating valve.
- B. Fan: Double width, double inlet, forward curved centrifugal fan, statically and dynamically balanced, with permanently lubricated bearings.
- C. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.
- D. Motors: \_\_\_\_ hp, \_\_\_\_ volts, single phase, 60 Hz.
  - 1. Refer to Section 23 0513.

## **2.08 HEATING COIL**

- A. Hot water heating coil of seamless copper tubes expanded into aluminum fins.

## **2.09 AIR FILTERS**

- A. Easily removed one inch thick permanent cleanable panel filters.

## **2.10 CONTROLS**

- A. Factory wired controls shall include contactor, high and low pressure cutouts, internal winding thermostat for compressor, control circuit transformer, non-cycling reset relay.
- B. Provide thermostat to cycle cooling, mounted within unit with 'fan-off-cool' switch allowing continuous fan operation, or cycling fan on call for cooling.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with requirements of NFPA 90A.
- C. Provide shut-off valves in condenser water inlet and outlet piping.
- D. Pipe condensate from drain pan to nearest floor drain.

**END OF SECTION 23 8113**

