

## **SECTION 23 81 26 – SPLIT-SYSTEM AIR-CONDITIONERS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

#### **1.3 SUBMITTALS**

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.
- F. Warranty: Special warranty specified in this Section.
- G. Per LEED Credit EA Enhanced Refrigerant Management, manufacturers' product data for refrigerants, which includes printed statement that refrigerants are:
  - 1. Free of HCFCs;
  - 2. Have an ozone depletion potential (ODP) of 0; and
  - 3. Have a global warming potential (GWP) of less than 50.

#### **1.4 QUALITY ASSURANCE**

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."
- D. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."
- E. Units shall be designed to operate with HCFC-free refrigerants.

## **1.5 COORDINATION**

- A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."
- B. Coordinate size, location, and connection details with roof curbs, equipment supports, and roof penetrations specified in Division 07 Section "Roof Accessories."

## **1.6 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: **Five** years from date of Substantial Completion.

## **1.7 EXTRA MATERIALS**

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Filters: One set of filters for each unit.
  - 2. Fan Belts: One set of belts for each unit.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier Air Conditioning; Div. of Carrier Corporation.
2. Evcon Industries, Inc.
3. First Co.
4. Friedrich Air Conditioning Company.
5. Koldwave, Inc.
6. Lennox Industries Inc.
7. Mitsubishi Electric Sales Canada, Inc.
8. Mitsubishi Electronics America, Inc.; HVAC Division.
9. Mitsubishi Heavy Industries America, Inc.; Air-Conditioning & Refrigeration Division, Inc.
10. Sanyo Fisher (U.S.A.) Corp..
11. Tadiran Electronic Industries Inc.; Appliance Division.
12. Trane Company (The); Unitary Products Group.
13. York International Corp.

## 2.2 CONCEALED EVAPORATOR-FAN COMPONENTS

- A. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
  1. Insulation: Faced, glass-fiber duct liner.
  2. Drain Pans: Galvanized steel, with connection for drain; insulated.
- B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
- C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.
- D. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.
- E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
  1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.
- F. Disposable Filters: 1 inch (25 mm) thick, in fiberboard frames.
- G. Wiring Terminations: Connect motor to chassis wiring with plug connection.

## 2.3 FLOOR-MOUNTING, EVAPORATOR-FAN COMPONENTS

- A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect.
  1. Discharge Grille: **Steel with surface-mounted frame.**
  2. Insulation: Faced, glass-fiber, duct liner.
  3. Drain Pans: Galvanized steel, with connection for drain; insulated.

- B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
- C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.
- D. Fan: Direct drive, centrifugal, **with power-induced outside air**.
- E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
  - 1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.
- F. Filters: Permanent, cleanable.

#### **2.4 WALL-MOUNTING, EVAPORATOR-FAN COMPONENTS**

- A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
- B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
- C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.
- D. Fan: Direct drive, centrifugal fan.
- E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
  - 1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.
- F. Filters: Permanent, cleanable.

#### **2.5 CEILING-MOUNTING, EVAPORATOR-FAN COMPONENTS**

- A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
- B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

- C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.
- D. Fan: Direct drive, centrifugal fan, **with power-induced outside air**, and integral condensate pump.
- E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
  - 1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.
- F. Filters: Permanent, cleanable.

## 2.6 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

- A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
- B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
  - 1. Compressor Type: **Scroll**.
  - 2. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
  - 3. Refrigerant Charge **R-410A**.
- C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
- D. Heat Pump Components: Reversing valve and low-temperature air cut-off thermostat.
- E. Fan: Aluminum-propeller type, directly connected to motor.
- F. Motor: Permanently lubricated, with integral thermal-overload protection.
- G. Low Ambient Kit: Permits operation down to 45 deg F (7 deg C).
- H. Mounting Base: Polyethylene.

## 2.7 WATER-COOLED, COMPRESSOR-CONDENSER COMPONENTS

- A. Casing: Steel, with baked-enamel finish in color selected by Architect, removable panels for access to controls, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

- B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
  - 1. Compressor Type: **Scroll**.
  - 2. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
  - 3. Refrigerant Charge: **R-410A**.
- C. Heat Pump Components: Reversing valve.
- D. Heat Exchanger: Copper tubes in copper tube or in steel shell, with water-temperature-actuated, water-regulating valve.

## 2.8 ACCESSORIES

- A. Control equipment and sequence of operation are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."
- B. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
- C. Thermostat: Wireless infrared functioning to remotely control compressor and evaporator fan, with the following features:
  - 1. Compressor time delay.
  - 2. 24-hour time control of system stop and start.
  - 3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
  - 4. Fan-speed selection, including auto setting.
- D. Automatic-reset timer to prevent rapid cycling of compressor.
- E. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
- F. Additional Monitoring:
  - 1. Monitor constant and variable motor loads.
  - 2. Monitor variable frequency drive operation.
  - 3. Monitor economizer cycle.
  - 4. Monitor cooling load.
  - 5. Monitor air distribution static pressure and ventilation air volumes.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install units level and plumb.

- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Install ground-mounting, compressor-condenser components on 4-inch- (100-mm-) thick, reinforced concrete base; 4 inches (100 mm) larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.
- D. Install ground-mounting, compressor-condenser components on polyethylene mounting base.
- E. Install roof-mounting compressor-condenser components on equipment supports specified in Division 07 Section "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.
- F. Install seismic restraints.
- G. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of **1 inch (25 mm)**. Refer to Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- H. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to unit to allow service and maintenance.
- C. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply **and return** ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Air Duct Accessories."
- D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- E. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, **test, and adjust** field-assembled components and equipment installation, including connections, **and to assist in field testing**. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

### **3.4 STARTUP SERVICE**

- A. Engage a factory-authorized service representative to perform startup service.
1. Complete installation and startup checks according to manufacturer's written instructions.

### **3.5 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 01 Section "Demonstration and Training."

### **END OF SECTION**