

SECTION 15600 HEATING & AIR CONDITIONING

PART 1 - GENERAL

1.1 NOTE

- A. The requirements of Section 15010 apply to work performed under this Section.

1.2 SCOPE

- A. The Work under this Section of the Specification shall include the furnishing of labor, equipment and materials for the installation of heating, air conditioning and ventilating systems as specified, shown on the Drawings or implied to provide continuous and satisfactory service.

PART 2 - PRODUCTS

2.1 DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNITS

- A. Provide direct expansion, split system air conditioning systems consisting of exterior condensing unit and wall mounted interior fan coil unit. Equipment shall be of a single manufacturer. Systems shall be rated and catalogued to be compatible. Unit shall be ARI rated but shall operate at the conditions and capacities as noted on the drawings.
- B. Outdoor Air
 1. Outdoor unit shall be air cooled with horizontal air discharge provided with a hermetic compressor.
 2. Compressor shall be welded steel hermetic provided with internal vibration isolation, crank case heater and motor winding over temperature and overcurrent safety devices.
 3. Heater transfer coil shall be copper or aluminum tube with aluminum plate fins. Coil shall provide subcooling and shall be capable of storing refrigerant in system when 80 percent full or it shall be provided with an accumulator receiver. Heat rejection fan shall be deep pitched corrosion resistant propeller fan protected by a fan guard. Fan shall be direct driven by permanently lubricated motor with inherent overload protection and Class B insulation.
 4. Provide outdoor unit, high and low pressure safety controls, time delay relay to prevent short cycling and automatic restart on resumption of electric service after a power failure. Provide freezestat to prevent coil freeze-up during low ambient condition or loss of air. Controls shall be solid state. Where units are three phase, provide thermal overloads in power phases to provide single phase protection of motor.
 5. Casing shall be suitable for exterior use and shall be provided with baked enamel finish over properly treated galvanized steel or other approved corrosion resistant finish. Unit shall be set on concrete pad.

C. Indoor Unit

1. Provide wall mounted fan coil unit with ceiling discharge compatible for use with outdoor unit specified above.
2. Fan coil unit shall be complete with insulated casing with asphaltum treated drain pan, copper tube aluminum fin direct expansion refrigeration coil with suitable expansion valve, distributor and solenoid valve, fan section and filter section and auxiliary electric heat. Evaporator fan shall be vee belt drive or multi-speed of direct drive suitable for the installed field conditions and capacity.
3. Auxiliary electric heater shall be medium watt density ni-chrome wire open coil provided with magnetic operating and backup contactors, automatic reset thermal overload protection, manual reset overcurrent protection and air pressure switch as required by the National Electrical Code.
4. Electric heater power wiring and supply fan shall be wired to one central point with separate circuit breakers or inherent overload protection provided for components. Provide control power transformer.
5. Filter shall be standard throw away type and shall be new and clean when building is accepted for use by the Owner.
6. Air conditioning units shall be similar to model listed on drawing and manufactured by Mitshubishi, Carrier, York or Lennox.

2.2 EXHAUST FANS - CENTRIFUGAL ROOF MOUNTED

- A. Provide roof exhaust fans in accordance with the schedule on the drawings and the specifications below. Fans shall be AMCA tested and rated.
- B. Roof exhausters shall be aluminum construction with stainless steel fasteners. Motor shall be located out of the air stream. Fans shall be complete with motor, direct or vee belt drive as indicated, disconnect means, backdraft dampers, discharge bird screen and prefabricated roof curb. Where fans are noted to be belt driven, provide adjustable sheave and belt tensioning device.
- C. Where fan is noted to be vertical discharge, provide fan with hinged curb and grease draw off tube.
- D. Disconnect means for single phase motors shall consist of motor starting switch inside of fan housing. Single phase motors smaller than 1/12 horsepower may be inherently overload protected and provided with cord and plug for disconnect means. Three phase motors shall be provided with three pole disconnect switches, mounted in the fan housing.
- E. Roof curb shall be double wall insulated, designed to match the exhaust fan and shall be provided with cant strip for flashing, wood nailer strip and sealing gasket. Curb shall be a minimum of 16 inches high.
- F. Exhaust fans shall be Greenheck, Jenn Aire, Penn Ventilator, Acme or ILG.

2.3 GAS VENTS (TYPE 'B' VENT)

- A. Provide type B gas vents where required or shown and of the sizes noted on the drawings.
- B. Gas vents shall be galvanized steel double wall construction. Provide roof flashing cone, storm collar and vent cap.

- C. Gas vents shall be Metal-Fab, Metalbestos or Amer-Vent.

2.4 GAS VENTS (POSITIVE PRESSURE)

- A. Provide gas vents for positive pressure venting where required or shown and of the sizes noted on the drawings.
- B. The double wall stack outer jacket shall be of 0.025" aluminized steel. The inner gas carrying pipe shall be 0.035" type 304 stainless steel.
- C. Portions of stack exposed to the atmosphere shall be protected with one base coat and one finish coat of heat resistant paint.
- D. Gas vents shall be Metal-Fab's model P1C or equivalent of Metalbestos or Amer-Vent.

2.5 TESTING AND BALANCING AIR & WATER SYSTEMS

- A. The air distribution system shall be balanced and adjusted to distribute the air quantities as noted on the drawings. Demonstrate to the Architect's satisfaction knowledgeability in this work and familiarity with the test instruments to be used. If the Architect does not approve of the Contractor's qualifications, the Contractor shall engage the services of an independent test organization specializing in this work and is a member of the Associated Air Balance Council or other nationally recognized air balancing organization.
- B. Test equipment must be approved by the Architect and properly calibrated prior to starting work. Repairs, alterations, adjustments and readjustments necessary to meet the design conditions shall be made.
- C. The balancing agency shall review the drawings before installation and advise the Contractor of additional dampers required in the ductwork, flow devices and balancing valves in the water piping, etc., to effectively and properly balance the systems. These devices shall be installed at no additional cost to the Owner.
- D. At the completion of the balancing and adjusting and prior to the operating test, submit to the Architect three (3) certified typewritten reports to be retained by the Architect. Reports shall include:
 - 1. Velocities and air quantities at supply returns and exhaust outlets installed under this contract.
 - 2. Pressure and/or temperature difference across various pieces of equipment.
 - 3. Air temperature delivered from heating and cooling equipment.
 - 4. Schedule of equipment.
 - 5. Speed of belt driven equipment.
 - 6. Nameplate data on motors installed under this contract.
 - 7. Actual operating voltage and ampacity readings on motors.
- E. Separate six hour operating tests shall be made during the cooling season and during the heating season in which an hourly record shall be made of the following:
 - 1. Settings of control equipment.
 - 2. Outside weather conditions.

3. Thermostat readings.
4. Dry and wet bulb temperatures in spaces.
5. Outside temperatures shall be below 40 degrees Fahrenheit during the heating test and above 85 degrees Fahrenheit during the cooling test. The air distribution systems shall be rebalanced as required during the first cooling season.

END OF SECTION