SECTION 237740 - PACKAGED ROOFTOP UNITS

PART 1 – GENERAL

1.1 DESCRIPTION

A. All work specified in this Section is governed by the Mechanical General Section 230100.

B. This Section 237740 and the accompanying drawings cover the provisions of all labor, equipment, appliances and materials, and performing all operations in connection with the construction and installation of the packaged rooftop units as specified herein and as shown. This work includes, but is not limited to, the following:

1. Packaged rooftop units including curbs and accessories
2. Control system (interlocked to the units)

C. Units shall be self-contained, rooftop curb-mounted, single package type. The rooftop units shall be completely factory assembled as a unitary package complete with operating controls and shall be completely piped, internally wired and fully charged with R-410a refrigerant. Only one electrical power connection shall be required.

1.2 INTENT

A. It is the intent of this Section of the specifications to provide complete, operable, adjusted single package rooftop units, as shown and specified which are free of excessive noise and vibration.

1.3 BASIS OF DESIGN

A. The basis of design is Trane. Any proposed substitutions or equals by other manufacturers shall be proven equal in all respects to the equipment specified as the basis of design. Particular attention is called to the requirements of Section 230100.

B. Acceptable substitute manufacturers are Carrier and McQuay.

PART 2 - PRODUCT

2.1 CURB

A. Each unit shall be provided with a full perimeter roof curb. The roof curb shall be of the same manufacturer as the unit, shall support the unit and provide a watertight enclosure to protect ductwork and utility services. Curb design shall comply with National Roofing Contractors Association requirements. Supply/return air opening gasketing shall be provided. Channel shall be provided allowing for adjustment of return air opening location to match the building structural frame indicated.

2.2 UNIT CABINETS

A. Rooftop unit cabinets shall be formed, galvanized steel construction with welded base

assembly. Galvanized steel surfaces shall be bonderized and painted with baked acrylic enamel for complete weather protection. All sheet metal screws shall be stainless steel. The outside air dampers shall be low leak gasketed dampers which must match and interlock with the single package rooftop units. Cabinets shall be fully insulated.

B. Unit cabinets shall be designed for curb mounting and mate with the full perimeter roof curb for a complete weathertight seal. Unit sides shall overhang the curb to form protective drip lip.

C. Access doors for the filter section and the fan section of all units shall be hinged type.

2.3 COMPRESSOR SECTION

A. Compressor section refrigeration system shall be factory charged, ready for operation, providing minimum two stage cooling capacity (50% and 100%) on units of over 5 tons capacity, minimum of three stages on units of nominal 20 and 25 tons and minimum of four stages on units larger than 25 nominal tons. Compressor protection shall include high and low pressure control, outdoor ambient protection, compressor sump heat, three-phase overload protection, anticycling timer providing a minimum five (5) minute time shut down of unit on interruption of power or automatic control shutoff.

2.4 COILS

A. Evaporator and condenser coils shall be copper tubing mechanically bonded to heavy duty aluminum fins. Aluminum tubes shall not be acceptable.

2.5 FANS

A. Fans shall be either single or double wheels, forward-curved and mounted on a common shaft with adjustable sheave drive. All fans shall be statically and dynamically balanced and tested in the factory. Fan shall not pass thru its first critical speed in order to meet the scheduled performance. Fan shaft shall be mounted on not less than two grease-lubricated ball bearings with all fan wheels mounted inboard of the bearings. The fan and motor assembly shall be mounted on a common base; on units with motor sizes larger than five (5) HP, the entire assembly shall be isolated from the rest of the unit by double deflection vibration isolators.

B. Variable air volume (VAV) units shall be complete with variable frequency inverter drives and matched inverter-duty motors.

2.6 GAS HEATING SECTION

A. Gas heating sections shall be mounted downstream of evaporator coils and shall be certified by AGA for use on natural gas. Heating shall be accomplished with a minimum of two stages.

B. Heat exchanger shall be fabricated from stainless steel, stress-relieved and free-floating.

C. The unit shall utilize an electronic, spark-ignition pilot light; not a standing pilot.

2.7 CONTROLS AND ACCESSORIES

A. All operating and safety controls shall be factory installed and shall include solid state compressor overload protection, magnetic contactors, thermostatic expansion valve, refrigerant line drier and automatic damper motors.

B. A 24 volt transformer shall be provided to accommodate controls and accessories. Each unit shall tie into the Restaurant Depot control system.

C. Controls on electric heat section shall meet NEMA specifications and requirements.

D. During night setback operation, morning warm-ups after night setbacks and whenever the unit is off, the outside air dampers shall be fully closed and admit no outside air.

E. Interlocks shall be made to the duct-mounted smoke detectors in each unit's supply and return ductwork to shut the unit off and fully close the return air dampers to prevent migration of smoke upon its detection.

F. Provide a factory mounted disconnect and integral duplex GFI convenience outlet on all units larger than 25 tons.

2.8 FILTERS

A. Units shall have high-efficiency, 2-inch thick, low velocity throwaway filters in commercially available sizes. Filters shall be not less than 30%/30% average dust spot efficient when tested in accordance with ASHRAE Test Standard 52-76; Farr 30/30 or an approved equal.

2.9 AIRSIDE ECONOMIZER

A. An airside economizer shall be provided with each unit. The economizer shall be factory-assembled complete with dampers, electrical actuators, exhaust fans and all controls. The outside air dampers shall be low-leakage type.

B. The airside economizer shall provide "free" cooling whenever the outside air enthalpy is less than the set point of the outside air enthalpy sensor and cooling is required. The enthalpy sensor shall be adjustable for temperature and humidity setpoints.

C. If the cooling load is satisfied by the airside economizer alone, no mechanical refrigeration shall be initiated and the economizer dampers shall be modulated to maintain the desired discharge air temperature. The economizer shall modulate up to its full open position to meet the cooling load. When the economizer is at its maximum outside air position and further cooling is required, mechanical refrigeration shall be utilized. When the enthalpy of the outside air is above its setpoint and during normal heating cycles, the outside air damper shall be at its minimum outdoor air position.

D. Exhaust fans and staged, static-pressure controls shall be provided to prevent over-pressurization of the building during economizer mode; provide with powered exhaust fans.

E. The position of the return and outside air dampers shall also be controlled as specified elsewhere in response to unit and external controls.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The packaged rooftop units and associated controls shall be installed in strict accordance with the manufacturer's recommendations.

B. The control system shall be completely wired under this Division 23. Wiring shall be in

accordance with the N.E.C. and shall meet all requirements for this installation.

3.2 STARTUP

A. Provide the services of a factory trained and qualified service technician employed by the unit manufacturer who shall inspect the installation including external control interlock and electrical power connections; supervise leak testing, initial operation, calibration of operating and safety controls and supervise electrical testing including insulation resistance of motors and voltage balance between phases during starting and running.

B. This service technician shall forward a report in four (4) copies to the Owner when the unit is in safe and proper operating condition. This report shall include all pressure and control settings, meg readings, voltage readings per phase during start and run, and shall list minor discrepancies to be corrected that affect safe and reliable operation. One additional copy of the report shall be left in the unit control panel. One copy of bound installation, operation, maintenance service and parts brochures, including applicable serial numbers, full unit description and parts ordering sources, shall be placed in the unit control panel at the time of startup; four (4) additional copies shall be forwarded to the Owner.

END OF SECTION 237740