SECTION 23 74 13

PACKAGED OUTDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Packaged roof top unit.

B. Unit controls.

C. Remote panel.

D. Mounting curb and base.

E. Maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim.

B. Section 23 05 13 - Common motor requirements for HVAC Equipment.

C. Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

D. Section 23 40 00 - HVAC Air Cleaning Devices.

E. Section 23 09 13 - Instrumentation and Control Devices for HVAC: Control components, time clocks.

F. Section 23 09 13 - Instrumentation and Control Devices for HVAC: Installation of thermostats and other controls components.

G. Section 26 27 17 - Equipment Wiring: Installation and wiring of thermostats and other controls components; wiring from unit terminal strip to remote panel.

H. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. AHRI 210/240 - Standard for Performance Rating of Unitary Air Conditioning and Air-Source Heat Pump Equipment; Air-Conditioning, Heating, and Refrigeration Institute.

B. AHRI 270 - Sound Rating of Outdoor Unitary Equipment; Air-Conditioning, Heating, and Refrigeration Institute.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilation Systems; National Fire Protection Association.

1.04 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.

C. Shop Drawings: Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.

D. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.

E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Red Clay Consolidated School District's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

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

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

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.

1.07 WARRANTY

A. Provide a five year warranty to include coverage for refrigeration compressors and heat exchangers.

1.08 MAINTENANCE SERVICE

A. Furnish service and maintenance of packaged roof top units for one year from Date of Substantial Completion.

B. Provide maintenance service with a two month interval as maximum time period between calls. Provide 24-hour emergency service on breakdowns and malfunctions.

C. Include maintenance items as outlined in manufacturer's operating and maintenance data, including minimum of six filter replacements, minimum of one fan belt replacement, and controls check-out, adjustments, and recalibration.

D. Submit copy of service call work order or report, and include description of work performed.

1.09 EXTRA MATERIALS

A. Provide two sets of filters.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Modine Corporation

B. York/JCI

C. Trane Corporation

D. McQuay

E. Valent Incorporated

F. AAON Corporation.

2.02 AIR CONDITIONING UNITS

A. General: Roof or ground mounted packaged units having gas burner as scheduled and electric refrigeration.

B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, return fan, heat exchanger and burner,, energy recovery wheel (where noted in the schedule), factory-mounted controls, air filters, hot water heating coil, refrigerant cooling coil and variable-speed compressors and hot-gas reheat circuits, condenser coil and condenser fan as scheduled.

C. Disconnect Switch: Factory mount disconnect switch on equipment under provisions of Section 26 27 17.

2.03 FABRICATION

A. Cabinet: Galvanized steel with baked enamel finish, including access doors with piano hinges and locking handle. Structural members shall be minimum 18 gage, with access doors or panels of minimum 20 gage.

B. Insulation: two inch thick minimum glass fiber or injected foam, double-walled unit construction.

C. Supply and Return and Exhaust Fan as scheduled: Backward inclined or airfoil type, resiliently mounted with V-belt drive and adjustable variable pitch motor pulley, and rubber isolated hinge mounted high efficiency motor or direct drive as indicated. Isolate complete fan assembly. Provide factory-mounted variable-frequency drives for all fan motors.

D. Air Filters: Minimum efficiency reporting value (MERV) of at least 10.

E. Roof Mounting Curb: Custom side-discharge 40" high galvanized steel, channel frame with gaskets, nailer strips

2.04 BURNER

A. Gas Burner: Forced draft type burner with adjustable combustion air supply, pressure regulator, gas valves, manual shut-off, intermittent spark or glow coil ignition, flame sensing device, and automatic 100 percent shut-off pilot. Provide turndown ratio as indicated in the schedule. Provide condensing burners as indicated in schedule.

B. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after air flow proven and slight delay, allow gas valve to open.

C. High Limit Control: Temperature sensor with fixed stop at maximum permissible setting, de-energize burner on excessive bonnet temperature and energize burner when temperature drops to lower safe value.

D. Supply Fan Control: Temperature sensor sensing bonnet temperatures and independent of burner controls, with provisions for continuous fan operation.

2.05 EVAPORATOR OR INDOOR COILS

A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection for cooling coils.

B. Provide thermostatic expansion valves for units of 6 tons capacity and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons cooling capacity and larger.

2.06 COMPRESSOR

A. Provide hermetic compressors, 3600 rpm maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves and gage ports, and filter drier.

B. Five minute timed off circuit to delay compressor start.

C. Outdoor thermostat to energize compressor above 35 degrees F ambient.

D. Provide step capacity control by variable-speed scroll technology and/or adjusting variable-speed compressors.

E. Provide hot-gas reheat coil for humidity control.

2.07 CONDENSER OR OUTDOOR COIL

A. Provide copper tube aluminum or copper fin coil assembly with subcooling rows and coil guard.

B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor. Provide high efficiency fan motors.

C. Provide refrigerant pressure switches to cycle condenser fans.

2.08 MIXED AIR CASING

A. Dampers: Provide outside, return, and relief dampers with damper operator and control package to automatically vary outside air quantity. Outside air damper to fall to closed position.

B. Gaskets: Provide tight fitting dampers with edge gaskets.

C. Damper Operator, Units 7.5 Ton Cooling Capacity and Larger: 24 volt with gear train sealed in oil with spring return on.

D. Outdoor airflow monitoring station: Provided at intake of the unit.

E. Mixed Air Controls: Maintain selected supply air temperature and return dampers to minimum position on call for heating and above 70 degrees (F) ambient, or when ambient air enthalpy exceeds return air enthalpy.

2.09 OPERATING CONTROLS

A. Provide factory controller and all necessary sensors and components for operation of refrigerant system, fan VFDs based on static-pressure feedback, energy recovery wheel, humidity control function, and economizer function. The humidity control (dehumidification sequence) shall be capable of being enabled when the unit is in both heating and cooling modes. The humidistat setpoint shall govern control of this sequence.

B. Provide BACnet interface on unit for connection of operating controls for BAS control. Control shall allow for modulating heating via the gas-fired burner and modulating stages cooling, fan, and damper control. See section 23 09 93 for required data to be relayed to the BAS for monitoring and control.

C. Provide remote mounted fan control switch for smoke-purge for each unit (on-auto) to activate only the exhaust fan at each unit, keep the outdoor air damper closed, and de-engerize the energy wheel.

D. See Specification Section 230993 - Sequence Of Operations, paragraphs 3.08 and 3.11 for required operatiing capabilities of the units.

2.10 HEAT RECOVERY

A. The heat recovery module shall be provided as shown on the drawing and shall have a factory mounted and tested energy recovery wheel. The energy recovery wheel shall be mounted in a rigid frame containing the wheel drive motor, drive belt, wheel seats and bearings.

B. The energy recovery cassette shall be rated in accordance with ARI Standard 1060 and shall bear the ARI certification symbol.

C. The energy recovery cassette shall contain a total energy heat wheel constructed of a light weight polymer material with permanently bonded desiccant coating. The energy recovery wheel media shall be capable of removal from the cassette and be cleanable using hot water or light detergent without degrading the latent efficiency.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.or illustrated by the manufacturer.

B. Verify that proper power supply is available.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NFPA 90A.

C. Mount units on factory built roof mounting curb providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.

D. Locate remote panels where identified in field coordination meeting.

E. Tie unit into BAS as specified.

3.03 SYSTEM STARTUP

A. Prepare and start equipment. Adjust for proper operation.

3.04 CLOSEOUT ACTIVITIES

A. Demonstrate operation to Owner's maintenance personnel.

3.05 MAINTENANCE

A. Provide service and maintenance of packaged roof top units for one year year from Date of Substantial Completion.

B. Provide routine maintenance service with a three month interval as maximum time period between calls.

C. Include maintenance items as outlined in manufacturer's operating and maintenance data, including minimum of six filter replacements, minimum of one fan belt replacement, and controls check-out, adjustments, and recalibration.

D. After each service call, submit copy of service call work order or report that includes

description of work performed.

END OF SECTION