Section 15622

Hot Water Coil Air Turnover, Space Heating System

Part 1: GENERAL

1.1 Section Includes:

- A. Hot Water Heated Units
- B. Controls
- C. Equipment Schedule

1.2 Related Sections:

- A. Section 01655: Starting up mechanical systems
- B. Section 15070: Pipe and pipe fittings
- C. Section 15100: Valves
- D. Section 15120: Piping Specialties
- E. Section 15400: Plumbing System
- F. Section 15990: Testing, adjusting and balancing
- G. Section 16050: Basic electrical materials and methods

1.3 References:

- A. American National Standards Institute (ANSI): Establishes requirements applicable to certifying direct gas-fired heaters.
- B. **ETL (Intertek) Testing Laboratories**: Independent testing facility certifies standards conformance.
- C. American Conference of Governmental Hygienists (ACGIH): Establishes air quality standards.
- D. Environmental Protection Agency (EPA): Enforces outdoor air quality standards.
- E. Occupational Safety & Health Administration (OSHA): Enforces air quality standards and safety in the work place.
- F. National Electric Code (NEC): Establishes electrical standards.
- G. Underwriters Laboratory (UL): Independent testing facility certifies component conformance to appropriate standards.
- H. National Fire Protection Agency (NFPA): Establishes fire prevention standards.

- I. Factory Mutual Global (FMG): Certifies gas manifold to owners insurance carrier.
- J. Industrial Risk Insurance (IRI): Certifies gas manifold to owners insurance carrier.
- K. Sheet Metal & Air Conditioning Contractors National Association (SMACNA): Covers sheet metal fabrication and insulation standards.

1.4 Quality Assurance:

Manufacturer shall:

- A. Furnish proof, satisfactory to the owner (or its representative), of having manufactured temperature modulating direct gas-fired space heating systems for a minimum of 10 years.
- B. Make its facility available to owner or his representative for quality control audit without prior notification.

1.5 Submittals:

- A. Manufacturer shall submit product data, including dimensions, duct & service connections, accessories, controls with schematics and sequence of operation, electrical nameplate data, wiring diagrams, fan curves and burner & filter data.
- B. Manufacturer shall furnish rigging, assembly, and installation instructions.
- C. Manufacturer shall furnish Operation & Maintenance Manuals, including descriptive literature, operation instructions, maintenance and repair data, and parts listing.

2.1 Acceptable Manufacturer's:

AbsolutAire, Inc. (Kalamazoo, MI) Phone: (800) 804-4000

2.2 Hot Water Coil Heated Air Turnover Units: Manufacturer shall:

- A. Provide a hot water heated indoor, upright recirculating constant volume with variable OA/RA feature for building pressurization and ventilation economizer.
- B. Provide self-contained packaged heaters that shall include the casing, copper and aluminum water coil, non-overloading fan, fan motor & drives, mixing chamber; positive position variable outdoor air/return-air dampers and automatic controls for temperature and economizer
- C. Provide a casing, which shall be a minimum 18-gauge, aluminized steel, welded to structural steel framing. Both interior and exterior structural steel shall be red or gray

oxide primed. All exterior casing seams shall be weather resistant. All interior and exterior surfaces will be cleaned of all oil and grease. Painted exterior will consist of a high-quality prime coat and a finish coat of machine enamel with rust inhibitors. Color is selected by the owner and custom matched by the equipment manufacturer. All interior surfaces will be lined with 1-inch thick, 1-1/2 pound density, coated fiberglass when specified. The insulation shall comply with UL standard 181 for erosion and NFPA 90A for fire resistance. All exposed edges will be coated to eliminate erosion. Fiberglass will be held in place with both adhesive and welded pins, per SMACNA standards. Provide a minimum of (2) hinged access doors with positive latching, watertight handles. All access doors shall be painted on the interior as well as the exterior, and hinged access doors shall include braces that lock in the open position during servicing.

- D. Provide a hot water coil constructed of 0.020" thick copper tubes and 0.0060" thick aluminum fins and a galvanized case. The coil shall have male NPT threaded Schedule 40 pipe connections for both the supply and return stubbed to the exterior of the air handlers housing. Hot water control valve include and installed by others.
- E. Provide outdoor air velocity across the coil, which shall be constant and between 500 and 800 FPM through the burner profile. The coil velocity shall be constant at all times throughout the operation of the heater.
- F. Supply fan shall be a double-width, double-inlet, centrifugal design, belt driven for the required air capacity. The motor shall be 1750 rpm, standard NEMA frame, Totally Enclosed Fan Cooled (TEFC) Premium Efficient mounted on an adjustable pivot base. The motor shall have a 1.15 service factor, suitable for continuous service at 120° F ambient temperature, and shall be wired for the specified voltage. The fan, motor, and drive shall be factory tested to ensure the specified air delivery (per ANSI standards) at the design total static pressure. The fan shaft shall be connected to the motor by a V-belt drive, capacity designed for 30% over the motor nameplate horsepower. The fan shaft shall be a turned, ground and polished solid shaft. A protective coating shall be applied to the shaft to minimize oxidation. Fan shall have ball bearings, and shall be designed for a minimum L10 life of 100,000 hours.

G. Controls:

a. **Main Control Panel:** shall meet NEMA 1, 2, 3, 3R ,3S, 4, 5 & 12 requirements and contain all standard electrical components, such as non-fused disconnect switch; motor starter; 120-volt and 24-volt transformers; control circuit fuses; flame control relay and a number-coded terminal strip. The complete control and safety system shall be factory tested before shipment and evidence of the factory start up provided with the O&M manual.

b. Space Temperature Control:

LX1 DDC temperature control system with a Niagara AX framework based programmable logic controller with sufficient I/O capabilities to allow for

complete control of the unit located inside the control panel, shall have a sensing thermistor located in the space as shown on the plans. The thermistor senses and controls the room temperature in the occupied mode. A second thermistor, mounted in the heater supply air, controls the allowable maximum and minimum discharge temperature in response to the actual discharge temperature being sensed. Temperature set point control for adjusting the space temperature is accomplished via BACnet Control interface.

c. Automatic Building Pressure Control:

The heater shall incorporate a separate outdoor-air / return-air mixing chamber, containing two (2) sets of 16-gauge galvanized multi-blade dampers, interlinked to work opposite each other. Each damper shall control the total heater fan volume. This damper control shall be through unit DDC control to economize ventilation and maintain building pressure. An automatic pressure control, linked to the outdoor-air/return-air dampers, is used to sense the room pressure. The pressure sensing range shall be 0.01 to 0.20 with a null span of 0.02 to 0.03 inches water column.

- d. **Remote Control Panel:** shall meet NEMA 1, 2, 5 requirements and shall and include all required operator interface via BACnet DDC control interface.
- e. Low-Temperature Freeze Stat: turns the fan motor off when cold air is being discharged from the heater. The minimum discharge temperature may be selected from 32°F to 70°F (factory set at 40°F).
- f. **High-Temperature Limit Switch:** turns the burner off when the discharge air temperature exceeds 130°F (field adjustable). The switch must then be manually reset at the heater.