Electric Coil [Make-Up Air / Displacement Ventilation / Space Heating] System

Note: Optional items and/or items requiring a choice, are shown between brackets and/or parentheses with selections separated by a forward slash, i.e.[a / b / c].

Part 1: GENERAL

1.1 Section Includes:

A. Electric Coil Heaters
B. Controls
C. Equipment Schedule

1.2 Related Sections:

A. Section 01655: Starting up mechanical systems
B. Section 15990: Testing, adjusting and balancing
C. Section 16050: Basic electrical materials and methods

1.3 References:

A. **ETL Testing Laboratories**: Independent testing facility certifies standards conformance.

B. **American Conference of Governmental Hygienists (ACGIH)**: Establishes air quality standards.

C. **Environmental Protection Agency (EPA)**: Enforces outdoor air quality standards.

D. **Occupational Safety & Health Administration (OSHA)**: Enforces air quality standards and safety in the work place.

E. **National Electric Code (NEC)**: Establishes electrical standards.

F. **Underwriters Laboratory (UL)**: Independent testing facility certifies component conformance to appropriate standards.

G. **National Fire Protection Agency (NFPA)**: Establishes fire prevention standards.

H. **Sheet Metal & Air Conditioning Contractors National Association (SMACNA)**: Covers sheet metal fabrication and insulation standards.

1.4 Quality Assurance:

Manufacturer shall:

A. Provide an electric heating coil manufactured in conformance to UL standards.

B. Provide electric coil heating equipment that does not exceed contaminant threshold limits for safe environment, as established by the ACGIH.

C. Furnish proof, satisfactory to the owner (or its representative), of having manufactured temperature modulating electric coil heating systems for a minimum of 10 years.

D. 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, electric coil, and 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) (800) 804-4000

2.2 Electric Coil Heaters:

Manufacturer shall:

A. Provide an electric coil [Rooftop / Horizontal / Suspended] heater with 100% O.A. [constant volume / variable volume / 2-speed] capability.

B. Provide self-contained packaged heaters that shall include the casing, electric coil, DWDI Forward Curve fan, fan motor and drives, and temperature controls.

   a. **Casing:** shall be a minimum 0.050 grade 5052 or 3003 aluminum [18 gauge aluminized / galvanized] sheet attached to a 1"x1" grade 6063 aluminum extruded tubular [cold rolled steel] structural framework. All exterior casing seams shall be 100% weather-tight. All interior and exterior surfaces will be cleaned of all oil and grease. [Option: painted exterior will consist of a high-quality catalyzed primer coat and a finish coat of machine enamel with rust inhibitors. Color selected by owner.]

b. **Insulation:** all interior surfaces will be lined with 1 inch thick, 1-1/2 pound density foil-face fiberglass insulation. The insulation shall comply with UL standard 181 for erosion and NFPA 90A for fire resistance and will be held in place with adhesive.

c. **Access door panels:** will be fully gasketed positive latching lift out type with rustproof handles and hardware. Foil face insulation will be adhered to the interior of the door panel(s).

C. **Filters:** provide disposable 1-1/2" dust-lok polyester media filters with wire reinforced internal frames (2" aluminum washable filters) accessible at the unit inlet hood (a side access v-bank filter section). [Provide a clogged filter warning (light / alarm / photohelic gauge) at the main (remote) control panel].

D. **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, [Open Drip Proof (ODP) / Totally Enclosed Fan Cooled (TEFC) / EPACT compliant / 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.

E. **Controls:**

a. **Main Control Panel:** shall be similar to NEMA 3R and contain all standard electrical components, such as [non] fused disconnect switch; motor starter; 120-volt and 24-volt transformers; control circuit fuses; and a number-coded terminal strip.

b. Temperature Controls:

i. Discharge Temperature Control:

A solid state temperature control system, located inside the control panel includes a sensing thermistor located in the supply fan discharge opening. The thermistor senses and controls discharge temperature. The temperature control for adjusting the discharge air temperature is located at [the main unit] [the remote panel].

ii. **Space Temperature Control:**

A solid-state temperature control system, 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 discharge, controls the allowable maximum and minimum discharge temperature in response to the actual discharge temperature being sensed.

c. **Remote Control Panel:** shall be provided and includes a summer-off-winter (vent-off-heat) switch, a fan on indicator light, and a heat on indicator light. The unit serial number and customer tag number will be on the panel face. The following optional items are included which are specific to this application and specification:

i. Discharge temperature control dial
ii. Space temperature dial
iii. Mechanical [elec. programmable with battery back up] 7-day time clock
iv. Low temperature alarm light (optional)
v. Dirty filter light (optional)

d. **High-Temperature Limit Switch:** turns the heat off when the discharge air temperature exceeds 130°F. The switch must then be manually reset at the heater.

2.3 Accessories (select each optional accessory needed):

Manufacturer shall (provide the following accessories):

A. **Low-Temperature Limit Switch:** turns the fan motor off when cold air is being discharged from the heater. The minimum discharge temperature may be selected from 0°F to 70°F. An integral timer shall by-pass this switch for five (5) minutes on initial start-up.

B. **Filter Inlet Hood:** (reference paragraph 2.2b). This option includes a clam-shell style filter rack accessible from the inlet hood face. Filters are a disposable 1-1/2" polyester media filter with and internal galvanized frame [2" aluminum mesh washable filter]. The hood is knock down in (4) pieces for field assembly. [Provide a clogged filter warning (light / alarm / photohelic gauge) at the main (remote) control panel].

C. **Inlet Hood with Bird Screen:** manufactured using the same gauge and metal type as the base unit and includes ½" x ½" galv. bird screen.

D. **Side Access Filter Section**: manufactured using the same gauge and metal type as the base unit and is field attached at the unit inlet (entering air) end. [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.] Filters are to be [{1" / 2"} aluminum mesh washable / 2" 30% pleated/disposable / 1-1/2" polyester media filter with and internal galvanized frame]. [Provide a clogged filter warning (light / alarm / photohelic gauge) at the main (remote) control panel]. Filters are UL Class 2.

E. **Variable Frequency Drive:** variable volume 100% OA models include an automatic building pressure control and a variable frequency drive (VFD) for supply fan speed control. Includes a building pressure differential switch to signal the VFD to vary fan speed as needed in response to the building negative or positive conditions. This diaphragm [photohelic] switch is mounted in the heater main control panel. The pressure sensing range shall be 0.01 to 0.20" W.C. with a null span of 0.01" to 0.03" W.C.

F. **Roof Curb:** provide a [full-perimeter curb / duct supply-air curb], 20" high [flat, pitched] curb, formed of heavy-gauge galvanized or aluminized steel. Installer shall shim the curb so that it is level. [Manufacturer to provide {1" foil face fiberglass} {1" therma-fiber} insulation on curb interior, glued and pinned as required.] [Manufacturer to provide 1" wood-nailer and cant strip.]

G. **Motorized [Inlet / Discharge] Damper:** a parallel blade [low leak] [spring return] damper is provided in a flange assembly shipped loose for field installation by others. Includes a 24-volt direct coupled actuator with a pre-wired cable.

H. **Gravity [Inlet / Discharge] Damper:** a parallel blade damper is provided in a flange assembly which is shipped loose for field installation by others. Damper blades are constructed of fabricated aluminum and have adjustable weights for balancing.

I. **Vibration Isolators**: shall consist of a steel housing and an isolation element, molded entirely of a colored oil-resistant neoprene stock for easy identification of capacity. The hangers shall have a deflection of 1/4" or less and will be supplied by the heater manufacturer.

J. **Discharge Diffuser:** shall be provided and will include horizontal [and vertical] blades. The diffuser will be constructed such that it discharges supply air in 3 [4] directions and will be constructed of a minimum of 16-gauge aluminized steel. The directional blades will be 14-gauge aluminized steel and will be field adjustable and are able to be locked into place. [4-way discharge heads shall be provided with insulation (1"-1-1/2#) installed on the interior floor area for noise reduction].