SECTION 235417 - HEATING COILS: ELECTRIC DUCT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

1.2 SCOPE

A. Provide factory assembled and prewired electric duct heaters where indicated. Heater capacities, sizes and operating characteristics shall be as scheduled on drawings or as indicated in other sections.

1.3 RELATION TO OTHER WORK

A. Refer to the section, "General Mechanical Provisions", for related requirements. Refer to other sections of Division 23 and to all other applicable portions of the Drawings and Specifications.

1.4 SHOP DRAWINGS

A. Refer to requirements of Section entitled "General Mechanical Provisions". Include complete data on heater sizes; required clearances; direction of air flow; control box construction and dimensions; power and control wiring (both factory and field); operating and safety controls; and capacities and operating characteristics.

1.5 MANUFACTURERS

A. Equipment items listed in the schedule on the drawings are based on a specific manufacturer to establish the desired style, quality, performance, and type of equipment. Equal products, complying with the required installation shown on the plans and with these specifications, by the following manufacturers are acceptable:

1. Brasch
2. Tennessee Plastics
3. Indeeco
4. Electric Heaters Division of I.T.E.
5. Valley Industries
6. Dell

PART 2 - PRODUCTS

2.1 GENERAL

A. Each heater shall be UL listed for zero clearance, open coil slip-in type for duct mounting. Sizes, direction of air flow, mounting position, electrical characteristics, and heating capacities shall be as indicated.

1. Meet all applicable requirements of current NEC.
2. UL listed including all built-in components.
3. Be entirely suitable for installation in the indicated locations (ductwork or air handling unit(s) as applicable).
4. Coordinated with the specified requirements of the mechanical system control system.

2.2 MATERIALS AND CONSTRUCTION

A. Galvanized or aluminized steel frame and terminal box with hinged cover.

B. Maximum watt density of 35 watts per square inch of resistance wire surface area (unless otherwise specified).

C. Terminals recessed into air stream 1-1/4 inches minimum.

D. Stainless steel resistance coil terminals and nuts.

E. Iron free resistance wire of 80% nickel and 20% chromium.

F. Reinforced resistance wire bracket supports spaced no greater than four inches apart with stiffening ribs and gussets.

G. Securely positioned terminal insulators and bracket bushings of high quality ceramic.

H. Dielectrically tested for 1000 volts plus twice the rated voltage of 2000 volts, whichever is greater.

I. Heat limiter in each energized heating element power line.

J. Balanced three phase delta connected load if three phase heaters are specified.

K. Insulated terminal box to prevent condensation.

L. Full fine break mercury contactors which will break all ungrounded conductors (note horizontal, vertical or oblique position of each heater assembly as shown on drawings).

M. Transformer with primary fusing if control voltage is different from supply voltage.

N. Overcurrent protection consisting of automatic circuit breaker(s) each installed in accord with NEC requirements.

O. Manual reset thermal cutout in series with a disc type, automatic reset thermal cutout for primary protection, and heat limiters in the heating element power lines to de-energize the elements if the primary cutout fails. Devices shall be serviceable through the terminal box without having to remove heater from duct.

P. Control terminals and power terminals.

Q. Pneumatic-electric switches (one per heater step) when control signal is pneumatic.

R. Built-in or remote pressure type air flow switch. Install in series with automatic reset thermal cutout.

S. Factory mounted integral disconnect switch.

PART 3 - EXECUTION

3.1 GENERAL

A. Arrange and install heater to provide uniform heating of air stream.

B. Properly and firmly support in each location.

3.2 PLACEMENT

A. Heater locations shall be essentially as shown on drawings; however, actual placement shall be verified using field measurements and data relating to the equipment actually approved for installation on this project. Heaters and all controls shall be arranged for horizontal or vertical, top, side or bottom mounting as indicated on drawings. Heater installation shall conform to all governing codes as to clearances, disconnect means, wiring, and like items.

B. Support: Provide duct hangers, and specified in section entitled "Ductwork", immediately adjacent to both sides of heater at both sides of the duct.

C. Duct Openings: Shall be accurately cut, properly reinforced, and gasketed as required for an air tight installation. Insulation shall be finished up to the control box in such a manner as not to compromise service access to heater and provide a proper vapor seal at the edge of the insulation.

3.3 CONTROL COORDINATION

A. Coordinate and provide all items necessary for each heater to operate in accord with the control system sequences and methodology described in other sections of this division.

3.4 TEST AND BALANCE

A. All heater performance shall be certified by test and balance procedures as specified in section covering testing and balancing.

3.5 CLEANING AND PROTECTION

A. Contractor shall protect the heaters from damage from the time of their receipt until final acceptance and shall thoroughly clean the complete heater (including interior of control box) of all dirt and construction debris prior to requesting final inspection. Control box, access door, elements, control and like items which become damaged during the course of

construction shall be required to "as new" condition or shall be replaced with new material or equipment components.

3.6 WIRING DIAGRAMS

A. Provide complete wiring diagram furnished by the heating coil system manufacturer to the mechanical systems control manufacturer and the electrical contractor. This wiring diagram shall completely indicate in full detail all electrical and control wiring requirements, terminals, etc., necessary to allow the control manufacturer and electrical contractor to completely coordinate their respective wiring portions of the heating coil system installation.

END OF SECTION 235417