SECTION 22 05 33 - HEAT TRACING FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide electric heat tracing in accordance with the Contract Documents.

1.2 WORK INCLUDED

A. Electric heat tracing to prevent pipes from freezing.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each type of product indicated.
   1. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.

B. Shop Drawings: For electric heating cable. Include plans, sections, details, and attachments to other work.
   1. Wiring Diagrams: Power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For electric heating cables to include in operation and maintenance manuals.

E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

A. Furnish and Install a complete UL Listed, system of heating cables, components, and controls to prevent pipes from freezing**.**

B. Provide a complete system from a single manufacturer. The system shall be complete with all required cable, splice kits, tape, thermostat, power distribution/control panel with GFI protection, end seal kits, etc., as required for a complete installation.

C. Unless indicated otherwise on the drawings, the contractor is required to design the heat tracing cable lengths, circuit start point and end points, as appropriate for the circuit limitations and provide the correct number of circuits and properly sized control panel for the intended application.

D. The installation shall comply with the manufacturer's instructions.

E. Component enclosures shall be rated NEMA 4X to prevent water ingress and corrosion. Installation shall not require the installing contractor to cut into the heating-cable core to expose the bus wires. Connection systems that require the installing contractor to strip the bus wires or that us crimps or terminal blocks, shall not be acceptable. All components that make an electrical connection shall be re-enterable for servicing. No component shall use silicone to seal the electrical connections. An exception will be made in areas where a conduit transition is required.

2.2 HEAT TRACING CABLE

A. The self-regulating heating cable shall consist of two (2) 16 AWG nickel-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature all along its length, allowing the heating cable to be cut to length in the field. The heating cable shall be covered by a radiation-crosslinked, modified polyolefin dielectric jacket. To provide a ground path and to enhance the heating cable’s ruggedness, the heating cable shall have a braid of tinned copper and an outer jacket of fluoropolymer, as required per section 427-23 of the NEC-1996.

B. In order to conserve energy and to prevent overheating, the heating cable shall have a self-regulating factor of at least 90 percent. The self-regulation factor is defined as the percentage reduction, without thermostatic control, of the heating cable output going from 40°F pipe temperature operation to 150°F pipe temperature operation.

C. The heating cable shall operate on line voltages of **208** volts without the use of transformers.

D. The heating cable for freeze protection shall be sized 8 watts per foot at 50°F. Piping 8"and larger shall have 2 strips of heat trace cable per foot.

E. Power connection, end seal, splice, and tee kit components shall be applied in the field.

F. Heating cable circuit shall be protected by a ground-fault device for equipment protection.

G. The heating cable shall be similar to XL-Trace cable as manufactured by Raychem Corporation.

2.3 LABELING

A. Warning Tape: Continuously printed "Electrical Tracing"; vinyl, at least 3 mils thick, and with pressure-sensitive, permanent, waterproof, self-adhesive back.
   1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
   2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.4 ELECTRONIC THERMOSTAT

A. Each heater cable shall be individually controlled by a pipe sensing electronic thermostat with stainless steel temperature sensing lead to the required length of installation. The electronic thermostat shall be similar to nVent EC-TS as manufactured by Raychem Corporation.

B. The electronic thermostat shall be provided with a temperature set point with LED indicators for alarm, power and heating cable status.

C. The electronic thermostat shall be NEMA 4X, UL approved. The panel shall operate off of the heater cable power supply, at that voltage.

D. Provide with pipe support bracket.

2.5 ACCEPTABLE MANUFACTURERS

A. Raychem Corporation

B. Nelson

C. Thermon

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and substrates to receive electric heating cables for compliance with requirements for installation tolerances and other conditions affecting performance.
   1. Ensure surfaces and pipes in contact with electric heating cables are free of burrs and sharp protrusions.
   2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install electric heating cable across expansion, construction, and control joints according to manufacturer's written recommendations using cable protection conduit and slack cable to allow movement without damage to cable.

B. Install electric heating cables after piping has been tested and before insulation is installed.

C. Install electric heating cables according to IEEE 515.1.

D. Install insulation over piping with electric cables according to Division 22 Section "Plumbing Insulation."

E. Install warning tape on piping insulation where piping is equipped with electric heating cables.

F. Set field-adjustable switches and circuit-breaker trip ranges.

G. Protect installed heating cables, including non-heating leads, from damage.

3.3 FIELD QUALITY CONTROL

A. Testing: Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.
   1. Test cables for electrical continuity and insulation integrity according to manufacturer's instructions before energizing.
   2. Test cables to verify rating and power input. Energize and measure voltage and current simultaneously.

B. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipe-mounting cables.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 BURIED PIPING

A. Buried splices or terminations will not be permitted. All splices or terminations in buried piping shall be extended above grade for access. Additional cable length required to accommodate the above grade splices shall be included.

3.5 TEMPERATURE SENSORS (RTD)

A. Install temperature sensors at worst case locations.

END OF SECTION