

## **SECTION 220533 - HEAT TRACING FOR PLUMBING PIPING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

A. Section includes plumbing piping heat tracing for freeze prevention.

B. Self-regulating, parallel resistance.

C. Related Requirements:

1. Section 230533 "Heat Tracing for HVAC Piping."

#### **1.3 ACTION SUBMITTALS**

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, and furnished specialties and accessories.

2. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.

#### **1.4 INFORMATIONAL SUBMITTALS**

A. Field quality-control reports.

B. Sample Warranty: For special warranty.

#### **1.5 CLOSEOUT SUBMITTALS**

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

#### **1.6 WARRANTY**

A. Special Warranty: Manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.

B. Warranty Period: Five years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 SELF-REGULATING HEATING CABLES**

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Thermon Americas Inc. (Basis-of-Design)
2. Nelson
3. or equal

B. Comply with IEEE 515.1.

C. Heating Element: Pair of parallel 16 AWG, nickel-plated copper bus wires embedded in crosslinked conductive polymer core, varying heat output in response to temperature along its length. Cable shall be capable of crossing over itself once without overheating.

D. Cable Cover: Polyolefin outer jacket.

E. Maximum Operating Temperature (Power On): 150 deg F.

F. Maximum Exposure Temperature (Power Off): 185 deg F.

G. Electrical Components shall be listed and labeled per NFPA 70.

H. Capacities and Characteristics:

1. Maximum Heat Output: 3 W/ft, 5 W/ft, 8 W/ft as required per manufacturer's design guide.

2. Piping Diameter: Size as indicated on drawings.

3. Number of Parallel Cables: As required per manufacturer's design guide.

4. Use 208-277V when possible.

5. Volts: [120] [208] [240] [277] <Insert value>.

6. Phase: 1.

7. Hertz: 60.

### **2.2 CONTROLS**

A. Local Digital Thermostat with GFEP and Alarm, Frio model S1, or equal:

1. User-settable set point and deadband preset to activate heat trace below 38F ambient.
2. Two-pole contactor switches up to 30 AMP heater loads at 120-277VAC.
3. Integral 30mA-300mA adjustable GFEP with UL 1053 Certification.
4. Enclosure shall be corrosion-resistant polycarbonate and NEMA 4X rated.
5. Normally-closed dry-contact alarm relay. The system shall alarm for power loss, ground fault condition, GFEP function test failure, and sensor loss.
6. User settable alarms for high/low temperature and high/low current.
7. [OPTIONAL] Local communications to include Modbus RS-485 with option for BACnet IP or BACnet MSTP connection. Monitoring points to include:
  - a. Voltage.
  - b. Current.
  - c. Alarm Status.
  - d. Alarm Type.
  - e. Heater Status.
  - f. Heater Override.
8. [OPTIONAL] Control panel shall include self-check capabilities verified by automatically generated PDF report (Frio Spot Check) including voltage, current, ground fault data, and sensor readings. Report must be verified during commissioning prior to hand-off.

## **2.3 ACCESSORIES**

- A. Cable Installation Accessories: Fiberglass tape, cable ties, silicone end seals, splice kits, and installation clips furnished by manufacturer.
- B. Warning Labels: Installed at 10'-20' intervals or as required by local code per NEC.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine surfaces and substrates for compliance with installation requirements.

- B. Ensure pipes are free of burrs and sharp protrusions.
- C. Proceed only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Division 26 responsible for power wiring and terminations.
- B. Division 22 responsible for control wiring and conduit as required.
- C. Install heating cable per manufacturer instructions and IEEE 515.1.
- D. Install insulation per applicable plumbing insulation section.
- E. Install warning tape on insulated piping.
- F. Set field-adjustable switches and breaker trip ranges by Division 26.

### **3.3 CONNECTIONS**

- A. Ground equipment per Section 260526.
- B. Connect wiring per Section 260519.

### **3.4 FIELD QUALITY CONTROL**

- A. Engage factory-authorized representative for testing and inspection.
- B. Test for continuity and insulation resistance before and after insulation.
- C. Verify voltage and current during energization.
- D. Provide automatically generated system verification report (Frio Spot Check) prior to hand-off.

### **3.5 PROTECTION**

- A. Protect installed heating cables from construction damage.
- B. Remove and replace damaged cables.

**END OF SECTION 220533**