

**SECTION 23 0533**  
**HEAT TRACING FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Plastic insulated series resistance electric heating cable.
- B. Self-regulating parallel resistance electric heating cable.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 0553 - Identification for HVAC Piping and Equipment.
- B. Section 23 0719 - HVAC Piping Insulation.
- C. Section 23 0913 - Instrumentation and Control Devices for HVAC.
- D. Section 23 0923 - Direct-Digital Control System for HVAC.
- E. Section 23 0993 - Sequence of Operations for HVAC Controls.
- F. Section 23 2113 - Hydronic Piping.
- G. Section 23 2114 - Hydronic Specialties.
- H. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- I. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- J. Section 26 0534 - CONDUIT.
- K. Section 26 0537 - Boxes.
- L. Section 26 2717 - Equipment Wiring.

**1.03 REFERENCE STANDARDS**

- A. IEEE 515.1 - IEEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Commercial Applications; 2012.
- B. ITS (DIR) - Directory of Listed Products; current edition.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL (DIR) - Online Certifications Directory; current listings at [database.ul.com](http://database.ul.com).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.
- B. Coordinate the work with other trades to provide ground fault protection for electric heat tracing circuits as required by NFPA 70.
- C. Coordinate the work with other trades to provide circuit breaker ratings suitable for installed circuit lengths.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for electric heat tracing.
- C. Manufacturer's Installation Instructions: Indicate installation instructions and recommendations.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions of equipment and controls, maintenance and repair data, and parts listings.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- F. Project Record Documents: Record actual locations of electric heat tracing lines and thermostats.

## **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

## **1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide two year manufacturer warranty for cables, connection kits, accessories, and controls.

## **PART 2 PRODUCTS**

### **2.01 PLASTIC INSULATED SERIES RESISTANCE ELECTRIC HEATING CABLE**

- A. Manufacturers:
  - 1. Emerson Industrial Automation; \_\_\_\_\_: [www.emersonindustrialautomation.com](http://www.emersonindustrialautomation.com).
  - 2. Pentair; \_\_\_\_\_: [www.pentairthermal.com](http://www.pentairthermal.com).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Provide products listed, classified, and labeled by UL (DIR), ITS (DIR), or testing firm acceptable to authorities having jurisdiction (AHJ).
- C. Factory Rating and Testing: Comply with IEEE 515.
- D. Heating Element:
  - 1. Resistor Wire: Provide single, dual stranded, or \_\_\_\_\_.
  - 2. Terminations: Waterproof, factory assembled, non-heating leads with connectors at both ends.
- E. Insulated Jacket: Minimum 4.0 mil polyimide film with silicon jacket or fluoropolymer resin.
- F. Cable Cover: Provide aluminum braid and silicon, thermoplastic fluoropolymer, or \_\_\_\_\_ outer jacket.
- G. Maximum Operating Temperature: 300 degrees F.
- H. Electrical Characteristics:

### **2.02 OUTER JACKET MARKINGS**

- A. Name of manufacturer, trademark, or other recognized symbol of identification.
- B. Catalog number, reference number, or model.
- C. Month and year of manufacture, date coding, applicable serial number, or equivalent.
- D. Agency listing or approval.
- E. Applicable environmental or area use requirements, such as NEMA 4, Type 4, IP ratings, and hazardous (classified) location markings including temperature rating.
- F. Any applicable warning/caution statements such as "WARNING: De-energize circuit before removing cover.

### **2.03 CONNECTION KITS**

- A. Name of manufacturer, trademark, or other recognized symbol of identification.
- B. Provide power connection, splice/tee, and end seal kits compatible with the heating cable and without requiring cutting of the cable core to expose bus wires.
- C. Furnish with NEMA 4X rating for prevention of corrosion and water ingress.
- D. Provide UV stabilized components.

## **2.04 ACCESSORIES**

- A. Provide Accessories As Indicated or As Required for Complete Installation, Including but Not Limited To:
  - 1. High temperature, glass filament tape for attachment of heating cable to metal piping.
  - 2. Aluminum self-adhesive tape for attachment of heating cable to plastic piping.
  - 3. Silicone end seals and splice kits.
  - 4. Installation clips.
  - 5. Warning labels for attachment to exterior of piping insulation. Refer to Section 23 0553.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that piping and equipment are ready to receive work.
- B. Verify field measurements are as shown on shop drawings.
- C. Verify required power is available, in proper location, and ready for use.

### **3.02 PREPARATION**

- A. Clean all surfaces prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's recommendations.
- B. Comply with installation requirements of IEEE 515.1 and NFPA 70, Article 427.
- C. Apply heating cable linearly on pipe with fiberglass tape only after piping has successfully completed any required pressure testing.
- D. Comply with all national and local code requirements.
- E. Identification:
  - 1. After thermal insulation installation, apply external pipeline decals to indicate presence of the thermal insulation cladding at intervals not to exceed 20 ft including cladding over each valve or other equipment that may require maintenance.

### **3.04 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION 23 0533**

