

## SECTION 260520 - RADIANT-HEATING ELECTRIC CABLES

### PART 1 - GENERAL

#### 1.1 SECTIONS INCLUDES

- A. Electric heating mat and cable for floor radiant heating. This pertains to the following electric heating mat and cable: Plastic, insulated series resistance.
- B. Controls
- C. Electric radiant floor heating installation materials.

#### 1.2 RELATED SECTIONS

- A. Section 15770 "Floor Heating and Snow Melting Equipment"
- B. Section 15773 "Electric Heating Cables, Mats, Modules, Panels and Controls"
- C. Section 16855 "Heating Cables (Electrical)"
- D. Section 238313 "Radiant Heating Electric Cables/Mats"
- E. Section 260520 "Heating Cables"
- F. Section 260523 "Electric Cables"
- G. Section 260620.16 "Electrical"
- H. Section 260620.23 "Electrical"
- I. Section 262200 "Low Voltage"
- J. Section 268313 "Radiant Heating Electric Cables"
- K. Section 268313 "Radiant Heating Electric Mats"

#### 1.3 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.
- B. Shop Drawings: For electric heating cable.
  - 1. Include scaled plans, sections, details, and attachments to other work.
  - 2. Include diagrams for power, signal, and control wiring.
  - 3. Include electrical panel schedules for load centers.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For electric heating cable/mat to include in operation and maintenance manuals.

## 1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.
  - 1. Warranty Period ComfortTile: 25 years from the date of Substantial Completion, provided that resistance readings are taken before, during, and after installation, and sent to Manufacturer.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS FOR ELECTRIC HEATING CABLE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

### 2.2 PLASTIC-INSULATED, SERIES-RESISTANCE HEATING CABLE - TILE HEATING CABLES/MATS FLOOR HEATING CABLE AND MAT

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Warmzone; ComfortTile, Floor Heating Cable or Mat by:

Warmzone  
12637 S. 265 W., Suite 100, Draper, UT 84020  
Phone: 888-488-9276 / Fax: 801-948-7599  
Web: [www.warmzone.com](http://www.warmzone.com)

- B. Comply with UL 1673, CSA, and CSA/US standards
- C. Heating Element: Dual conductor resistive wire. Terminate with waterproof, factory-assembled splice to a 10 ft (3 m) cord (nonheating lead "cold-lead").
- D. Maximum Operating Power on Operating Temperature: **212 deg F (100 deg C)**.
- E. Capabilities and Characteristics:
  - 1. Cable Construction: Series heating cable (mat), 2-conductor.
  - 2. Cable Diameter: **1/8 to 1/6 inch (3.2 - 4.2 mm)** flexible round cable.
  - 3. Cable Conductor: Copper.
  - 4. Cable Conductor Insulation: Fluoropolymer.
  - 5. Cable Outer Jacket: High Temp PVC
  - 6. Cold Lead: Standard - **10 ft. (3 m)**.
  - 7. Splice: Factory assembled, waterproof, UV rated, single-point connection.
  - 8. Minimum Bending Radius: **7/8 inch (22.2 mm)**.
  - 9. Minimum Heat Output: **3 W/ ft. (9.84 W/ m)**.
  - 10. Minimum Installation Temperature: **40 deg F (5 deg C)**.
  - 11. Minimum Spacing: **2 inches (51 mm)**.
  - 12. Mat Spacing: **3 inches (76 mm) = 12 W/sq. ft. (129 W/sq. m)**.
  - 13. Electrical Characteristics:

- a. Voltage: [120] [240].
  - b. Phase: Single-phase.
  - c. Hertz: 0-60 Hz.
  - d. Full-Load Amperes: By wattage.
  - e. Maximum Circuit Capacity: 15 amps.
  - f. Maximum Overcurrent Protection: Per NEC Code (NFPA 70).
- F. Cable-Heated Mats: Factory-fabricated cable and self-adhesive coated plastic mesh with uniform **3 inch (76 mm)** cable spacing, in **18 inch (457 mm)** widths.
- G. Capacities and Characteristics:
- 1. Maximum Heat Output (Cable): [**12 W/sq. ft. (129 W/sq. m) at 3 inch (76 mm) recommended spacing**] [**18 W/sq. ft. (194 W/sq. m) at 2 inch (51 mm)**] [**9 W/sq. ft. (97 W/sq. m) at 4 inch (102 mm)**]
  - 2. Maximum Heat Output (Mat): **12 W/sq. ft. (129 W/sq. m).**

## 2.3 CONTROLS

- A. Comply with requirements in Section 230900 "Instrumentation and Control for HVAC" and Section 230993 "Sequence of Operations for HVAC Controls" for control devices and sequence of operations for radiant-heating electric cables.
- B. Wall-Mounted Ambient and Floor Sensing Thermostats for Floor Heating Cables:
  - 1. Minimum temperature range from [**40 to 104 deg F (5 to 40 deg C)**] [**50 to 90 deg F (10 to 32 deg C)**].
  - 2. Manually operated with on-off switch.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. For all products, examine surfaces and substrates to receive electric heating cables or cable-heated mats for compliance with requirements for installation tolerances and other conditions affecting performance.
  - 1. Ensure surfaces in contact with electric heating cables or cable-heated mats are free of burrs and sharp protrusions.
  - 2. Measure and verify square footages (square meters) for areas to be heated.
  - 3. Verify available supply voltages for project.
  - 4. Identify location of any required junction box(s). Ensure that the maximum cold lead distance for each product is not exceeded.
  - 5. Ensure that environmental requirements for required controls are not violated.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLICATIONS

- A. Install the following types of electric heating cable for the applications described:
  - 1. Floor Radiant Heating: PVC-insulated, series-resistance heating cable.

### 3.3 INSTALLATION

- A. Electric Floor Heating Systems Installation.
  - 1. Comply with manufacturer's product data, including product technical bulletins, installation instructions, and design drawings. Complete installation must conform to manufacturer's installation instructions, NEC Code, and any appropriate local electric codes.
  - 2. Electric radiant floor heating mat/cable for placement in mortar or a cementitious material (e.g. Self-Leveling Cement or Thinsset).
    - a. Perform electrical resistance test to verify product integrity before removing from packaging (document readings).
    - b. Install one detection monitor device (e.g. Loud Mouth, Screamer) per mat/cable power leads, as specified by manufacturer.
    - c. Test fit mat/cable to specified area (heating element wire CAN NOT be cut).
    - d. Secure mat/cable to floor surface using manufacturer's approved methods.
    - e. Perform electrical resistance test again prior to covering with cementitious material to verify product integrity (document readings).
    - f. Determine the thermostat location and install a single duplex wall case.
    - g. Secure thermostat floor sensor into mat/cable area (between cable runs).
    - h. Provide / pull electrical power source (120v or 240v) to thermostat wall case.
    - i. Pull mat/cable power leads (cold lead) into thermostat electrical box.
    - j. Photograph installation for records.
    - k. Apply cement-based polymer-modified mortar over floor heating mat/cable and install finish floor surfaces as specified.
    - l. Perform electrical resistance test again to verify product integrity (document readings).
    - m. Connect thermostat to mat/cable power leads, floor sensor, and power source.
    - n. Test and measure current with amp probe for less than 1 minute and shut down.
    - o. DO NOT place system into full operation until floor mortars are fully cured according to mortar manufacturer's specification.

### 3.4 CONNECTIONS

- A. Ground all equipment according to NFPA 70 (NEC) Class 1 wiring.

### 3.5 FIELD QUALITY CONTROL

- A. Testing: **Owner will engage** a qualified electrician to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a qualified service representative to test and inspect components, assemblies, and equipment installations, including connections.

- C. Perform the following tests and inspections [**with the assistance of a qualified service representative**]:
  - 1. Perform tests before, during, and after heating element installation - before application of coverings such as thinset.
  - 2. Test heating element for electrical continuity and insulation integrity before energizing.
  - 3. Test heating element to verify rating and power input. Energize and measure voltage and current simultaneously according to instructions.
- D. Repeat tests for continuity, insulation resistance, and input power after applying finished surface on heating element.
- E. Radiant-heating electric elements will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports for warranty purposes, and send to manufacturer.

### 3.6 PROTECTION

- A. Protect installed heating elements, including non-heating leads, from damage during construction.
- B. Remove and replace damaged heating elements according to instructions.

END OF SECTION 260520