

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: 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 Wellspring Manufacturing, Floor Heating Cable or Mat by one of the following:
 - 1. ProLine Radiant
12637 S. 265 W., Suite 100A, Draper, UT 84020
Phone: 866-676-9276 / Fax: 801-948-7599
Web: www.prolineradiant.com
 - 2. Warmzone
12637 S. 265 W., Suite 100, Draper, UT 84020
Phone: 888-488-9276 / Fax: 801-948-7599
Web: 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 Thinset).
 - 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