SECTION 238313 - RADIANT-HEATING ELECTRIC CABLES

PART 1 - GENERAL

1.1 SECTIONS INCLUDES

A. Electric snow and ice heating elements on Roofs (shingles or metal), gutters, and downspouts. This pertains to the following electric heating cable: Self-regulating, parallel resistance, Heat-Trace cable.

B. Controls, Accessories

C. Associated 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 260520 “Heating Cables”
E. Section 260523 “Electric Cables”
F. Section 260620.16 “Electrical”
G. Section 260620.23 “Electrical”
H. Section 262200 “Low Voltage”
I. Section 268313 “Radiant Heating Electric Cables”

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.

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 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, Self-Regulating heat cables: 2-10 years from 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 SELF-REGULATING HEATING CABLE FOR ROOF AND GUTTER DE-ICING

A. Basis-of-Design Product: Subject to compliance with requirements, provide Wellspring Manufacturing; Self Regulating heat cable 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. Compliance: UL IEEE 515

C. Cable, Self Regulating Heating: with a homogenous self-regulating polymer heating element fed from two 16awg tined copper buss bars with an insulated tinned copper ground braid that extends through its length. Standard with a Thermoplastic UV rated covering.

D. Maximum Power on Operating Temperature: 149 deg F (65 deg C)

E. Capabilities and Characteristics:

1. Cable Construction: Conductive Polymer heating element fed with 16awg tinned copper buss wires.
2. Cable Width: minimum .36 inch (9.3mm) nominal. Cable both flexible and UV protected.
3. Ground Conductor: Tinned Copper.
4. Cable Outer jacket: UV Rated thermoplastic or fluoropolymer.
5. Cable Inner Insulation Jacket: Polyolefin

6. Splice: Field assembled Type determined by application.
7. Terminator: Field assembled, Type determined by application.
8. Minimum Bending Radius: 1.4 inch (36 mm).
9. Maximum Heat Output: [RHSR-12- 12W/ft. (40 W/ m)] [RHSR- 10- 10W/ft. (31 W/m)] [RHSR-8- 8 W/ft. (25 W/m)] [RHSR-5- 5 W/ft. (17 W/m)] @50 deg F (10 deg C)
10. Minimum Installation Temperature: -4 deg F (-20 deg C).
11. Minimum Spacing: May be over lapped
12. Electrical Characteristics:

    a. Volts: [100 to 120] [**200 to 277**].
    b. Phase: [**Single-phase**].
    c. Hertz: 0-60 Hz.
    d. Total Wattage by Cable Length
    e. Minimum Circuit Capacity: 15 amps.
    f. Maximum Over current Protection 40amp.

F. Accessories (Required for Specific applications)

1. Roof Ice and Gutter melt.

    a. Power and termination kit.
    b. Roof Clips.
    c. Down spout Hangers.
    d. Epoxy.

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. Precipitation and Temperature Sensor for electric snow and ice heating elements on Roofs (shingles or metal), gutters, and downspouts

1. System activation shall be controlled by WS Snowmelt controller with external temperature and moisture sensors. Control of the system shall be achieved by the use of one or two remote mounted sensors which will collectively sense the outdoor temperature and the presence of falling snow.

    a. System shall be capable of responding to the input from both a temperature and moisture sensor.
    b. Controller will be capable of controlling one zone.
    c. Control device shall be CSA, ETL, UL or equivalent Approved.

2. WS-2C, WS-5C or WS-8C Aerial mounted sensors with integral or remote temperature and moisture sensors. Appropriate contactor / relay enclosures shall be NEMA 3R minimum rated, suitable for outdoor mounting. Control of the system shall be achieved by the use of an Aerial Controller with integrated snow and temperature sensors which will collectively sense the outdoor temperature and the presence of falling snow.

a. System shall be capable of responding to the input from both a temperature and moisture sensor.
b. Controller will be capable of controlling one zone.
c. Controller will remain energized for an adjustable duration following the end of snowfall, so that slush and ice formation are prevented or evaporated.
d. Controller shall feature a device to permit Manual Override. The manual feature shall self-disconnect after a time delay to prevent system run-away.
e. Controller shall have remote auxiliary control unit (WS-AUX) that mimics Aerial Sensor for easy visibility and ground access.
f. Control device shall be CSA, ETL, UL or equivalent Approved.

2.4 ACCESSORIES

A. WS Interconnect Cable: To go between Aerial Snow Sensor and the remote auxiliary (WS-AUX) control unit. Cable should be stranded, shielded 6 conductor, 22 AWG.

1. Length: [**50 ft. (15.2 m)**] [**100 ft. (30.5 m)**] [**200 ft. (61 m)**].

B. Securing accessories: Roof clips (PLSR14/PLSR13) and Downspout hanger kit (PLSR15) to secure cable to roofs or within gutters and downspouts.

PART 3 - EXECUTION

3.1 EXAMINATION

A. For all products, examine surfaces and substrates to receive electric heating cables for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Ensure surfaces in contact with electric heating cables 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 run length 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. Snow and Ice Melt for metal/shingle roofs, gutters and downspouts: Self regulating, parallel-resistance heating element.

3.3 INSTALLATION

A. 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.

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
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. Radiant-heating electric elements will be considered defective if they do not pass tests and inspections.

E. 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 238313