

DIVISION 23 8313 Radiant Electric Heating Cables

LOW VOLTAGE DE-ICING / SNOW MELTING SYSTEM UNDER NON-CONDUCTIVE ROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install low voltage de-icing / snow melting system with screen heating element under non-conductive roofing as described in Contract Documents.
- B. Related Sections:
 - 1. Section 073100 - Shingles and Shake: Installation coordination with roofing material and details
 - 2. Section 073200 - Roof Tiles: Installation coordination with roofing material and details.
 - 3. Section 074100 - Roof Panels: Installation coordination with roofing material and details.
 - 4. Section 075000 – Membrane Roofing: Installation coordination with gutter material and details.
 - 5. Section 076000 – Flashing and Sheet Metal: Installation coordination with gutter material and details.
 - 6. Section 077000 – Roof and Wall Specialties and Accessories: Installation coordination with gutter material and details.
 - 7. Section 260600 – Schedules for Electrical: Materials and installation of wiring and electrical power source.

1.2 SYSTEM DESCRIPTION

- A. The system shall consist of all equipment and materials for a complete roof de-icing system to be installed below the roofing materials per the electrical plans and details.
- B. The area covered and heat density (measured by Watts or BTU equivalent) per linear foot of heating element or square foot of area for each Heatizon System product are determined by the spacing between adjacent runs of heating element, the total length of heating element, and the size of the transformer. See manufacturer's installation instructions for more detailed information.

1.3 ELECTRICAL CODES AND STANDARDS

- A. The entire design and installation of the Heatizon ZMesh® System shall comply with the Manufacturer's Installation Manual.
- B. National Electrical Code (NEC) for US installations; Canadian Standards Association (CSA) for Canadian Installations. (Current Editions).
- C. Requirements of the "Authority Having Jurisdiction".
- D. All Tuff Cable® Heaters shall be approved to CSA and UL Standards for this application.
 - 1. Self-regulating cables are not acceptable for this application.
 - 2. Heating elements that are not woven bronze conductors are not acceptable for this application.
 - 3. Line voltage cables are not acceptable for this application.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's technical product data and written installation instructions for

low-voltage electric screen heating element systems.

B. Shop Drawings:

1. At Architect's request, submit drawings showing layout of system control box, activation device, grounding connections, and heating cables required to provide complete operating system. Include the following:
 - a. Locations for activation devices.
 - b. Location of low-voltage heating cable step-down transformer and control box.
 - c. Cold-lead cable runs from transformer to heating element connection points.
 - d. Heating element layout and spacing.
 - e. Cold-lead jumpers between non-adjacent areas.
 - f. Connections between cold-lead and heating element.
 - g. Low-voltage wiring between control box and activation device.
 - h. Location of aerial or slab-mounted temperature/moisture sensor(s).
 - i. Low-voltage wiring between sensor(s) and activation device(s).
 - j. Differentiate between:
 - 1) Control wiring.
 - 2) Heating element.
 - 3) Cold-lead.
 - 4) Branch-circuit wiring.
 - k. Differentiate between zones of heating element.

C. Operation and Maintenance Data:

1. Submit manufacturer's written maintenance and operation instructions for system.

D. Warranty:

1. Submit signed copy of system manufacturer's standard warranty for system.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Firm regularly engaged in manufacturing of low-voltage electric screen heating elements, of type, sizes and ratings required, whose products have been in satisfactory use in similar service for not less than five years.

B. Installer Qualifications:

1. Licensed Contractor with a minimum of two years successful certified experience installing projects utilizing electric screen heating element systems equal to systems specified in this section.

C. Regulatory Requirements:

1. Comply with applicable local electrical code requirements of local authorities having jurisdiction.
2. Provide products that are listed, recognized, and labeled by Nationally Recognized Testing Laboratory (NRTL) that include but are not limited to:
 - a. ETL subsidiary of Intertek.
 - b. Canadian Standards Association (CSA).
 - c. Underwriters Laboratories (UL).
3. Conform to requirements for Standard for Safety for Electric Radiant Heating Panels and Heating Panel Sets (UL - 1693, 3rd Edition, dated October 14, 2011).
4. Conform with requirements of "Outline of investigation for Roof and Gutter De-icing Cable Units," (UL - 1588 Issue 4, dated May 24, 2002), and "IEEE Recommended Practice for Electrical Impedance, Inductive and Skin Effect Heating of Pipelines and Vessels" (IEEE 844-2000).
5. Conform to requirements of "Dry-Type General Purpose and Power Transformers" (UL - 1561).
6. Conform to "Requirements for Electrical Resistance Heating Cables and Heating

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle in accordance with manufacturer's written instructions. Store the materials in dry indoor location off the ground.
- B. Remove damaged materials from job site and replace with new at no additional cost to Owner.

1.7 WARRANTY

- A. Provide Manufacturers Standard with following requirements:
 - 1. Control Unit Components: 1 year
 - 2. Power Transformer: 5 years
 - 3. Heating Element: 25 years

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Approved Manufacturers:
 - 1. Heatizon Systems/Comfort Radiant Heating, 9 Morris Lane, Clifton Park, NY 12065 (888) 448-0555 www.comfortradiant.com - info@comfortradiant.com
 - 2. Substitutions: Not Permitted.

2.2 COMPONENTS

- A. Heating Element:
 - 1. Low-voltage Screen Heating Element Heating element shall be bright bronze woven metal fabric screen: ZMesh®
 - a. Rated for operating at variable output of 0 to 12 watts per linear foot.
 - b. Maximum Operating Voltage: 0.1262 volts per linear foot of heating element.
 - c. Maximum Secondary Voltage: Not to exceed 32.0 volts.
 - d. Heating Element Operating Temperature: Not to exceed 90 degrees C.
 - e. Screen element thickness not to exceed 0.020".
 - f. Heatizon Systems ZMesh® number E102.
 - g. Width: 9 inches or 12 inches.
 - h. Rated for installation on wood or concrete-based sub-roof.
 - i. Heating Element shall allow for penetrations by screws, nails and staples as long as they do not contact any other metallic objects.
- B. Heating Element Power Transformer:
 - 1. Properly sized so heating element operation is less than 96 amps.
 - 2. Multi tapped on primary side to allow for operation of supply of 120, 208, 240, and/or 277 volts.
 - 3. Multi tapped on secondary side to allow proper operation when operating range of heating elements lengths.
 - 4. Heatizon Systems Options:
 - a. S050 (0.5kVA)
 - b. S101 (1kVA)
 - c. S102 (2kVA)
 - d. S103 (3kVA)
 - e. S202 (2x 2kVA) (single primary with dual secondary)
 - f. S203 (2x3kVA) (single primary with dual secondary)
- C. Control Unit:
 - 1. Provide unit that:
 - a. Soft starts transformer.

- b. Monitors overall system for proper and safe operation.
 - c. Interfaces with activation device.
 - d. Shuts system off in event of fault.
 - e. Provides protection for over-current, undercurrent and high temperature transformer (CBX6T and CBX23T models have a 24VAC power supply for Activation Device).
- 2. Provide means of faults and fault status.
 - 3. Fitted with power service disconnect rated for system operating range.
 - 4. Heatizon Systems Control Box: SLC500, CBX6, CBX6T, CBX23, CBX23T, and RADIANT8 (CBX6T and CBX23T models have a 24VAC power supply for Activation Devices).
- D. Activation Device
- 1. Provide unit with a dry contact.
 - 2. Provide one or more of the following:
 - a. Aerial Mounted Temperature - Moisture Sensor: Model M326, M326A24, M326ARS24 requiring 24V or M326A or M326ARS requiring 120V.
 - b. Gutter Moisture and Ambient Temperature Sensor: Model M435
 - c. 12 hour Mechanical Timer: Model M325D.
 - d. 24 hour Programmable Timer: Model M323.
 - e. Electronic Temperature contact: Model M336.
 - f. Remote Temperature Controller: Model M322.
 - g. Gutter Controller: Activates one circuit of GutterMelt® heat trace line voltage system whenever low voltage system is on.
 - 3. Multiple Circuits for Control, Monitoring, and Load Management:
 - a. Where controls exceed 3 in total on one activation scheme, use M329 12 Channel Selector Box or M346 Monitor Station.
 - b. Where remote monitoring is necessary use M346 Monitor Station
 - c. Where individual zone control in necessary us M329 12 Channel Selector Box or M346 Monitor Station.
 - d. Where separate activation and control with M330 Relay Panel Series line voltage products use M346 Monitor Station.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine roof deck for proper installation, cleanliness, or condition that may hinder successful installation of low-voltage electric snow melt system.
 - 1. Notify Contractor in writing of items needing correction.
 - 2. Do not install snow melt system until faulty conditions are corrected.

3.2 INSTALLATION

- A. Interface with Other Work:
 - 1. Coordinate installation of low voltage cable heat melt system with appropriate sections in Division 07 for roofing material and appropriate sections of Division 26 Electrical.
- B. Install snow melt system, including Heating Element, Transformer, Control Box, and Activation Device, in accordance with Manufacturer's written instructions and approved Shop Drawings.
- C. Install optional moisture barrier on roof deck where screen heating element will be installed. Install moisture barrier over all of screen heating element to enclose element in a water-tight barrier.
- D. Attach manufacturer's supplied red octagonal warning sign (STOP! DANGER!) spaced equally on De-Icing / Snow Melt System on roof.

3.3 FIELD QUALITY CONTROL

- A. Testing as directed by System Manufacturer:
 - 1. Prior to covering, visually inspect the heating element and cold leads for cuts, shorts, and other damage; repair as necessary.
 - 2. Check for continuity to any conductive material, including but not limited to metal; eliminate as necessary.
 - 3. Conduct After-Installation Element Tests per manufacturer's installation instructions. Test system in presence of Architect, Contractor, and Owner's Representative, to be certain system functions in accordance with design intent.

- B. Verify that all heating element is completely covered.

- C. Immediately prior to during, and immediately following attachment of roofing material, check each heating element for electrical continuity and check for electrical isolation (resistance) to ground and any metallic materials near the heating element. Use Heatizon Roof Alarm Model NI126 during installation of all roofing materials to detect shorts. Repair cut or damaged heating elements immediately.

3.4 DEMONSTRATION

- A. Provide adequate demonstration and training to Owner in operation and maintenance of system.

END OF SECTION