

SECTION 15774

LOW VOLTAGE FLOOR WARMING/SPACE HEATING SYSTEM—TUFF CABLE

PART 1 GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install low voltage electric cable-type heating element floor warming system as described in Contract Documents
- B. Related Sections:
 - 1. Division 9 – Appropriate sections for floor finishes over floor warming system.
 - 2. Division 16 - Appropriate sections for Grounding and bonding and power supply connections.

1.2 SYSTEM DESCRIPTION

- A. 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 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and written installation instructions for low-voltage electric cable heating element systems.
- B. Shop Drawings: At Architect's request, submit drawings showing layout of system Control Box, activation device, grounding connections, and heating element required to provide complete operating system. Include the following:
 - 1. Locations for activation devices.
 - 2. Location of low-voltage heating cable step-down transformer and control box.
 - 3. Cold-lead cable runs from transformer to heating element connection points.
 - 4. Heating element layout and spacing.
 - 5. Cold-lead jumpers between non-adjacent areas.
 - 6. Connections between cold-lead and heating element.
 - 7. Low-voltage wiring between control box and activation device.
 - 8. Location of floor temperature sensors.
 - 9. Low-voltage wiring between sensor(s) and activation device(s).
 - 10. Differentiate between:
 - a. Control wiring.
 - b. Heating element.
 - c. Cold-lead.
 - d. Branch-circuit wiring.
 - 11. Differentiate between zones of heating element.
- C. Operation and Maintenance Data: Submit manufacturer's written maintenance and operation instructions for system.
- D. Warranty: Submit copy of system manufacturer's standard warranty for system.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Firm regularly engaged in manufacturing of electric cable 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 for low-voltage electric cable 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 Testing Laboratories,
 - b. Canadian Standards Association (CSA), and
 - c. Underwriters Laboratories (UL).
 - 3. Conform with requirements of "Safety for Electric Radiant Heating Panels and Heating Panel Sets" (UL - 1693, 1st Edition, dated December 11, 1996).
 - 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 with requirements of "Dry-Type General Purpose and Power Transformers" (UL – 1561).
 - 6. Conforms with requirements of "Power Units other than Class 2" (UL-1012) and "Electric Space Heating Cables" (UL - 1673).

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle in accordance with manufacturer's written instructions. Store 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.

1.6 WARRANTY

- A. Provide Manufacturer's Standard Warranty with following requirements:
 - 1. Control Box Components - One year
 - 2. Power Transformer - Five years
 - 3. Heating Element - 25 years

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Heatizon Systems, 4403 South 500 West, Murray, Utah 84123 (888) 239-1232
www.heatizon.com.

2.2 COMPONENTS

- A. Heating Element:
 - 1. Copper stranded cable insulated with chemical- and gasoline-resistant thermoplastic vinyl and sheathed with nylon jacket for corrosion and mechanical protection.
 - 2. Rated for operating at variable output of 0 to 12 watts per linear foot.
 - 3. Maximum Operating Voltage: 0.118 volts per linear foot of heating element.
 - 4. Maximum Secondary Voltage: Not to exceed 65.5 volts.

5. Heating Element Operating Temperature: Not to exceed 80 degrees C.
 6. Heatizon Systems Tuff Cable number E101 (UL E174340).
- B. Low-voltage Electric Heating Element 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 element lengths.
 4. Heatizon Systems Options:
 - a. S050 (0.5kVA)
 - b. S101 (1kVA)
 - c. S102 (2kVA)
 - d. S103 (3kVA)
 - e. S104 (4kVA)
 - f. S105 (5kVA)
 - g. S106 (6kVA)
 - h. S202 (2x 2kVA) (single primary with dual secondaries)
 - i. S203 (2x3kVA) (single primary with dual secondaries)
- C. Control Box:
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 overcurrent, 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, and CBX23T (CBX6T and CBX23T models have a 24VAC power supply for Activation Device).
- D. Activation Device:
1. Provide unit with a dry contact rated for 1 amp and 250 volts AC.
 2. Provide one of the following:
 - a. Thermostat: Model M315 (Ivory).
 - b. Thermostat: Model M315H (White).
 - c. Digital SlimlineThermostat: Model M317 (also requires M313).
 - d. Programmable Slimline Thermostat: Model M318 (also requires M313).
 - e. Remote Bulb Temperature Sensor: Model M320.
 - f. Programmable Thermostat: Model M321.
 - g. Floor Temperature Controller: Model M322.
 - h. Floorstat FWT-1: Model M330.
 - i. 12 hour Mechanical Timer: Model M325D.
 - j. 24 hour Programmable Timer: Model M323.
- E. System Accessories:
- a. Butt Splice: Model #210BS

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine wood or concrete subfloor for proper installation, cleanliness, or condition that may

hinder successful installation of low-voltage electric heating system.

1. Notify Contractor in writing of items needing correction.
2. Do not install floor warming system until faulty conditions are corrected.

3.2 INSTALLATION

- A. Interface with Other Work: Coordinate installation of heating system with appropriate sections of Division 16 Electrical.
- B. Install heating system, including Heating Element, Transformer, Control Box, and Activation Device, in accordance with Manufacturer's written instructions and approved Shop Drawings.
- C. Attach manufacturer's supplied red octagonal warning sign (STOP! DANGER!) spaced equally on Floor Warming System on surface in which system is installed.
- D. Install floor covering as soon as possible after heating element installation.

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 embedded.

3.4 DEMONSTRATION

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

END OF SECTION