

DIVISION 23 8313 Radiant Electric Heating Cables

UNDER FLOOR RADIANT HEATING - Heatwave

PART 1 GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and Install Heatizon Heatwave® Fiberglass Mesh – Cable type heating element for floor warming and or space heating as described in Contract Documents.
- B. Related Sections:
 - 1. Section 035300 – Concrete Topping: Installation coordination with concrete floor material and details.
 - 2. Section 033000 – Cast-In-Place Concrete.
 - 3. Section 096000 – Flooring: Installation coordination with specific floor materials and details.
 - 4. Section 260600 – Schedules for Electrical: Materials and Installation of wiring and electrical power source.

1.1 SYSTEM DESCRIPTION

- A. The system shall consist of all equipment and materials for a complete floor warming/space heating system to be installed.
- 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 heat output of the Heatwave® Floor Warming Cable and the spacing between adjacent runs of heating element in the fiberglass mesh. See manufacturer's installation instructions for more detailed information.
- C. For space heating applications, a heat-loss calculation should be performed to design the required output of the system.
- D. System should not exceed 15 watts per square foot.

1.3 ELECTRICAL CODES AND STANDARDS

- A. The entire design and installation of the Heatizon Heatwave® Floor Warming System shall comply with the Manufacture'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 Heatwave® Floor Warming Systems shall be approved to CSA and UL Standards for this application.
 - 1. Self-regulating cables are not acceptable for this application.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and written installation instructions for floor warming / space heating cable system.
- B. Shop Drawings: At architect's request, submit drawings showing layout of system relay panel, activation device, grounding connections, and heating cables required to provide complete operating system. Including the following:
 - 1. Locations for activation devices.
 - 2. Locations of relay panel, junction boxes, feeder wires, and load wires.
 - 3. Cold lead runs from relay panel / junction box / activation device to heating element connection points.
 - 4. Heating element layout and spacing.
 - 5. Locations where heating element will cross joints, jumper locations.
 - 6. Wiring between relay panel and activation device.
 - 7. Location of floor or ambient temperature sensors.
 - 8. Differentiate between:
 - a. Control wiring.
 - b. Heating element.
 - c. Cold Lead.
 - d. Branch-circuit wiring.
 - 9. 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.

1.5 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 services for not less than five years.
- B. Installer Qualifications:
 - 1. Licensed Electrical Contractor with a minimum of two years successful certified experience installing projects utilizing electric heating cable 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 or recognized and labeled by Nationally Recognized Testing Laboratory (NRTL) that includes, but not limited to :
 - a. ETL subsidiary of Intertek Testing Laboratories,
 - b. Canadian Standards Association (CSA), and
 - c. Underwriters Laboratories (UL).
 - 3. Conform to requirements of "Standard for Electric Space Heating Cables" (UL – 1673, 2nd Edition, dated May 30, 1996).
 - 4. Conform to "Requirements for Electrical Resistance Heating Cables and Heating Device Sets" (CSA – 22.2, No 130-03, dated January, 2008)

1.6 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.

1.7 WARRANTY

- A. Provide Manufactures Standard with following requirements:
 - 1. Heatwave® Floor Warming Cable – Ten year
 - 2. Relay panel and Activation device – One year

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Heatizon Systems, 4137 South 500 West, Murray, Utah 84123 (888) 293-1232
www.heatizon.com

2.2 STOCKING DISTRIBUTOR

- A. Comfort Radiant Heating, LLC, 9 Morris Lane, Clifton Park, New York, 12065 (888)448-0555
www.comfortradiant.com

2.3 COMPONENTS

- A. Heating element
 - 1. Heatwave® Floor Warming System shall be supplied by Heatizon Systems (Tel: 888-239-1232, Fax: 801-293-3077)
 - 2. Shall have constant wattage output.
 - 3. Resistance cable heater construction shall consist of high tensile strength stranded resistance wire encased in Teflon insulation.
 - 4. TPE insulation shall be surrounded by tinned plated copper braid to provide ground path.
 - 5. TPE over jacket shall be extruded over nickel coated copper braid.
 - 6. Heatwave® Floor Warming Cable is attached by thread to fiberglass mesh backing.
 - 7. Maximum Heatwave® Floor Warming Cable output is up to 15 watts/sqft.
 - 8. Heatwave® Floor Warming Systems electrical rating:
 - a. 120V
 - b. 240V
- B. Relay Panel
 - 1. Heatizon Relay Panel
 - a. M330 – Relay Panel accommodating 4 circuits can used in conjunction with activation scheme.
- C. Activation
 - 1. All Heatwave® Floor Warming System circuits shall be activated by a Heatizon Systems approved activator for Heatwave® Floor Warming Systems:
 - a. Examples: A 7 day programmable thermostat.
 - b. Multiple Circuits: Where the rating of the activator would be exceeded, it shall be used in conjunction with a Heatizon Relay Panel (M330) for activation of multiple heater circuits.

2.3 ACCESSORIES

- A. Insulation:
 - 1. Concrete slab and pavers: Provide $\frac{3}{4}$ " or 1" thick extruded polystyrene insulation below concrete slab prior to concrete pour. Insulation shall be rated at the appropriate mechanical properties for each application.
 - 2. Wood Subfloor: Provide a minimum R13 of insulation in joist space below subfloor. Embed Heatwave® Floor Warming Cable in cementitious material.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas where heating element is to be installed for proper installation, cleanliness, or condition that may hinder successful installation of floor heating system.
 - 1. Notify Contractor in writing of items needing correction.
 - 2. Do not install floor heating system until faulty conditions are corrected.

3.2 INSTALLATION

- A. Interface with Other Work: Coordinate installation of Heatwave® Floor Warming System with appropriate sections of Division 26 Electrical.
- B. The current Heatwave® Floor Warming System Installation Manual shall be considered as part of this specification.
- C. Heatwave® Floor Warming Cable sheaths shall not touch or cross one another nor shall the heating portion of cables cross expansion joints.
- D. Heatwave® Floor Warming Cables are to be installed at the specified spacing and in accordance with Heatizon recommended Heat Load or Heat Loss requirements.
- E. All junction boxes shall be located in accessible areas. Junction boxes shall not be located in the heated slab, but shall be located above grade level. Covers shall be kept on boxes when not being accessed.
- F. All terminations shall be protected from the weather and from physical damage and bonded to the system ground.
- G. Any field alternations or deviations shall proceed only after authorization has been issued by engineer. All changes shall be accurately recorded by the contractor and shall be turned over to the engineer upon completion of the heating system scope of work.

3.3 FIELD QUALITY CONTROL

- A. Testing as directed by system manufacturer.
 - 1. Field testing of insulation resistance and continuity of the units shall be carried out with a 200 Ohm meter and recorded by the Electrical Contractor.
 - 2. Testing shall be performed by the Electrical Contractor done in the following order:

- a. Prior to Installation of Heatwave® Floor Warming System (when removed from package).
 - b. After Installation of Heatwave® Floor Warming System on Substrate.
 - c. After Heatwave® Floor Warming System is embedded in asphalt, paved concrete, mortar, or sand bed and pavers.
3. Verify that all heating element is completely embedded.

3.4 RESISTANCE RECORDING

- A. Insulation resistance shall be compared to readings in tables of the Heatizon Heatwave® Floor Warming System Installation Manual during each test.
- B. A complete system startup shall be performed to verify successful operation.
- C. Resistance readings shall be recorded in the Heatwave® Floor Warming System Installation Manual

3.5 DEMONSTRATION

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

END OF SECTION