

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

- A. Radiant snow melting systems using electric mats and cables embedded in concrete, asphalt, and below pavers.

### 1.2 RELATED SECTIONS

- A. Section 03300 – Concrete
- B. Section 06100 – Rough Carpentry
- C. Section 07210 – Insulation
- D. Section 15774 – Radiant-Heating Electric Cables

### 1.3 REFERENCES

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. Canadian Standards Association (CSA):
  - 1. CAN/CSA C22.2 No. 130 – Requirements for Electrical Resistance Heating Cables and Heating Device Sets
  - 2. CSA C02.2 No. 24 – Temperature-Indicating and –Regulating Equipment
  - 3. CAN/CSA C22.2 No. 14 – Industrial Control Equipment
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 70, National Electrical Code (NEC), especially Sec. 424 and 426
- D. Tile Council of North America (TCNA):
  - 1. Any applicable standards relating to the installation of tile or stone.
  - 2. TCNA #RH115-0 – Latex – Portland Cement Mortar, Electric System
  - 3. TCNA #RH116-07 – Cementitious Self-leveling Underlayment, Bonded Electric System Thin-set
  - 4. TCNA #RH130-07 – EGP (Exterior Glue Plywood) Latex – Portland Cement Mortar Electric System
  - 5. TCNA #RH135-07 – Backer Board Electric System Thin-set
- E. Underwriters Laboratory (UL):
  - 1. UL Standard 508A – Industrial Control Panels
  - 2. UL Standard 515 – Electric Resistance Heat Tracing for Commercial and Industrial Applications
  - 3. UL Standard 758 – Appliance Wiring Materials
  - 4. UL Standard 873 – Temperature-Indicating and Regulating Equipment
  - 5. UL Standard 1673 – Electric Radiant Heating Cables

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- 6. UL Standard 1693 – Electric Radiant Heating Panels and Heating Panel Sets
- F. American National Standards Institute (ANSI)/Underwriters Laboratories, Inc. (UL):
  - 1. Any applicable standards relating to the installation of tile or stone.
- G. Watts Radiant
  - 1. Watts Radiant ProMelt Installation Manual
  - 2. Watts Radiant Electric Floor Warming Design Software (WireWorks)

## 1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. Show compliance with UL, CSA Standards.
  - 2. Show compliance with any applicable ANSI or NTCA Standards as they relate to the installation of tile or stone.
- B. Performance Requirements:
  - 1. Provide electric snow melting system manufactured, fabricated, and installed to comply with regulatory agencies and authorities with jurisdiction
  - 2. Maintain performance criteria stated by the manufacturer without defects, damage, or failure.
- C.

## 1.5 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product submittal data and installation instructions for each product.
- C. Shop Drawings – Electric Snow Melting System:
  - 1. Provide installation drawings indicating detailed mat/cable layout for each area, mat/cable dimensions, snow melting sensor/control locations, zoning requirements, and/or other details required for installation of the system.
  - 2. Provide electrical schematics, as needed
- D. Samples: Submit selection and verification samples of primary materials.
- E. Documentation:
  - 1. Provide manufacturer's detailed instructions for site preparation and product installation.
  - 2. Provide manufacturer's electrical power requirements and heat output in watts delivered to the structure.
  - 3. Provide documentation indicating the installer is trained to install the manufacturer's products, as needed.
- F. Quality Assurance and Control Submittals:
  - 1. Upon request, submit test reports from recognized testing laboratories.
- G. Closeout Submittals – Submit the following:

1. Warranty documents specified
2. Operation and maintenance data
3. Manufacturer's field reports as specified in this document
4. Final as-built mat/cable layout drawing

### 1.6 QUALITY ASSURANCE

#### A. Manufacturer Qualifications:

1. Manufacturer shall have a minimum of ten years experience in similar systems.
2. Manufacturer shall provide products of consistent quality in appearance and physical properties.
3. Manufacturer shall use the highest quality products in the production of systems and components referenced in this document.
4. Manufacturer to submit finished mat/cable assembly to minimum 1500 volt dielectric test for insulation integrity and perform resistance verification check.
5. Verify mat/cable is affixed with UL or ETL Marked sticker on power lead indication model, serial number, manufacture date, resistance, total output, and voltage.
6. Materials shall be from a single manufacturer to ensure consistent quality and compatibility.

#### B. Installer Qualifications:

1. Use and installer with demonstrated experience on projects of similar size and complexity and/or documentation proving successful completion of familiarization training hosted/approved in writing by the system manufacturer.
2. Electrical rough-in and connections shall be done by a licensed electrician.

#### C. Certifications: Provide letters of certification as follows:

1. Installer employs skilled workers holding a trade qualification license or equivalent, or apprentices under the supervision of a licensed trades person.

#### D. Regulatory Requirements and Approvals – Electric Snow Melting Systems: Provide an electric snow melting system that complies with the following requirements:

1. Snow melting cables/mats for installation in concrete, asphalt, or under pavers shall be Listed to UL 515 and CSA C22.2 No. 130.
2. Snow melting sensors shall be UL listed or low-voltage.
3. Snow melting controls shall be Listed to UL 508a and CAN/CSA C22.2 No. 14.

#### E. Pre-installation meetings

1. Verify project requirements, substrate conditions, excavation conditions, system performance requirements, coverings, manufacturer's installation instructions, and warranty requirements.
2. Review project construction timeline to ensure compliance or discuss modifications as required.
3. Coordinate with other trade representatives to verify areas of responsibility.
4. Establish the frequency (during construction phase of the project) the engineer intends for site visits and inspections by the manufacturer's representative.

#### F. Mock-up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect

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2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Section.
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

### 1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Mortar-set Systems: Mortar shall cure for 25 days (or time specified by mortar manufacturer) prior to starting heating systems.

### 1.9 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty:
  1. Submit manufacturer's standard warranty document executed by authorized company official.
  2. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.
    - a. Warranty covers the repair or replacement of any materials proven defective.
    - b. Warranty may transfer to subsequent owners.
    - c. Warranty Period for Electric Floor Heating Mats/Cables: Refer to manufacturer's 25-year, prorated warranty against failure due to defect in material or workmanship, beginning with date of manufacture.
    - d. Warranty Period for Thermostats, Controls, and Accessories: Refer to manufacturer's 1-year (2-year for SunStat), non-prorated warranty against failure due to defect in material or workmanship, beginning with date of purchase.

### 1.10 SYSTEM START-UP

- A. Do not start the system for a minimum of 25 days or as specified by mortar, concrete and/or covering manufacturer as applicable.

- B. Verify all electrical components are installed per local and National Electrical Code (NEC) prior to start-up.

### 1.11 OWNER'S INSTRUCTIONS

- A. Instruct Owner about operation and maintenance of installed system.
- B. Provide Owner with manufacturer's installation instructions for installed components within the system, including ohm reading information for the mats/cables as recorded in installation manual.
- C. Provide Owner with all operating instructions/documents for sensors and controls.
- D. Provide Owner with copies of any detailed layout drawings and photos of installed product before coverings are installed.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
  - Watts Radiant
  - A Watts Water Technologies Company
  - 4500 E. Progress Place
  - Springfield, MO 65803
  - (800) 276-2419; (417) 864-6108; Fax: (417) 864-8161
  - Web: <http://www.wattsradiant.com>
- B. Substitutions: not permitted

### 2.2 PRODUCT CHARACTERISTICS

- A. Electric Snow Melting System: ProMelt electric snow melting systems including:
  - 1. ProMelt mats
  - 2. ProMelt cables.

### 2.3 ELECTRIC SNOW MELTING MAT

- A. Snow melting mat to have the following construction:
  - 1. Heating Cable Construction: Dual heating elements with reinforcement and insulated, ground system, and outer jacket.
  - 2. Power Lead Construction: Insulated current-carrying conductors, ground system, outer jacket; minimum 20 feet (6.1 m) long.
  - 3. Mat Construction: Heating cable secured to open mesh system in pre-set spacing.
- B. Size:
  - 1. Mat size in widths of 2 feet (610 mm), 3 feet (914 mm) and lengths of 5 feet (1.5 m) through 56 feet (17.1 m) – Refer to Drawings.
- C. Ratings:

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1. Mat shall be provided in 120VAC, 208VAC, 240VAC, or 277VAC per drawings and submittals.
2. 38 watts per square foot (129 Btu/h/sqft) or 50 watts per square foot (171 Btu/h/sqft).

D. Models:

1. Mat shall be model series SM as supplied by Watts Radiant.

### 2.4 ELECTRIC SNOW MELTING CABLE

A. Snow melting cable to have the following construction:

1. Heating Cable Construction: Dual heating elements with reinforcement and insulated, ground system, and outer jacket.
2. Power Lead Construction: Insulated current-carrying conductors, ground system, outer jacket; minimum 20 feet (6.1 m) long.
3. Packaging: Cable wound onto spool or proprietary package system.

B. Size:

1. Cable size in factory set lengths of 29 feet (8.8 m) up to 456 feet (139 m). Cannot be cut to length on site. Refer to Drawings.

C. Ratings:

1. Cable shall be provided in 120VAC, 208VAC, 240VAC, or 277VAC per drawings and submittals.
2. Secured using cable ties or proprietary Cable Strap, allow on-site spacing at 3 inch (76 mm) o.c. (50 watts/sqft (171 Btu/h/sqft)), or 4 inch (101 mm) o.c. (38 watts/sqft (129 Btu/h/sqft)). Refer to Drawings.

D. Models:

1. Cable shall be model series SC as supplied by Watts Radiant.

### 2.5 ELECTRIC SNOW MELTING SENSORS/CONTROLS

A. Use sensors/controls provided by system manufacturer.

1. ProMelt PM-2B Detector:
  - a. Automatic moisture and temperature detection
  - b. Adjustable trigger temperature
  - c. Pole-mounted, outdoor-rated
  - d. Moisture sensor fixed to the detector
  - e. 120/208/240V, not 277V, maximum 30A load
2. ProMelt PM-224 Detector:
  - a. Automatic moisture and temperature detection
  - b. Adjustable trigger temperature
  - c. Pole-mounted, outdoor-rated
  - d. Moisture sensor fixed to the detector
  - e. 24V (Operates in conjunction with the ContactorPro)
3. ProMelt PM-824 Detector:
  - a. Automatic moisture and temperature detection
  - b. Adjustable trigger temperature
  - c. Pole-mounted, outdoor-rated
  - d. Moisture sensor connected to the detector by a 10 ft cable

- e. 24V (Operates in conjunction with the ContactorPro)
- 4. ProMelt PM-DP Display Panel:
  - a. Remote monitor for the ProMelt PM-2B detector
  - b. Manual On, Automatic, and Standby operations
  - c. 24V (supplied by PM-2B)
- 5. ProMelt PM-HSC5 Slab Detector:
  - a. Automatic moisture and temperature detection
  - b. Slab-mounted
  - c. 24V (Operates in conjunction with the ContactorPro)
- 6. ProMelt CP-50 ContactorPro Panel:
  - a. Turn-key contactor panel
  - b. Operates in conjunction with the ProMelt PM-224, PM-824, or PM-HSC5 detectors
  - c. Manual On with timer or Automatic operation
  - d. NEMA Type 1 for indoor mounting
  - e. 120/208/240/277V with one (1) 50A contactor
- 7. ProMelt CP-100 ContactorPro Panel:
  - a. Turn-key contactor panel
  - b. Operates in conjunction with the ProMelt PM-224, PM-824, or PM-HSC5 detectors
  - c. Manual On with timer or Automatic operation
  - d. NEMA Type 1 for indoor mounting
  - e. 120/208/240/277V with two (2) 50A contactors
- 8. ProMelt CP-200 ContactorPro Panel:
  - a. Turn-key contactor panel
  - b. Operates in conjunction with the ProMelt PM-224, PM-824, or PM-HSC5 detectors
  - c. Manual On with timer or Automatic operation
  - d. NEMA Type 1 for indoor mounting
  - e. 120/208/240/277V with four (4) 50A contactors
- 9. ProMelt CP-200EX ContactorPro Extension Panel:
  - a. Turn-key contactor panel
  - b. Operates in conjunction with the ProMelt PM-50, PM-100, or PM-200 panels
  - c. NEMA Type 1 for indoor mounting
  - d. 120/208/240/277V with four (4) 50A contactors

### 2.6 ELECTRIC SNOW MELTING ACCESSORY COMPONENTS

- A. **Monitoring Device:** Use device called LoudMouth provided by manufacturer. It is battery powered and connects to all three power lead wires of mats/cable to monitor installation. Provides both visual (red LED) and audio (loud beep) alarms if heating mats/cables are damaged.
- B. **CableTrowel:** For system compatibility, use manufacturer's plastic CableTrowel to help prevent cutting of the heating mat/cable during thin-set mortar installation.
- C. **CableStrap:** For system compatibility in floor heating cable installations, use manufacturer's CableStrap. CableStrap to allow different cable spacings:
  - 1. 3 inch (76 mm) o.c. (50 watts/sqft)
  - 2. 4 inch (101 mm) o.c. (38 watts/sqft).

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## PART 3 EXECUTION

### 3.1 EXAMINATION

#### A. Site Verification of Conditions:

1. Verify that site conditions are acceptable for installation of the system. Refer to manufacturer's installation manual for information.
2. Do not proceed with installation of the system until unacceptable conditions are corrected.

### 3.2 INSTALLATION OF ELECTRIC SNOW MELTING SYSTEM

#### A. Comply with manufacturer's product data, including product technical bulletins, installation instructions and design drawings.

#### B. Electric snow melting mat

1. Test the resistance and insulation integrity of the mat and record.
2. Verify that the site is ready to receive the mat, including all base substrate preparation.
3. Prepare electrical per drawings and bring electrical conduit to the site for the power leads and slab sensor (if used).
4. Test-fit the mat in the area specified. Mat heating cable cannot be cut shorter to fit.
5. Secure the mat to the substrate or reinforcement material as required.
6. Secure the slab sensor (if used).
7. Test the resistance and insulation integrity of the mat and record.
8. Pull mat power leads into electrical conduit.
9. Photograph installation for records.
10. Install coverings of concrete; asphalt (maximum 285°F); sand/stone dust and pavers; or mortar and tile. Minimum 1 to 1 ½ inch thick covering.
11. Install marker plate identifying snow melting product in the area.
12. Test the resistance and insulation integrity of the mat and record.
13. Make electrical connections to snow melting mat, sensors/controls, and power source. Test system briefly and shut down.

#### C. Electric snow melting cable

1. Test the resistance and insulation integrity of the cable and record.
2. Verify that the site is ready to receive the cable, including all base substrate preparation.
3. Prepare electrical per drawings and bring electrical conduit to the site for the power leads and slab sensor (if used).
4. Verify measurements of area specified are correct per cable size. Cable cannot be cut shorter to fit.
5. Secure the cable to the substrate (using CableStrap) or reinforcement material (using plastic cable ties) as required.
6. Secure the slab sensor (if used).
7. Test the resistance and insulation integrity of the cable and record.
8. Pull cable power leads into electrical outlet.
9. Photograph installation for records.
10. Install coverings of concrete; asphalt (maximum 285°F); sand/stone dust and pavers; or mortar and tile. Minimum 1 to 1 ½ inch thick covering.



11. Install marker plate identifying snow melting product in the area.
12. Test the resistance and insulation integrity of the cable and record.
13. Make electrical connections to snow melting mat, sensors/controls, and power source. Test system briefly and shut down.

### 3.3 FIELD QUALITY CONTROL AND TESTING

#### A. Site tests:

1. To ensure system integrity, do not damage the system or cut heating cable for any reason. Cover heating mat/cable against site damage if there is a delay between product installation and floor covering installation.
2. Perform electrical resistance measurements and record in the mat/cable installation manual as required before, during, and after product installation.
3. If LoudMouth monitor device is used, secure before installation begins and remove only after final coverings are finished including grout application.
4. Test system briefly after installation for function and integrity but do not place system into full operation until mortars or other coverings as applicable are fully cured per manufacturer specifications.
5. Keep records of system products, test results, and photographs for inspection.

### 3.4 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas.
- B. Repair or replace damaged installed products.
- C. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.
- D. Remove construction debris from project site and legally dispose of debris.

### 3.5 DEMONSTRATION

#### A. Electric Snow Melting System

1. Demonstrate operation of snow melting system to Owner or Owner's personnel.
2. Advise the Owner or Owner's representative about the required cure time for mortar or other covering as applicable before putting system into full operation.
3. Provide Owner or Owner's personnel with manufacturer's installation, operation, and maintenance instructions for installed components within the system.

### 3.6 PROTECTION

- A. Protect installed work from damage caused by subsequent construction activity on the site. Provide Owner with copy of photos and drawings of product locations to assist.