



SECTION 32 17 43

PAVEMENT SNOW MELTING SYSTEMS

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pavement snow melting systems.

1.2 RELATED SECTIONS

- A. Section 23 83 18 - Radiant-Heating Hydronic Snow-Melting Equipment: For coordination with primary heating plant, pumps, heat exchangers, and other mechanical components not integral to the pavement snow melting panels.

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM F1807 - Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps, for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing.
 - 2. ASTM F2159 - Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps for SDR9 Crosslinked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing.
- B. ICC Evaluation Service (ICC-ES):
 - 1. ICC-ES Product Certificate PMG-1788 for Therma-HEXX hydronic radiant heating applications.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.

- B. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- C. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
 - 1. Detailed ThermaPANEL system layout, manifold locations, zoning, tubing runs, and integration with finish surfaces; based on as-built dimensions provided by Contractor.
- D. Certifications: ICC-ES PMG-1788 report.
- E. Operation and Maintenance Data: Include glycol monitoring, seasonal changeover, filter cleaning and troubleshooting.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of ten years documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
 - 1. Experienced in hydronic radiant systems; trained in socket fusion welding, if used, and system balancing and startup. Manufacturer training or guidance required.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items, and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
 - 1. Store all components in original packaging in secure location.
- B. Protect components from unnecessary environmental exposure, impact, and abuse prior to installation.
- C. Keep panels pressurized during installation where possible to detect pressure drop issues.
- D. Fill and pressurize with the appropriate glycol mixture prior to applying any permanent surface such as poured in place concrete or mortared surfaces to ensure the integrity of the system during construction.

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 recommended limits.

1.9 WARRANTY

- A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Therma-HEXX Corporation, which is located at:
199 Constitution Ave., Suite 7
Portsmouth, NH 03801
Tel: 603-319-8815
Email: [request info \(contact@therma-hexx.com\)](mailto:request info (contact@therma-hexx.com)); Web: <https://therma-hexx.com>
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00.
 - 1. Tray systems comprised of aluminum sheets and/or embedded non UV protected PEX or PE-RT tubing, or electrical trace wire are not acceptable substitutions due to performance and UV exposure limitations.

2.2 SYSTEM DESCRIPTION

- A. A modular hydronic snow and ice melting system for pavement applications.
 - 1. Carbon black infused, thermoformed heat exchange panels.
 - 2. Factory-fused interconnecting tubing with infused carbon black UV protection, copper.
 - 3. Distribution manifolds, circulator, air eliminator, expansion tank, ASTM F1807 copper fittings.
 - 4. Specialized controls for automatic operation.
 - 5. Accessories.
- B. Application Types:
 - 1. Ground-Mounted: At-grade installation for sidewalks, driveways, patios, and other paved surfaces.
 - 2. Pedestal-Mounted: Elevated modular system for roof decks, balconies, plazas, and terraces.

2.3 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Delegate Design: The Manufacturer is to be responsible for the complete system design, engineering, layout, zoning, performance verification, and provision of shop drawings.
- B. Thermal Output: Minimum 150 Btu/hr/sq ft (87.92 Watts per sq ft) or as required by design and use.
- C. Surface Coverage: Modular panels provide even temperatures across the adjoining surface (e.g., pavers) for maximum energy transfer without striping.
- D. Compliance: ICC-ES PMG-1788 certification for hydronic radiant heating applications.
- E. Operating Limits: Maximum operating pressure 37 psi (266 kpa) at 140 degrees F (60 degrees C) maximum supply temperature.

- F. The system is not oxygen barring and requires fluid contacting components to be non-ferrous. A stainless-steel heat exchanger is an acceptable barrier to ferrous components.
- G. Exposed plastic components are to be UV protected with infused carbon black.
- H. Ground-Mounted
 - 1. Structural Load: Full load-bearing panels utilize 3 lbs per cu ft (48 kg per cu m) density EPS insulation with minimum 60 psi (413.7 kpa) compressive strength to prevent crushing or paver settling.
- I. Pedestal-Mounted:
 - 1. Structural Load: Panels must have a minimum compressive strength of 60 psi (413.7 kpa) with 1 lbs per cu ft (16 kg per cu m)) density EPS insulation with insulation removed at supported corners.
 - a. Pavers Requiring Central Pedestal Support: Use 3 lbs per cu ft (48 kg per cu m) density EPS.
 - 2. Paver Implosion Prevention: Where required, modular Panels are to be attached to pedestals at each corner with appropriate fasteners to prevent paver implosion from heavy impacts.
 - 3. Wind Uplift Prevention: Where required, modular Panels and paver assemblies are to be fastened to pedestals at each corner via an appropriate system allowing convenient disassembly while meeting wind uplift specifications.

2.4 MODULAR HEAT EXCHANGE PANELS

- A. Material: Carbon black infused Bimodal copolymer of LLDPE/HDPE with UV and chlorine resistance.
- B. Dimensions:
 - 1. Nominal Full Panels: 24 x 24 inches (610 x 610 mm).
 - a. Actual: 23.5 x 23.5 inches (597 x 597 mm).
 - 2. Nominal Half Panels: 12 x 24 inches (305 x 610 mm). for edges and steps.
 - a. Actual: 11.5 x 23.5 inches (292 x 597 mm).
 - 3. Thickness: 1.5 inch (38 mm) total thickness; Panel Body with attached insulation.
 - a. Panel Body: 0.4 to 0.5 inches (10 to 13 mm).
- C. Interconnects: Factory-fused PE-RT SDR-9 tubing.
 - 1. Socket fusion welded to eliminate mechanical joints under permanent surfaces.
 - 2. Size: O.D. 0.625 inches / 1/2 inch Copper Tube Size (CTS);
- D. Fluid Capacity: Approximately 0.26 gallons (1 Liter) per panel, plus or minus 10 percent.
- E. Insulation:
 - 1. Factory-Attached: 1 inch (25 mm) rigid EPS foam underside. 3 lbs per cu ft (48 kg per cu m) for load-bearing.
 - 2. Ground-Pedestal Mounted: 1 lbs per cu ft (16 kg per cu m).
 - a. Central Pedestal Support, Where Required: 3 lbs per cu ft (48 kg per cu m).
- F. Accessories:
 - 1. Paver Securing: Proprietary alignment disks and rings for paver securing
 - 2. Drainage Spacers of Pedestal Applications: 1/8 inch (3 mm) drainage gaps.

- 3. Trimmable and filler panels where indicated.
- G. Acceptable Onsite Connections: ASTM F1807 copper insert fittings utilizing a copper crimp ring for SDR9 PE-RT tubing.
- H. Manifolds: Use ASTM F877 approved compression fitting type.
- I. Fittings and Connections: Non-ferrous (e.g., brass, copper alloy, or stainless steel) to comply with system requirements.

2.5 RELATED MATERIALS

- A. PE-RT tubing, copper fittings, manifolds, filters, pumps, expansion tank, air elimination, and glycol feeder.
- B. Controls: As specified by Therma-HEXX unless noted "by others".
- C. By Others:
 - 1. Interlocking Concrete pavers, bedding material, joint material, base materials, and adjustable pedestals.
 - 2. Mains piping and fittings, specified by system engineer, supplied by installing contractor.
 - 3. Anything not on the system supplier bill of materials list.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until the substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
- C. Do not cover the system with permanent surface materials until pressure testing is completed and verified.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION - GENERAL

- A. Install in accordance with manufacturer's instructions, approved submittals, approved shop drawings, ICC-ES PMG-1788 guidelines, and in proper relationship with adjacent construction.
- B. Pressure Test: Manifolds and main piping only, not panels, to 100 psi (689.5 kpa) with air unless specified otherwise.
 - 1. Before Panel Connection: Isolate expansion tank and air eliminator during initial tests.
- C. Install Panels in Rows: Connect to manifolds and pressurize sequentially. Reference manufacturer training manual.
 - 1. Pressure: Test at 50 psi (344.75 kpa) maximum. See ICC-ES listing.

- D. Exterior Applications: Minimize exposure. Cover promptly with finish surface.
 - 1. Do not step or lean on pedestal mounted panels.
 - 2. ThermaPANEL's that have been bent into a sagging profile on pedestals must be re-bent in an upward crown for positive surface contact. A metal stiffener in the panels allows this to be done easily.
- E. Fill and purge: Use glycol mixture.
 - 1. Fill system with premixed glycol solution.
 - a. Glycol Solution Concentration: As per location and climate.
 - b. Never isolate expansion tank with fluid in the system.
 - c. Purge each circuit when filling using standard procedures.
- F. Install Air Elimination, Coalescing Preferred:
 - 1. Line-size wye filters on manifolds.
 - 2. System Relief Valve: 60 psi (413.7 kpa).
 - 3. Automatic Glycol Feeder and Pressurization: 14 to 17 psi (96.5 to 117.2 psi maximum).
 - 4. Low-Pressure Shutoff: 5 psi (34.5 kpa).
- G. Place 4 ft (1219 mm) loops of connecting tubing over access points, e.g., roof drains, scuppers, to allow temporary displacement of panels for future servicing without disconnecting or cutting tubes.

3.4 GROUND-MOUNTED INSTALLATION

- A. Prepare compacted sub-base per approved shop drawings.
 - 1. The ground-mounted base is to meet ICPI guidelines specifically designed for the intended use with specified pavers by others.
- B. Anchor panels to concrete substrate using 3 inch (76 mm) concrete screws and washers at designated points. Start from center if required.
- C. Screed: 1 inch (25 mm) bedding sand or stone dust over panels. Fill gaps.
- D. Install interlocking pavers directly on screeded sand; tamp/add joint material and re-tamp per specifications by others.

3.5 PEDESTAL-MOUNTED INSTALLATION

- A. Layout adjustable pedestals per system manufacturer's plans. Set first rows pedestals level and plumb using pedestal manufacturer leveling bases or angle compensators.
- B. Unfold pre-connected panel rows across pedestals. Span at least two pedestals per panel for structural stability.
- C. Immediately place pavers atop panels.
 - 1. Use alignment rings to lock corners and maintain drainage gap as specified.
 - a. Drainage Gaps: To be 1/8 inch (3 mm) if not specified.
 - 2. Provide secure perimeter to prevent paver movement.
- D. For 2 cm Porcelain Pavers or Other Uncertified Surfaces:
 - 1. Mechanically fasten ThermaPANEL corners to pedestals with manufacturer-approved screws to prevent paver implosion or injury hazards from heavy object impact.
 - a. Alternatively, install a centrally located pedestal beneath the ThermaPANEL for additional support.

- E. Plenum Space: 3 inch (76 mm) minimum below panels to roof membrane for manifold placement.
- F. Maintain clear, open gaps between pavers to allow air pressure equalization and reduce wind uplift effects.
 - 1. Not Permitted: Configurations that block or restrict airflow through paver gaps where wind uplift is a concern.
- G. Plastic Tubing Exposed to Sunlight in Paver Gaps: To be UV protected with infused carbon black.

3.6 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.
- B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
- C. Pressure Testing: Air test to 50 psi (344.74 kpa) for 1 hour minimum prior to finish installation.
 - 1. Hot Fluid Test: Circulate 120 to 140 degrees F (49 to 160 degrees C) fluid at operating pressure.
 - 2. Verify panel and connection integrity.
- D. System Balancing: Mains piping is to be reverse return unless otherwise noted.
 - 1. Adjust manifold flow meters to full open.
- E. Acceptance: Document tests; retain and return failed panels or other supplied components for manufacturer evaluation and warranty.

3.7 CONTROLS AND SEASONAL OPERATION

- A. Provide moisture and temperature sensors in highest load zones or as specified per plan.
- B. Include Seasonal Changeover: Manual three-way valve and differential control for warm-weather heat diversion (e.g., to pool).
- C. Instruct Owner on monitoring glycol concentration, pressure, and changeover.

3.8 CLEANING AND PROTECTION

- A. Clean products in accordance with the manufacturer's recommendations.
- B. Touch-up, repair or replace damaged components before Substantial Completion.

END OF SECTION