SECTION _____

RADIANT HEATING AND SNOW-MELTING SYSTEMS

PART 1 GENERAL

1.1 DESIGN / PERFORMANCE REQUIREMENTS

A. 23.5” x 23.5” x 1.4” Modular heat exchange units (Panels) shall be manufactured from a bimodal copolymer of LLDPE and HDPE with UV and chlorine resistant properties.

B. Panels do not contain oxygen barrier.

C. Panel Inlet and outlet interconnects shall be made with Therma-HEXX ThermaTUBE and shall be .625” OD (1/2” CTS) SDR-9. The tube shall be shall be manufactured from a bimodal copolymer of LLDPE and HDPE with UV and chlorine resistant properties and comply with ASTM F2623, ASTM F1807, ASTM F2159, ASTM D2683.

D. Panels shall have a fluid capacity of .26 gallons (Imperial) (+/- 10%).

E. Panels shall weigh approximately 1.6 lbs. per square foot including fluid and 1 lb. density EPS insulation.

F. Panels shall have a minimum 1” thickness of rigid EPS or XPS foam insulation attached to the underside of the Panels.

G. Panels will be connected to each other with tubing of similar material to that of the Panels using fusion welding technology.

H. Maximum panel pressure shall not exceed 40 PSI.

I. Maximum panel supply temperature shall not exceed 140°F.

1.2 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

B. Shop Drawings: The ThermaPANEL system layout shall be submitted as a shop drawing. Final drawing shall be based upon as-built dimensions of the covered area. The installing contractor or the General Contractor shall be responsible to provide the as-built measurements to Therma-HEXX in a timely manner.

C. Operation and Maintenance Data: (per project requirement)

1.3 QUALITY ASSURANCE

A. Single Source Requirements: To the greatest extent possible, provide hydronic modular heat exchange systems and ancillary products specified in this section from a single manufacturer.

B. Installer Qualifications: Installing contractor shall have the appropriate licensing and training for the installation of radiant hydronic systems. Installer must be certified in the installation and welding of PP-R pipe systems or receive manufacturer guidance with the installation if PP-R pipe is utilized. Installer must be qualified in the installation, system balancing, startup and maintenance of Panel systems, or receive manufacturer guidance on these procedures.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging with labels intact until ready for installation and protect from wet weather and direct sunlight.

B. Prevent dirt or foreign materials from entering distribution piping or Panels

C. Protect modular Panels and connected tubing from objects that are capable of piercing, abrading, bending, impacting the panels and tubing. Prolonged direct exposure to sunlight for more than 15 days shall be prevented.

1.5 SEQUENCING

A. Ensure that the system layout and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

C. Ensure that the affected trades are in possession of the proper equipment required for the installation of the entire system to prevent interruption of construction progress.

1.6 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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Therma-HEXX Corporation, which is located at:

199 Constitution Ave.; Unit 7; Portsmouth, NH 03801; Tel. (603) 319-8815; Email: contact@therma-hexx.com; Web: www.thermahexx.com

B. Substitutions: None permitted.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer and is inadequate, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean substrate surfaces thoroughly prior to installation to eliminate any objects that could interfere with the Panel system or puncture the panel system.

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

A. Install in accordance with manufacturer's instructions and approved shop drawings.

B. For pedestal mounted systems, the recommended sequence of installation for the Panel system is to locate and install the manifolds and send and return piping, PRESSURE TEST TO MANUFACTURERS SPECIFICATIONS. Once a manifold is installed and connected to the main supply and return piping, isolate the expansion tank by closing the shut off valve to it, and pressure test the manifold and main piping system to 30 psi prior to the installation of the heat exchange panels. Pressure test the expansion tank to make sure that it is sealed and at the proper pressure for the system to the manufacturers specifications. Open the system valve to the expansion tank after it passes the pressure test.

Once the main send and return system passes the pressure test, set the system pressure to the maximum pressure marked on the heat exchange Panels. As each row of Panels is installed, it should be hooked up to the manifold and pressurized. While the next row of panels is prepared, the paver / pedestal installer shall set the pavers and prepare the next row of pedestals. As each zone is completed, move to the next manifold and follow the same procedure until all Panels are installed. Pavers or finish surface should be installed as soon after pressurization as possible. Whenever possible, keep Panels pressurized during installation of Pavers or finish surfaces. When pressurizing with air, some fluctuation of pressure (approximately +/- 10%) is normal as the Panels will expand when placed under pressure.

C. Installation training videos are available at www.therma-hexx.com

D. Fill the system with water, pressure test to the stated maximum pressure as marked on the Panels and purge before filling with glycol mixture. Make sure that the expansion tank is NOT isolated from the system. After successfully testing with water, blow the water out of system with compressed air and replace with the appropriate glycol mixture.

E. Never keep the system isolated from the expansion tank when fluids are in the system. Over expansion of the Panels and bursting can occur on warm days when the fluid will expand in the system.

F. For ground mounted systems, apply 1 inch of bedding sand or stone dust to the top of the modular heat exchange panels making sure to fill the gaps between the Panels with sand, screed the sand to the appropriate thickness and level, apply the paver or stone surface and tamp the units to provide an even surface to within .125 inch between the paver units. Apply polymeric sand to manufacturer specifications using a plate vibrator / compactor using a sheet of plywood between the plate compactor and the paver surface to protect the paver surface from marring.

G. Route piping in an orderly manner, as designated by the manufacturer or architect / engineer on approved shop drawings. Changes to routing as specified on shop drawings must be approved by the manufacturer. The installing contractor shall document the as built installation.

H. When called out on Drawings, Panels may be trimmed or cut as required only in the direction of the Panel flow up to a minimum width of 8". Panels may be cut with any jigsaw, table saw or hand-held power saw or sheet metal shear, using cutting blades appropriate for plastic, wood or metal. Do not cut pressurized Panels. Complexity of the required cut will dictate the appropriate cutting tool. Panel cuts will expose internal fluid distributing channels. Take appropriate steps to ensure fluid channels are not contaminated with foreign materials and debris while exposed. Panel cutting should only be performed by installers who have had proper instruction from the Panel manufacturer. Trimmed or cut Panels must be resealed using the appropriate tools and technique as made available by the Panel manufacturer. Following the cutting or trimming of any Panels, the sealed off openings shall be tested with soapy water to verify resealing integrity.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

J. Where Panels are installed over roof drains, manifolds or other objects that require access or inspection, the installing contractor shall provide a minimum of a 4 foot loop of ½" PE-RT connecting tubes between Panels, on the inlet and outlet of the Panel, located directly above the roof drain to allow for the temporary displacement of the panel to allow for future maintenance of the roof drains without the need to disconnect the Panels. Connecting loops can be welded with standard PE-4710 - ½" CTS socket fusion fittings (to be provided by Manufacturer).

K. Maintain clearance for access to valves and fittings.

L. Air elimination is essential for proper operation of the Panel system. Installer shall be responsible to ensure proper installation of air elimination devices. Coalescing type air separation units are recommended.

M. Verify pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

N. If required, install a line sized shut-off valve and strainer on pump suction, and line sized check valve and balancing valve on pump discharge. Install air vent and drain connection on horizontal pump casings. Install a swing check valve on the return side of each manifold and spring type in line check valves (set above the static system pressure) on the send side of each manifold if the main system is located above the Panels elevation to prevent draining of the system glycol should a leak occur. An adjustable pressure reducing valve (PRV) should be installed on the inlet side of each manifold if the system operating pressure will exceed the maximum Panel pressure to allow for system head pressure requirements.

O. Install unions downstream of valves and at equipment or apparatus connections.

P. Install electrical devices furnished loose for field mounting.

Q. Install control wiring between control panel and field mounted control devices.

R. System control concept. This system is designed to facilitate snow and ice removal from designated paver areas in winter months. Coverage areas are defined within the projects drawing package. In summer months, the system is designed to collect & remove solar generated surface heat from the same areas and to distribute the collected energy to a designated place should one be provided.

S. System control sequencing – Snow and Ice Removal Mode. The system shall be controlled by a dedicated Snow and Ice Melting control, as designated and supplied by the Manufacturer. Key components shall consist of Controller, Snow & Ice Melting Sensor and in-paver temperature sensor. Sensor shall be surface mounted, located within the paver system in an area which is deemed the most critical for snow and ice removal. Paver installer shall be responsible for making provisions for the installation of sensors and in-paver temperature sensor. The controller shall be programmed by the system installer to meet the requirements of the owner.

T. System control sequencing – Heat transferring Mode. The system shall be controlled by a differential controller, as designated and supplied by the Control Manufacturer.

U. Connect the system to power source as specified in Section 16150.

V. Once the entire system is piped and deemed leak-free, fill and purge the system as needed for normal operation. Fill each Panel row separately to ensure complete removal of air as well as completely filling with mixed antifreeze solution.

W. Install an automatic glycol injection and pressurization system set to a maximum of 14psi with a minimum of a 17 gallon tank capacity or appropriate size for the size of system to allow for over pressurization outflow collection and system pressurization maintenance. A low pressure shut off switch set to 10 psi shall be installed to shut down the pump(s) should the glycol feeder run out fluid and cease to pressurize the system. The system requires a circulating fluid that contains antifreeze. Installer shall be responsible for determining exact concentration required, depending upon location and operating conditions. Follow the recommendations of the antifreeze manufacturer and consider operating conditions, health and safety requirements before choosing and installing antifreeze. It is recommended that the solution be premixed prior to installation to ensure proper mixing and concentration level. Installer shall be responsible to check final concentration following installation. Antifreeze concentration diminishes over time. Follow the manufacturer's recommendations for testing and monitoring of concentration levels.

X. Install an adequate sized air elimination unit and expansion tank. Note that each Panel and its interconnecting tubes hold 0.26 - .36 gallons of fluid.

Y. The snow melt control system shall be designed with one or more zones capable of both moisture and temperature sensing. Locate sensors to monitor the most critical pedestrian areas under control. All zones shall be operated simultaneously when prompted by the control system. Warm weather operation is intended to remove excess heat from pavers and redistribute this heat into the fountain water. Seasonal operation shall be controlled by a manually operated three-way value and in-line temperature gauge. Building maintenance staff shall be instructed on recommended process for seasonal change-over and for ongoing temperature monitoring.

Z. Provide acceptance testing of all components and maintain a written record of the results of all acceptance tests.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Repair or replace damaged products before Substantial Completion. Retain any failed Panels for return to manufacturer for testing and evaluation.

END OF SECTION