

SECTION 15109 – HYDRONIC SNOW MELTING SYSTEMS

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. Furnish and install all piping, fittings, flanges, unions, bolting, gaskets, welding, threading and soldering for the snow melting piping network, branches and connections to all fuel fired HVAC and electrical equipment and systems to make complete and operations systems.
- B. All systems shall be installed in accordance with local code including vent piping and relief discharge termination points.
- C. Secure all permits and local/state approvals for the installation of all components included under this Section.

1.2 RELATED SECTIONS

- A. Examine all drawings and criteria sheets and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.

1.3 REFERENCES

- A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of the Contract Documents.
- B. ASME: American Society of Mechanical Engineers
- C. NFPA: National Fire Protection Association
- D. ANSI: American National Standards Institute
 - 1. A13.1: Scheme for Identification of Piping Systems
- E. ASTM: American Society for Testing and Materials
 - 1. D-2122: Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
 - 2. D-2513: Standard Specification for Thermoplastic Gas Pressure / Rev. B: Pipe, Tubing and Fittings

3. D-1248: Standard Specification for Polyethylene Plastic Molding and Extrusion Materials
4. D-3350: Polyethylene Plastic Pipe and Fittings Materials

F. Copper Development Association

1.4 SUBMITTALS

- A. See Section 15050 and General Conditions for additional information.
- B. Product Data: Include date on pipe materials, controls.
- C. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- D. Project Record Documents: Record actual locations of all piping, valves, valve tag numbers and control devices.
- E. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- F. Provide piping plans to a minimum scale of 1/4" - 1'-0".

1.5 QUALITY ASSURANCE

- A. Installer: Company specializing in performing work of the type specified in this section, with documented experience.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect piping systems and specialties from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 ENVIRONMENTAL

- A. Do not install piping when environmental conditions are outside the specific limitations of the referenced codes and manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 HYDRONIC SNOW MELTING SYSTEMS

A. General

1. Provide all materials required to supply, install and pressure test Engel Method cross-linked polyethylene (PEX-A) tubing system as shown on drawings or specified herein for a complete snow melting system. The radiant snow melting system shall include, but not limited to, all piping, manifolds, valves, pumps, expansion tank, pressure relief valves, and controls to provide a complete and operational heating system. The applicable installation method(s) shall comply with published installation instructions from the tubing manufacturer.
2. The hydronic snow melting systems shall be as manufactured by Wirsbo, Stadler or Rehau.
3. The contractor shall submit to the Engineer in writing that the PEX tubing furnished under this specification conforms to the material and mechanical requirements specified herein.
4. All PEX tubing shall be stored in its carton or under cover to avoid dirt accumulation and extended exposure to direct sunlight. Tubing shall not be exposed to direct sunlight for more than 30 days.
5. PEX tubing shall carry a twenty-five (25) year non-prorated limited warranty against failure due to defects in quality or workmanship.

B. Products

1. The PEX-A tubing shall be homogeneous throughout and essentially uniform in color, opacity, density and other properties. The inside and outside surfaces shall be matte or glossy in appearance. The tubing wall shall be free of cracks, holes, blisters, voids, foreign inclusions, or other defects that are apparent to the naked eye and that may affect the wall integrity. Mild surface abrasions are acceptable. Gouges or notches in the tubing wall greater than 10% of the minimal wall thickness are not acceptable and are subject to rejection of that tubing loop (refer to ASTM F 876 for additional information).
2. Tubing
 - a. The Engel Method PEX (PEX-a) tubing is to be manufactured by Wirsbo or equal in accordance with ASTM F 876. Tubing shall not be manufactured using Siliane method during the cross-linking process. The tubing shall have an integral oxygen diffusion barrier installed at time of manufacturing that does not exceed a diffusion rate of 0.1 grams per cubic meter per day. The tubing shall be issued a Standard Grade Hydrostatic Design Stresses and Pressure Rating in accordance with all three temperatures and pressures listed in Table 1 of ASTM F 876. Tubing shall be tested in accordance with PPI TR-3 and listed in PPI TR-4. Tubing manufacturing process shall be certified by an ICBO approved independent third party testing laboratory and verification agency. Tubing shall comply with Canadian Standards Association (CSA) Standard CAN/CSA B 137.5.

3. Manifolds

- a. Manifolds shall be manufactured of dezincification resistant brass material and supplied by the tubing system manufacturer. Manifold mounting brackets shall be supplied by the tubing manufacturer. Manifolds shall be capable of individual flow control through loop zone valves or similar type of devices. Manifold shall have manual flow balancing capability manufactured within the body of the manifold. Isolation valves to the manifolds shall be installed to provide isolation of a manifold from the remaining hydronic system. Each manifold location shall have the ability to vent air manually from the system. Thermometers shall be installed ahead of the supply and return manifolds at each manifold location.
- b. Manifolds located below ground shall be constructed of High Density Polyethylene (HDPE) material. Tube fitting shall be swaged onto HDPE nipple at the manifold. Nipples must arrive from the Pex tubing manufacturer with the tube fittings installed. Manifolds shall be isolated from supply and return piping with valves that are suitable for isolation and balancing.
- c. Fittings to attach the PEX tubing to the manifold shall be supplied by the tubing manufacturer. Fittings shall be classified as a manufactured fitting and consist of Pex Ring (marked to the perspective tube size) and applicable Pex fitting. An air tight seal is required for pressure testing. Fittings shall be compatible with the manifold and PEX tubing. Fittings shall be certified to comply with the requirements of ASTM F877 and CAN/CSA B137.5.

4. Supply and Return Piping to Manifolds – Above Ground

- a. Supply and return distribution piping shall be properly sized for the given volume and velocities required at system design. Suitable distribution piping material can be either PEX or type L copper piping for all supply fluid temperatures. Fittings shall be compatible with piping material used. Fittings will be supplied to transition from distribution piping to system manifolds.

5. Supply and Return Piping to Manifolds – Below Ground

- a. Supply and return distribution piping shall be properly sized for the given volume and velocities required at system design. Suitable distribution piping material can be either PEX or type K copper piping for all supply fluid temperatures. Copper piping must be protected if embedded in concrete or soil. Fittings shall be compatible with piping material used. Fittings will be supplied to transition from distribution piping to system manifolds.

PART 3 - EXECUTION

3.1 RADIANT SNOW MELTING SYSTEM INSTALLATION

- A. During the installation, all tubing shall be capped on each end to prevent foreign materials from entering the tubing. All tubing shall be checked for abrasions prior to installation. Tubing

embedded in the floor shall be installed without joints or splices. The cold bending radius of the tubing shall be in accordance with paragraph X2.3.6 of ASTM F 877. The tubing shall be installed in such a manner as to effectively address the heat loss of the space. Tubing shall not be placed near heat sensitive materials. The manifold and all fittings shall be accessible for maintenance. After the system is filled with glycol solution, all air shall be vented from the system. After the system is allowed to stabilize at the operating temperature of the heating fluid, the system shall be vented again. PEX tubing shall be properly pressure tested, in accordance with the tubing manufacturer's guidelines, prior to burial of the tubing in concrete. Tubing system shall maintain a pressure test, under a minimum pressure of 100 psi, for a period of twenty-four (24) hours prior to the concrete pour. Tubing system shall be kept under constant pressure during installation of concrete over the tubing.

B. Concrete Slab Construction

1. In areas where tubing must cross metal expansion joints that occur in the concrete, the tubing shall be installed below the metal expansion joints. Fibrous expansion joints may be penetrated depending on the tubing manufacturer's and structural engineer's recommendation. The tubing shall be fastened to the flat mesh or reinforcing bar in accordance with the tubing manufacturers design recommendations. Vertical compressive strength of the high density extruded board insulation to be determined by the structural engineer. Required insulation value (R value) to be determined by the radiant floor design. Tubing shall be pressured prior to and during the concrete pour to ensure system integrity.

C. Supply Fluid Temperature Control

1. Supply fluid temperature control device shall be designed to deliver the appropriate fluid temperatures to meet the demand of the heating load with respect to the varying outdoor temperatures, as specified by the tubing manufacturer/system design. Control device(s) shall interface with system controller. Control strategy and components shall be supplied by the tubing system manufacturer.

D. Aqueous/Glycol Solution

1. All aqueous/glycol solutions shall be premixed and not site mixed. Site mixed solutions are not allowed due to the possibility of glycol and water separation in a static system. Aqueous/glycol solution shall be mixed to proper concentration levels to protect the system from freezing during operation shut down. The aqueous/glycol solution manufacturer shall be responsible for providing information of the freeze/flow protection levels with varying outdoor conditions. Aqueous/glycol solution shall be monitored through an established maintenance program as outline by the glycol manufacturer. Ethylene glycol will not be used in the system. Propylene glycol is the only approved glycol solution for the system.

E. Penetrations Through Fire Rated Assemblies

1. Penetrations of PEX tubing through fire rated walls, floors or ceilings must be installed using a suitable smoke and fire stop caulk around the tubing. The smoke and fire stop caulk must be supplied by the tubing manufacturer and be tested and compatible for use with PEX tubing. Refer to ASTM E 119 and ASTM E 814 to determine proper installation practices.

END OF SECTION