

SECTION 238318 – SNOW-MELTING EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

- A. Provide all labor, materials, and equipment as necessary to complete work as indicated on the Drawings and as specified herein.
- B. Section Includes: Snow-melting system.
- C. Related sections:
 - 1. Division 23 Section 230500 - COMMON WORK RESULTS FOR HVAC
 - 2. Division 23 Section 232123 - HYDRONIC PUMPS
 - 3. Division 23 Section 232500 - HVAC WATER TREATMENT
 - 4. Division 23 Section 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC
 - 5. Division 32 Section 321313 – CONCRETE PAVEMENT

1.3 REFERENCES

- A. ASHRAE Handbook - 2011 HVAC Applications, Snow Melting and Freeze Protection

1.4 SYSTEM DESCRIPTION

Note: Coordinate site plan design with PDC project mechanical rep and landscape architect.

- A. System shall be of hydronic type, packaged, skid mounted unit, except for distribution piping. System shall consist of glycol heater unit, circulating pump, expansion tank, air separator, temperature and pressure gauges, balancing valve, valves and fittings, chemical treatment, supply and return main, manifolds and fittings, distribution loops, and controls.
- B. Design criteria/parameters:
 - 1. Heat Output Min. 156 BTU/hr-SF at 3 def F, 15 MPH wind
 - 2. HWH Supply Temperature Max. 120 degree F
 - 3. Glycol/Water Solution 40%
 - 4. Heat Source - Steam 10 PSI
- C. Field-mounted power devices including combination starters and wiring shall be furnished and installed by the electrical contractor. Control devices and wiring shall be furnished and installed by the control contractors.

1.5 SUBMITTALS

Note: Review snow melt layout with PDC project mechanical rep and landscape architect.

- A. Shop Drawings: Include performance data, components and accessories, wiring diagrams, dimensions, weights and loadings, field connections, and required clearances.
- B. Test Reports: Include operating test data submitted by the manufacturer's field service representative
- C. Operation and Maintenance Data: Include approved selection data, start-up instructions, maintenance data, part lists, accessories, control and wiring diagrams, and test reports.
- D. LEED™ Documentation: Submit required documentation showing credit compliance with applicable LEED™ 2009 standards using submittal template.
 - 1. Product data shall show that equipment COP and/or EER exceed requirements of ASHRAE 90.1-2007 by 30% or more
 - 2. Commissioning Plan
 - 3. Commissioning Report

1.6 QUALITY ASSURANCE

- A. Codes and Standards
 - 1. MMC 2012
 - 2. ASHRAE 90.1-2007
- B. LEED™ NC 2.2 Compliance
 - 1. Standards Required for All Projects
 - a. EA (Energy and Atmosphere) Prerequisite 2 - Minimum Energy Performance
 - b. EA Credit 1 - Optimize Energy Performance: Meet or exceed the requirements of ASHRAE Standard 90.1- 2007 by 30% for new buildings and by 26% for existing buildings
 - 2. Additional Standards for LEED™ Certifiable Projects
 - a. EA Prerequisite 1 - Fundamental Commissioning of the Building Energy Systems
 - 3. Optional Standards for LEED™ Certified Projects
 - a. EA Credit 1 - Optimize Energy Performance (Additional)
 - b. EA Credit 3 – Enhanced Commissioning

1.7 WARRANTY

- A. Manufacturer shall furnish, at the completion of installation, as described herein, a Certificate of Inspection signed by authorized representative. The minimum five (5) year system warranty shall be provided to the Owner by the Contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are Wirsbo Co., Heat Link, Snow Technology Inc., Viega North America, REHAU, and Hume Snow Melting System, Inc.. Systems by other manufacturers, whose products have been in successful operation for at least 5 years will be considered.

Note: Select the type of piping system preferred for the project (HDPE or PEX) or allow contractor to choose. Discuss with PDC project mechanical rep.

2.2 HDPE PIPES AND FITTINGS

- A. Underground distribution loop shall be equal to Meltaway cross-linked polyethylene, rated at minimum 180 degrees F. and 100 PSI pressure, conform to applicable ASTM standards, and marked "SNOW MELTING SYSTEMS". Minimum pipe size shall be 1/2".
- B. Underground mains shall be equal to high density polyethylene (HDPE).
- C. Mains inside building shall be same as hot water heating piping. Refer to Division 23 Section 230500 "Common Work Results for HVAC."
- D. Distribution manifolds shall be manufactured of HDPE, or approved equal, with factory installed fusion-welded Rosex fittings.
- E. Loop lengths shall be equalized to provide balanced flow without requiring balancing valves on each loop or reverse return arrangement. Provide balancing valve for each manifold.
- F. Loops shall be a maximum length of 300 feet and form a continuous conduit without joints from supply to return manifolds.
- G. Fittings shall be manufactured of HDPE and shall be Wirsbo's Rosex fitting, consisting of a cap mounted over a serrated insert sleeve with O-ring sealing.

2.3 PEX PIPES AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Infloor Radiant Heating, Inc.
 - 2. MrPEX Systems Inc.
 - 3. REHAU
 - 4. ROTH Industries, Inc.
 - 5. Upnor Wirsbro, Co.
 - 6. Vanguard Piping Systems, Inc. a Viega Company

7. Veiga North America.
 8. Watts Radiant, Inc. a division of Watts Water Technologies., Inc.
 9. Zurn Plumbing Products Group; Zurn Radiant Heating Systems.
 10. FlorHeat Company (The)
 11. HeatLink USA Inc.
 12. IPEX Inc.
 13. Slant/Fin Corp.
 14. Warmboard, Inc.
- B. Pipe Material: PEX plastic in accordance with ASTM F 876.
- C. Mains inside building shall be same as hot water heating piping. Refer to Division 23 Section 230500 "Common Work Results for HVAC."
- D. Distribution manifolds shall be manufactured of HDPE, or approved equal, with factory installed fusion-welded Rosex fittings.
- E. Oxygen Barrier: Limit oxygen diffusion through the tube to maximum 0.10 mg cu.m/day at 104 deg F (40 deg C) in accordance with DIN 4726.
- F. Fittings: ASTM F 1807, metal-insert type with copper crimp rings and matching PEX tube dimensions; or plastic-insert type cold expansion fittings and corresponding rings, materials meeting requirements of ASTM F 1960; or metal insert and cold jointing compression system meeting ASTM F 2080. .
- G. Pressure/Temperature Rating: Minimum 100 psig (690 kPa) and 180 deg F (82 deg C).
- H. Loop lengths shall be equalized to provide balanced flow without requiring balancing valves on each loop or reverse return arrangement. Provide balancing valve for each manifold.
- I. Loops shall be a maximum length of 300 feet and form a continuous conduit without joints from supply to return manifolds.
- J. Minimum pipe size shall be 1/2".
- 2.4 MANIFOLD VAULT
- A. Heavy duty manhole frame and cover.
1. Frame: East Jordan Iron Works product # 00180211
 2. Cover: East Jordan Iron Works product # 00180522
- B. 48" reinforced concrete pipe, cut to required length.

2.5 GLYCOL HEATER UNITS

- A. Glycol heater unit shall consist of heat exchanger, temperature/pressure relief valve, strainer, float and thermostatic steam trap, vacuum breaker and air vent, pressure and temperature gauges, drain/flush valve, and controls.

Note: Select the type of heat exchanger in the following paragraph. Vertical shell and coil heat exchanger may be used where space is limited. Consult with PDC prior to application.

- B. Heat exchanger shall be a steam to water, ASME approved, unaffected by thermal shock and designed for full standby shutdown. Heat exchanger shall be vertical shell and coil type manufactured by Elge, or horizontal shell and tube type manufactured by Bell & Gossett, or approved equal.

2.6 CIRCULATING PUMPS

- A. Refer to Division 23 Section 232123 "Hydronic Pumps."

2.7 CONTROLS

Note: Omit unit controller and connect the system to EMCS if applicable. Consult with PDC.

- A. Control shall include snow/ice sensor, outdoor sensor, supply and return glycol temperature sensors, overheat protection, snow/ice detector, pneumatic control valve, signal selector, status pilot lights, control transformer, relays, EP switches, and combination starter with hand-off-auto switch. System shall be turned on and off automatically.
- B. Snow/ice melting control shall regulate the rate at which heat is transferred into a snow melting slab, and determine the required supply glycol temperature from measurement of the slab temperature. Modulation of the heat delivery shall be accomplished by a modulating steam valve. Snow/ice detector shall activate the snow/ice-melting control upon the detection of snow/ice formation on the snow melting slab.
- C. Microprocessor-based snow/ice-melting controller manufactured by Tekmar Control System shall be provided for stand alone system, not connected to the EMCS.
- D. Glycol temperature shall be limited to 120 degree F. A secondary high-limit manual reset shall be locked at 130 degree F.

2.8 WATER TREATMENT

- A. Dowfrost HD with yellow dye, inhibited propylene glycol and corrosion inhibitor shall be provided by the Contractor. Refer to Division 23 Section 232500 "HVAC Water Treatment."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Snow Melt System

1. A complete snow melt system including tubing loop, manifolds, fittings, and sensors shall be installed in accordance with the manufacturer's recommendations. The

Contractor shall follow the Shop Drawings for tube layout, tube spacing, concrete joint pattern and manifold and sensor locations.

2. Stamp "Heated Walk Limit" all along the edge of the heated surface. Review layout with Project Representative prior to stamping. Stamp is available from Owner. See Division 32 Section 321313 "Concrete Pavement."
3. Distribution manifolds, attached to supply and return mains, shall be located within heated pavement in manifold vault unless approved by owner.
4. A minimum of one supply and one return manifold is required for each 1,600 square foot area and for alternate expansion/construction joints. Install main piping under the concrete walk as much as possible. Main piping installed outside the walk shall have at least 36" of cover, and shall be protected by concrete panel and indicator warning tape. Where 36" of cover cannot be achieved provide separate ductile iron sleeves sized to allow for 2/3 full condition. Provide flow balance for entire system.
5. Reinforcing steel (See Division 32 Section 321313 "Concrete Pavement" shall be furnished by the Contractor and supported, as required, over entire heated area.
6. One-half inch pipe loops shall be attached to reinforcing steel on 6" centers using 12 inch minimum return bends without fittings. No pipe shall extend through expansion, construction or working joints in concrete slab. Where pipes pass into a frost free door foundation pipe insulation shall be used (See Detail). Pipes and continuous steel may extend through control joints (surface tool marks). Pipe loops shall be embedded in concrete at specified depth. All pipe connections, fittings and distribution manifolds shall be free of concrete and arranged so as to be easily serviced through manifold vaults.
7. Mechanical joints shall not be buried without access for maintenance.
8. Distribution loop shall be pressure-tested with water or air in accordance with the manufacturer's recommendations prior to concrete cover. The system shall remain at this pressure during the concrete installation and for a minimum of 24 hours thereafter to insure system integrity. An Owners representative shall witness the pressure-test.
9. Packaged systems shall be installed on a 6" high housekeeping pad.
10. Unless otherwise noted, snow melt system shall be connected to Central Control Energy Management with enable/disable point, status point, supply and return temperatures, and general alarm.
11. Clearly label piping with heat transfer fluid manufacturer, type, and system total fluid volume within 6 feet of point where glycol is added.

3.2 FIELD QUALITY CONTROL

- A. Refer to Division 23 Section 230593 "Testing, Adjusting and Balancing for HVAC."
- B. Manufacturer shall provide inspection service and technical assistance for the installation:
 1. Site preparation

2. Testing
3. Start-up and balance
4. Annual maintenance shall be available for inspection, adjustment and lubrication of system equipment.

END OF SECTION 238318