SECTION 23 21 15 - UNDERGROUND HYDRONIC PIPING

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. Section includes underground piping materials and accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing hydronic piping systems with the following minimum working-pressure ratings:

1. Hot-Water Piping: 150 psig at 200 deg F.
2. Chilled-Water Piping: 150 psig.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Conduit piping.
2. Cased piping.
3. Loose-fill insulation.

B. Shop Drawings: For underground hydronic piping.

1. The manufacture shall calculate requirements for expansion compensation for underground piping and adjust the expansion as shown on the drawings if necessary.
2. Show expansion compensators, offsets, and loops with appropriate materials to allow piping movement in the required locations. Show anchors and guides that restrain piping movement with calculated loads, and show concrete thrust block dimensions.
3. Show pipe sizes, locations, and elevations. Show piping in trench, conduit, and cased pipe with details showing clearances between piping, and show insulation thickness.

C. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PIPING SYSTEM

A. Description: Factory-fabricated piping with carrier pipe, insulation, and casing.

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1. Provide a Urethane pre- insulated piping system manufactured by Rovanco Piping Systems.

B. Carrier Pipe: Type L Copper tube and fittings or Schedule 40, A-53 steel pipe and fittings.

C. Carrier Pipe Insulation: Polyurethane Foam Pipe Insulation: Rigid, cellular, high-pressure injected between carrier pipe and jacket. Closed cell content – 90 to 95% in conformance with ASTM C-591. Provide minimum 2” thick insulation on heating system piping and 1” thick insulation on chilled water system piping.

D. Jacketing: PVC minimum 60 mills thick for piping up to 1 ½”, 70 mills thick for piping 2” to 3” and 80 mills for 4” diameter pipe and larger.

E. The manufacturer shall provide the locations of the required number of anchor and guides required for the installation.

F. Fittings will be field insulated and jacketed with materials supplied by the piping system manufacturer.

PART 3 - EXECUTION

3.1 PIPING APPLICATION

A. Hot-Water Heating Piping:

1. NPS 2 (DN 50) and smaller shall be:

a. Type L drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

2. NPS 2-1/2 (DN 65) and larger shall be any of the following:

a. Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
b. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install expansion loops, anchors and guides as required and recommended by the piping system manufacturer.

C. Remove standing water in the bottom of trench.

D. Do not backfill piping trench until field quality-control testing has been completed and results approved.

E. Install piping at uniform grade of 0.2 percent. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points and elsewhere as required for system drainage. Install manual air vents at high points.

F. Install components with pressure rating equal to or greater than system operating pressure. Install piping free of sags and bends. Install fittings for changes in direction and branch connections.

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G. Secure anchors with concrete thrust blocks per manufacture's installation instructions.

3.3 JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and the manufacture's installation instructions. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

B. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.

E. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.4 IDENTIFICATION

A. Install continuous plastic underground warning tapes during back filling of trenches for underground hydronic piping. Locate tapes 6 to 8 inches (150 to 200 mm) below finished grade, directly over piping.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to instruct the installer on the proper installation procedures. The factory authorized representative shall inspect the installation and verify the testing and adjustment of all components, assemblies, and equipment, including all connections are properly installed.

B. The factory authorized representative shall provide a report indicating the installation meets the manufacture's requirements.

END OF SECTION 23 21 15

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