

SECTION 15510 – “UNDERGROUND PIPING”

- 1.0 This section pertains to all underground chilled water, steam and steam condensate, domestic water, natural gas, and sewer piping systems installed throughout the University Campus.

Reference Sections:

Section 15050 for Basic Materials and Methods.

Section 15400 for Piping Systems.

Section 15515 for Hydronic Specialties

Section 15525 for Steam and Condensate Specialties.

2.0 Chilled Water Piping:

- A. Underground piping systems shall be constructed of concrete lined, ductile iron pipe using Elastomer gasketed bell and spigot joints rated for a 350 PSI working pressure. The minimum thickness of the cement lining shall be as follows:

1. Up to 12” – 1/16”.
2. 14” to 24” – 3/32”.
3. Above 24” – 1/8”.

The ductile pipe dimensions and tolerances shall conform to ANSI/AWWA C151/A21.51 Class 56 standards. The piping will be factory coated with an asphaltic coating. The contractor must be directed not to field apply any coating to the pipe. All underground piping must be cathodically protected. Pipe bedding shall be equal to Type 1 through 5 per ANSI/AWWA Standards. A holiday detector shall be used during the installation to determine if any faults exist in the asphaltic coating.

- B. Joints shall be fully restrained mechanical type equal to U.S. Pipe and Foundry T.R. Flex type.
- C. Transition from ductile iron (TR-Flex) to building piping (steel) shall be made by a spun ductile iron flange (by US-pipe) to steel flange connection. Connection shall comply with ANSI / AWWA C115 / A21.15 “Class 250#. The use of mechanical fittings is prohibited. Consider piping restraining systems as required. Ductile iron connections shall not project more than 3’ into building. Site work contractor shall be responsible for all DI piping systems. Building mechanical contractor is responsible for making the DI to steel connection. Pressure test laterals to determine supply and return before making final connections.

- D. Laterals from mains through the building foundation shall be run strait with NO offsets.
- E. Protection of the valves and valve boxes during construction is paramount. Avoid heavy loads directly on piping systems!
- F. Provide isolation valves outside buildings (**not in the street – just inside the curb line preferred**) as near to the connection to utility main **and** inside buildings before any branch connections or devices.

3.0 Steam Piping:

- A. Cellular glass insulated steel carrier pipe (steam-schedule40, condensate-schedule80) inside insulated outer steel conduit and jacketed with extruded high-density polyethylene (HDPE). System needs to be drainable, dryable and testable. Outer casing field joints shall be wrapped with a shrink sleeve seal.
- B. The design shall specify and indicate all thrust blocks, anchors, moment guides, oversized elbows and expansion loops necessary for a complete system. Include all end seals, gland seals and pipe supports. A holiday detector shall be used during the installation to determine if any faults exist in the conduit coating.

Manufacturers and models: Multi-Therm 500 with HDPE Jacket (By Permapipe-Ricwil), Duo-Therm 505 (By Thermacor), or Insul-800 (by Rovanco). “No exceptions”

- C. Threaded joints are permitted up to a 2" nominal pipe size. Above 2 inches, all joints must be flanged or welded.
- A. Thermal PAK flexible ball and slip joints.
Ball joint shall be of integral design. Series P-2 Ductile iron seats with injectable packing cylinder while under full line pressure. Packing cylinder shall be a Type B (400H) packing cylinder. Type B contains an integral stainless steel safety valve to supplement the discharge tip design and provide a positive shut off when the plunger is used. Note: Specify removable and resilient insulation blanket.

Manufactures: Advance Thermal Systems, Inc. or Barco (600 Series / Style III)

- 4.0 Domestic Water: Refer to Section 15400 for Piping and Materials.
- 5.0 Natural Gas: Refer to Section 15400 for Piping and Materials.

6.0 Sewer: Refer to Section 15400 for Piping and Materials.

7.0 Site Utility Valving Requirements:

Provide isolation valves outside buildings (**not in the street**) as near to the connection to utility main and inside buildings before any branch connections or devices.

8.0 General Information:

- A. Typically, the University owns and maintains the Campus steam distribution piping after service from the local provider (Trigen Philadelphia).
- B. All underground utility work within the right-of-way must follow the GPIS permitting system process. The A/E is responsible for entering the appropriate information in the system in a timely fashion to concur with the project schedule requirements.
- C. All restoration by permit tee to be accordance with the Streets Department Standard Construction Item publication.
- D. Laboratory waste within buildings shall be a separate system through the building wall. The laboratory waste systems shall be piped to a common sampling manhole before connected to the site sanitary system.
- E. A/E shall coordinate the termination of services with the Utility Companies and project the costs of extending services to any new buildings or projects.
- F. Critical Utilities: On a project by project basis, the A/E and the University shall determine which utilities are critical to support the project during a utility failure. Consideration shall be given to multiple sources or utility connections to critical functions (such as chilled water for Vivarium facilities).

END OF SECTION