

CONSTRUCTION STANDARD SPECIFICATION

SECTION 15371

PIPING - DEIONIZED WATER

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PIPING - DEIONIZED WATER

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

Materials and operations required for the installation of deionized water piping system with less than 3 ppm dissolved solids and of 10 megaohm or less resistivity including fittings, valves, equipment, joints and tests. NOTE: For Ultrapure water systems of 10 megaohm or greater resistivity special specification will be issued.

1.02 REFERENCES

The current editions of the following standards are part of this specification.

A. American National Standard Institute (ANSI):

ANSI B31.3, Chemical Plant and Petroleum Refinery Piping,

Chapter VII - Non-Metallic Piping and Piping Lined With Non-Metals

B. American Society For Testing Materials (ASTM):

ASTM D 1785 - PVC Plastic Pipe, SCH 40, 80, and 120

ASTM D 2467 - PVC Plastic Pipe Fittings

ASTM D 3087 - Anion Exchange Material

ASTM D 1782 - Cation Exchange Material

ASTM D 3375 - Mixed Bed Ion Exchange Material

ASTM D 3736 - Operating Characteristics of Reverse Osmosis Devices

1.03 QUALITY ASSURANCE

A. Bonding Materials And Procedures:

Conform to ANSI B31.3, Chapter VII.

PART 2 - PRODUCTS

2.01 ACCEPTABLE DISTRIBUTORS

The firms mentioned herein are of acceptable type, quality and performance. All material shall be equal to Heflin-Harrington Plastics Company, Ryan Herco Company or Albuquerque Windustrial Company Products.

2.02 MATERIALS

A. Piping:

Schedule 80 PVC pipe, manufactured specifically for deionized water use, furnished in 20-foot lengths, cylindrical and straight. Pipe material shall be Type 1, Grade 1 PVC conforming to ASTM D-1785 and shall comply with ANSI B31.3.

B. Fittings:

Schedule 80 PVC fittings, socket ends, conforming to ASTM D2467, cleaned and packaged.

C. Valves:

1. Ball:

True Union PVC valve, socket ends, teflon seat, cleaned and packaged individually.

2. Check Valve:

Ball type PVC valve, socket end, cleaned and packaged individually.

D. Equipment:

1. All water treatment equipment shall conform to ASTM D3087, D1782, D3375 or D3736 which ever is applicable.

2. All pumps, flow and metering devices and other such equipment shall be compatible and manufactured for use with deionized water.

PART 3 - EXECUTION

3.01 PIPING INSTALLATION

A. General:

1. The piping shall be coordinated with respect to space available with the HVAC, plumbing and electrical installation.
 - a. In every instance where there is a conflict in the routing or the piping and the HVAC ducting, the routing of the HVAC ducting shall have priority.
 - b. The installed piping shall not interfere with the operation or accessibility of doors and windows; shall not encroach on aisles, passageways, and equipment; and shall not interfere with the servicing or maintenance of equipment.
2. The pipe shall be cut accurately and square to measurements established at the construction site and shall be worked into place without springing or forcing, properly clearing all openings and equipment.
 - a. Cutting or weakening of structural members to facilitate piping installation is not permitted.
 - b. Pipes shall have burrs removed by reaming and shall be so installed as to permit free expansion and contraction without damage to joints or hangers.
3. All piping shall be run parallel with the lines of the building unless otherwise noted on the drawings.
4. Unless otherwise shown on the drawings, horizontal piping shall pitch down in the direction of flow with grade of not less than 1/8 inch per foot. A valved drain connection shall be provided at all low points.
5. Piping connections to equipment shall be in accordance with details shown on the drawings.
6. Service pipe, valves, and fittings shall be kept a sufficient distance from other work to permit finished covering not less than 1/2 inch from such other work, and not less than 1/2 inch between finished covering on the different services.
7. Interconnecting piping for the water treatment equipment shall be furnished and installed by the Contractor.
 - a. The water treatment equipment supplier shall provide start-up service make adjustments and instruct Sandia National Laboratories (SNL) maintenance personnel on proper operation.
 - b. The contractor shall supply all charging chemicals required for initial start-up and testing.
 - c. All relief valve discharge piping shall be piped to the storage tank unless otherwise shown on drawings.

B. Installation of Valves:

1. Valves shall be installed at the locations shown on the drawings and where specified.
2. All valves shall be installed with their stems horizontal or above.

C. Pipe Hangers:

1. Unless otherwise noted on the drawings, horizontal overhead runs of pipe shall be hung with adjustable wrought iron or malleable iron pipe hangers.
 - a. Chain-strap, perforated bar or wire hangers WILL NOT be permitted.
 - b. All "C-Clamp" hangers shall have lock nuts or retaining straps; pipe rings shall be solid ring adjustable swivel type.
 - c. Trapeze hangers may be used in lieu of separate hangers on pipes running parallel to each other and close together.
 - d. All hangers shall have short turnbuckles or other SNL approved means of adjustment, and shall be suspended from structural members.
 - e. Hangers and collars shall be of a size proportionate to the weight of the pipe supported.
2. Where the piping is attached to metal partitions, full-length through bolts shall be used with large washers on both sides.
3. Piping in tunnels or chases shall be supported on Unistrut or approved equal, as indicated on the drawings.
4. Pipe shall not be supported in tight clamps, but shall be free to move axially.

D. Hanger Spacing:

1. Hangers shall be spaced in accordance with the following schedule.
2. If pipe is insulated, the maximum spans shall be reduced 35% to accommodate the weight of insulation.

MAXIMUM SPAN (FT)

Schedule 80 Pipe

Temperature °F

Pipe Size	70	120 & Above
1/2"	5	continuous
3/4"	5	"
1"	5-1/2	"
1-1/2"	5-1/2	"
2"	6	"
3"	7	"
4"	7-1/2	"
6	8-1/2	"
8	9	"
10	9-1/2	"

E. Joints:

Joints shall be socket-welded using solvent cement in accordance with manufacturer's installation recommendations. Screwed joints shall be permitted only if called for on drawings.

F. Storage:

Pipe and fittings shall be stored before installation indoors and away from direct sunlight.

3.02 TESTS

A. General:

1. Before insulation is applied, all piping, equipment and accessories installed under this contract shall be inspected and tested by the Contractor in the presence of the Inspector, and approved before acceptance.
2. All labor, material and equipment required for testing shall be furnished by the Contractor.
3. The contractor shall be responsible for all repairs and retesting as required.
4. All instruments and other equipment whose safe pressure range is below that of the test pressure shall be removed from the line or blanked off before applying the tests.
5. Contractor to provide a valved pressure tap with a 150 psi gauge and a one inch valved connection point for leak testing and cleaning of system.

B. Testing:

Deionized water piping shall be leak tested with deionized water at 1-1/2 times system operating pressure and shall show no drop in pressure in a two-hour period.

3.03 CLEANING

- A. Upon completion of the leak testing, all piping installed under this contract shall be cleaned with chlorinated water (sodium hypochlorite, 500 ppm) for a four-hour period.
- B. All valves in the lines being sterilized shall be in the open position during the cleaning procedure. Once an hour all end-use points shall be opened. New sodium hypochlorite shall be added to the system to maintain concentration level.
- C. After cleaning, the system shall be flushed with deionized water until detected chlorine is less than .1 ppm.

END OF SECTION