SECTION 02632

POLYVINYL CHLORIDE (PVC) WATERLINE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required, and install polyvinyl chloride (PVC) waterline, fittings, and appurtenances as shown on the drawings and as specified herein.

1.02 REFERENCE SPECIFICATIONS, CODES & STANDARDS

A. This standard references the documents listed below. They form a part of this standard to the extent specified herein. In any case of conflict, the requirements of this standard shall prevail.


8. ASTM D2774 - Recommended Practice for underground Installation of Thermoplastic Pressure Piping.


1.03 **SUBMITTAL**

A. Submit to the Engineer within ten days after receipt of Notice-to-Proceed a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. Submit for approval, as provided in the Supplement to the General Conditions, complete, detailed shop drawings of all PVC pipe and fittings.

C. Submit and shall comply with pipe manufacturer’s recommendations for handling, storing, and installing pipe and fittings.

**PART 2 - PRODUCTS**

2.01 **WATER MAIN**

A. Polyvinyl Chloride (PVC) Pipe

1. Pipe smaller than 4 inches: Conform to requirements of ASTM D2241 with a standard dimension ratio (SDR) of 18, and a pressure rating of 200 psi. PVC material used in pipe shall be as specified in ASTM D1784, Cell Classification 12454-B.

2. Pipe 4 inches through 12 inches: Conform to requirements of AWWA C-900 with a dimension ratio (DR) of 18, pressure class 150. PVC material used in pipe shall be as specified in ASTM D1784, Cell Classification 1245-B.

3. Pipe larger than 12 inches: Conform to requirements of “Recommended Standard Specification for Polyvinyl Chloride (PVC) Water Transmission Pipe (Nominal Diameter 14-36”) as prepared by the uni-Bell PVC Pipe
Association. Pipe shall have a cast iron outside diameter, having a dimension ratio (DR) of 25 with a pressure rating of 165 psi. PVC material used in the pipe shall be as specified in ASTM D1784, Cell Classification 1254B.

4. The potable water mains shall be blue in color.

5. All pipe shall be manufactured in the United States.

B. Steel Encasement Pipe: Conform to ASTM Designation A252, Grade 2. Joints shall be welded completely around the pipe by a certified welder. Pipe shall meet all AASHTO standards and Florida DOT requirements.

C. Fittings:

1. PVC Pipe: Fittings shall be ductile iron mechanical joint, with a working pressure of 250 psi and conforming to AWWA Specifications C110 or C153. All bolts and nuts shall be 304 stainless steel, Cor-blue or Cor-Ten or equal. Cor-Ten shall meet the requirements for ANSI/AWWA C111/A21-11 for buried application. For pipe 8 inches and smaller, fittings shall be C900 PVC rated fittings.

2. Tapping Sleeves: Sleeve shall be stainless steel, mechanical joint type, with working pressure rating of 250 PSI, and conform to AWWA Standard C110.

3. All fittings shall be manufactured in the United States.

D. Joints

1. Restrained Joint for PVC Pipe: Pipe fittings and other requiring restraint shall utilize Megalug appurtenances (or approved equal) joint restrain devices.

2.02 IDENTIFICATION

A. Pipe shall bear identification markings that will remain legible after normal handling, storage, and installation. Markings shall be applied in a manner that will not weaken or damage the pipe. Marking shall be applied at intervals of not more than 5 feet on the pipe. Marking on the pipe shall include the following:

1. Nominal size and OD base.

2. PVC
3. Dimension ration
4. AWWA pressure rating.
5. AWWA designation.
6. Manufacturer’s name and trademark.
7. Manufacturer’s production code, including day, month, year, shift, plant, and extruder of manufacturer.
8. All PVC water pipe shall be color-coded blue.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Polyvinyl Chloride (PVC) water pipe shall be installed in accordance with the manufacturer’s recommendation, as shown on the drawings, and as specified herein.

B. The Contractor shall use care in handling, storage, and installation of pipe and fittings. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer’s recommendation. Under no circumstances shall pipe or fittings be dropped into the trench.

C. Pipe shall be laid to lines and grade shown on the drawings with bedding and backfill as shown on the drawings. Blocking under the pipe will not be permitted.

D. When laying is not in progress, or the potential exists for dirt or debris to enter the pipe, the open ends of the pipe shall be closed with plug or by other approved means.

3.02 TESTING WATER MAIN

A. All force mains shall be field tested in accordance with AWWA C-900 and as specified herein. The Contractor shall supply all labor, equipment, material, gages, pumps, and incidentals required for testing.

B. The test pressure shall be 150 psi for water mains, unless noted otherwise. The test pressure shall be measured at the highest point along the test section.
C. Testing shall be conducted after backfilling has been completed and before placement of permanent surface.

D. Testing procedures shall be as follows:

1. Fill line slowly with water. Maintain flow velocity less than two feet per second.

2. Expel air completely from the line during filling and again before applying test pressure. Air shall be expelled by means of taps at points of highest elevation.

3. Apply test pressure. Maintain pressure within 5 psi of the test pressure for a period of two hours. Measure the quantity of water that was pumped into the line to maintain pressure and the quantity of water required to bring the line up to test pressure. The sum of these two quantities is defined as leakage.

4. Carefully examine all exposed pipe, fittings, and joints during the test.

E. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

\[
L = \frac{SD(P)^{1/2}}{133,200}
\]

in which \(L\) is the allowable leakage, in gallons per hour; \(S\) is the length of pipe tested; \(D\) is the nominal diameter, in inches; and \(P\) is the test pressure, in psi.

F. If any test of pipe laid discloses leakage greater than that allowed, the Contractor shall, at his own expense, locate and repair the cause of leakage and retest the line.

G. All visible leaks are to be repaired regardless of the amount of leakage.

3.03 CLEANING

A. At the conclusion of the work, the Contractor shall thoroughly clean all of the new pipe lines by flushing with water and pigged to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed at the Contractor’s expense.
3.04 DISINFECTION

Disinfect completed water pipeline in accordance with Section 2675.

END OF SECTION