Section 02630 - 6 INCH TO 12 INCH POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

1. SCOPE. This section covers 6 inch through 12 inch buried polyvinyl chloride (PVC) pressure pipe. PVC pressure pipe shall be furnished complete with all fittings, jointing materials, anchors, blocking, encasement, and other necessary appurtenances.

Pressure and leakage tests, cleaning, and disinfection are covered in other sections. Pipe trenching, bedding, and backfill are covered in the earthwork section.

2. GOVERNING STANDARD. Except as modified or supplemented herein, all PVC pressure pipe shall conform to the applicable requirements of ANSI/AWWA C900.

The supplementary information required in the foreword of the governing standard is as follows:

Affidavit of Compliance (Sec. 1.4)	Required.
Plant Inspection (Sec. 4)	Not required.
Special Markings (Sec. 2.6)	Not required.
Special Preparation for Shipment (Sec. 2.7)	Not required.
Certification (Sec. 2.1.4)	Required.

3. MATERIALS.

Pipe and Couplings	ANSI/AWWA C900; cast iron pipe OD. Pressure class 200 psi, wall thickness of DR 14. The bell of the pipe shall be an integral thickness wall made mono-lithically with the pipe.
Fittings	Cast iron; ANSI/AWWA C110/A21.10, 250 psi pressure rating, except shorter laying lengths will be acceptable.
Thixotropic Coal Tar Paint	MIL-C-18480; Kop-Coat "Bitumastic No. 50", Tnemec "46-450 Heavy Tnemecol", or Valspar "35-J-10 Hi-Build Bituminous Coating".
Joints	
PVC to PVC	ANSI/AWWA C900, stab type, with elastomeric gaskets. Gaskets shall be synthetic rubber. Natural rubber will not be acceptable.

PVC to Ductile Iron	ANSI/AWWA C111/A21.11, except gaskets shall be synthetic rubber. Natural rubber will not be acceptable.
Conductive Tracer	#12 plastic coated solid copper wire taped to the top of the pipe. See standard drawings for installation at valve boxes.
Location Tape	Non-Metallic location tape shall be placed 1 foot above mains.
Polyethylene Tube	Seamless, ANSW/AWWA C105/A21.5 installation method A for fittings: if required in Special Conditions.

Manufacturing quality control shall be maintained by frequent, regularly scheduled sampling and testing. Testing shall comply with the governing standard.

4. SHOP COATING AND LINING. The exterior surfaces of cast iron fittings shall be coated with a bituminous coating. The interior surfaces of cast iron fittings shall be lined with cement mortar.

5. STORAGE AND HANDLING. Storage and handling shall be in accordance with Chapter 6 of AWWA Manual M23. Pipe, fittings, and accessories shall be handled in a manner that will ensure installation in sound, undamaged condition. Pipe shall not be stored uncovered in direct sunlight.

6. INSPECTION. Pipe and fittings shall be carefully examined for cracks and other defects immediately before installation; spigot ends and bells shall be examined with particular care. All defective pipe and fittings shall be removed from the site of the work.

7. LAYING PIPE. Pipe shall be protected from lateral displacement by pipe embedment material installed as specified in the earthwork section. Pipe shall not be laid in water or under unsuitable weather or trench conditions.

Each pipe shall be laid on a firm bed, true to line and grade, and in such a manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line or disturbance of the line and grade. All lumps, blisters and excess coating shall be removed from the bell and spigot end of each pipe, and the inside of the bell and the outside of the spigot shall be wire-brushed and wiped clean and dry and free from oil and grease before the pipe is laid. Pipe shall be laid with the bell ends facing the

direction of laying. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.

Cutting of pipe for closure or for other reasons shall be done in a neat and workmanlike manner and in a method which will not damage the pipe. All such cutting shall be done by mechanical cutters. Cut ends and rough edges shall be ground smooth and the cut end of the pipe shall be beveled.

Deflection from a straight line shall not exceed the maximum deflection recommended by the pipe manufacturer. If the specified alignment requires deflections in excess of those recommended, the Contractor shall provide either bends or short lengths of pipe, in such lengths and number, that the angular deflection of the joints are not exceeded.

Each pipe foreman on the project shall have been issued an installation booklet for the type of pipe to be installed.

Minimum depth of bury shall be 3 feet to top of pipe. Maximum laying length shall be 20 feet.

During cold weather, particular care shall be taken in handling and laying pipe to prevent impact damage.

Pipe shall be laid with bell ends facing the direction of laying, except when reverse laying is specifically permitted by the Engineer.

Foreign matter shall be prevented from entering the pipe during installation.

Whenever pipe laying is stopped, the open end of the line shall be sealed with a watertight plug. All water in the trench shall be removed prior to removing the plug.

Pipe shall be kept shaded and as cool as possible during installation and shall be covered with backfill immediately after installation.

Prior to final acceptance by the Owner, Contractor shall perform continuity tests on the conductive tracer to ensure proper installation. All defective areas shall be repaired and the conductive tracer retested.

7.01. Cleaning. The interior of all pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean until the work has been accepted.

7.02. Alignment. Piping shall be laid to the lines and grades indicated on the drawings. Pipelines or runs intended to be straight shall be laid straight. Deflections from a straight line or grade shall not exceed the maximum deflections specified by the manufacturer.

Unless otherwise specified or indicated on the drawings, and subject to the acceptance of the Engineer, either shorter pipe sections or fittings shall be installed as required to maintain the indicated alignment or grade.

7.03. Marking. Pipe shall be marked and labeled in accordance with AWWA C900 Section 2.5.

8. CUTTING PIPE. Cutting shall comply with the pipe manufacturer's recommendations and Chapter 7 of AWWA Manual M23. Cuts shall be smooth, straight, and at right angles to the pipe axis. After cutting, the end of the pipe shall be dressed to remove all roughness and sharp corners and shall be beveled in accordance with the manufacturer's instructions.

9. JOINTING.

9.01. Stab-Type Joints. Joints shall be stab-type designed so that the pipe and fittings may be connected on the job without the use of solvent cement or any special equipment. The stab-type joint is a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded, rubber ring gasket in an annular recess in the pipe or fitting socket and the forcing of the plain end of the entering pipe into the socket, thereby compressing the gasket radially to the pipe to form a positive seal. The gasket and the annular recess shall be so designed and shaped that the gasket is locked in place against displacement as the joint is assembled. The joints shall be designed so as to provide for the thermal expansion or contraction experienced with a total temperature change of at least 75 F in each joint per length of pipe. Jointing operations shall conform to the instructions and recommendations of the pipe manufacturer.

All joints at valves, tees, Y-branches, bends, and plugs shall be restrained utilizing restrained push-on joints as specified in the ductile iron pipe Section 02620.

All joint surfaces for gasketed joints shall be lubricated immediately before the joint is completed. Gaskets and lubricants shall be as supplied by the pipe manufacturer, shall be suitable for use in potable water, shall be nontoxic, shall not support the growth of bacteria, shall not impart color, taste, or odor to the water, shall be compatible with the pipe materials, shall be stored in closed containers, and shall be kept clean. Each spigot shall be suitably beveled to facilitate assembly.

9.02. Mechanical Joints. Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned, and reassembled. Overtightening bolts to compensate for poor installation practice will not be permitted.

10. CONNECTIONS WITH EXISTING PIPING. Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered. Each connection with an existing pipe shall be made at a time and under conditions which will

least interfere with service to customers, and as authorized by the Owner. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property.

Special care shall be taken to prevent contamination of potable water lines when dewatering, cutting into, and making connections with existing pipe. No trench water, mud, or other contaminating substances shall be permitted to enter the lines. The interior of all pipe, fittings, and valves installed in such connections shall be thoroughly cleaned and then swabbed with, or dipped in, chlorine solution having a chlorine content of 200 milligrams per liter.

11. SERVICE CONNECTIONS. Tapping saddles or tapping sleeves shall be used for all service connections 2 inches and smaller. Direct tapping of PVC pipe will not be permitted. Fittings shall be used for service connections larger than 2 inches unless otherwise indicated in the drawings. Water service connections are specified in the water service connections and meters section.

12. CONCRETE ENCASEMENT. Concrete encasement shall be installed as indicated on the drawings. Concrete and reinforcing steel shall be as specified in the cast-in-place concrete section. All pipe to be encased shall be suitably supported and blocked in proper position and shall be anchored against flotation.

13. REACTION ANCHORAGE AND BLOCKING. All bell-and-spigot or all-bell tees, Y-branches, bends deflecting 11-1/4 degrees or more, valves, and plugs which are installed in piping subjected to internal hydrostatic heads in excess of 30 feet shall be provided with suitable reaction blocking, anchors, joint harness, or other acceptable means for preventing movement of the pipe caused by internal pressure. Regardless of the restraining system provided, all valves, tees, Y-branches, bends, and plugs shall be restrained utilizing restrained push-on joints as specified in the ductile iron pipe Section 02620.

Concrete blocking shall extend from the fitting to solid undisturbed earth and shall be installed so that all joints are accessible for repair. The dimensions of concrete reaction blocking shall be as indicated on the drawings or as directed by the Engineer. If adequate support against undisturbed ground cannot be obtained, metal harness anchorages consisting of joint clamps or tie rod and clamp systems acceptable to the Engineer shall be installed to provide the necessary thrust resistance. If the lack of suitable solid vertical excavation face is due to improper trench excavation, acceptable metal harness anchorages shall be furnished and installed by the Contractor at no additional cost to the Owner.

Reaction blocking, anchorages, or other supports for fittings installed in fills or other unstable ground shall be provided as required by the drawings or as directed by the Engineer.

All steel clamps, rods, bolts, and other metal accessories used in tapping saddles or reaction anchorages subject to submergence, or in contact with earth or other fill material, and not encased in concrete shall be protected from corrosion by two coats of coal tar paint applied to clean, dry metal surfaces. The first coat shall be dry and hard before the second coat is applied.

14. HYDROSTATIC TESTS. After installation, PVC piping shall be tested for defective workmanship and materials by being subjected to a hydrostatic test and then disinfected as specified in the pipeline pressure and leakage testing and disinfection section.

15. DRAWINGS AND DATA. Drawings and data shall be submitted in accordance with the submittals section. Drawings and data shall include, but not be limited to, the following:

Details of joints.

Gasket material.

Pipe length.

Affidavit of Compliance (ANSI/AWWA C900, Sec. 1.4).

Certification (ANSI/AWWA C900, Sec. 2.1.5).

End of Section